

The background of the slide is a vibrant green image. The upper portion is a solid green field, while the lower portion features a close-up of a green leaf with numerous clear water droplets. In the center of the green field, the chemical formula "CO<sub>2</sub>" is displayed in a large, semi-transparent, light green font.

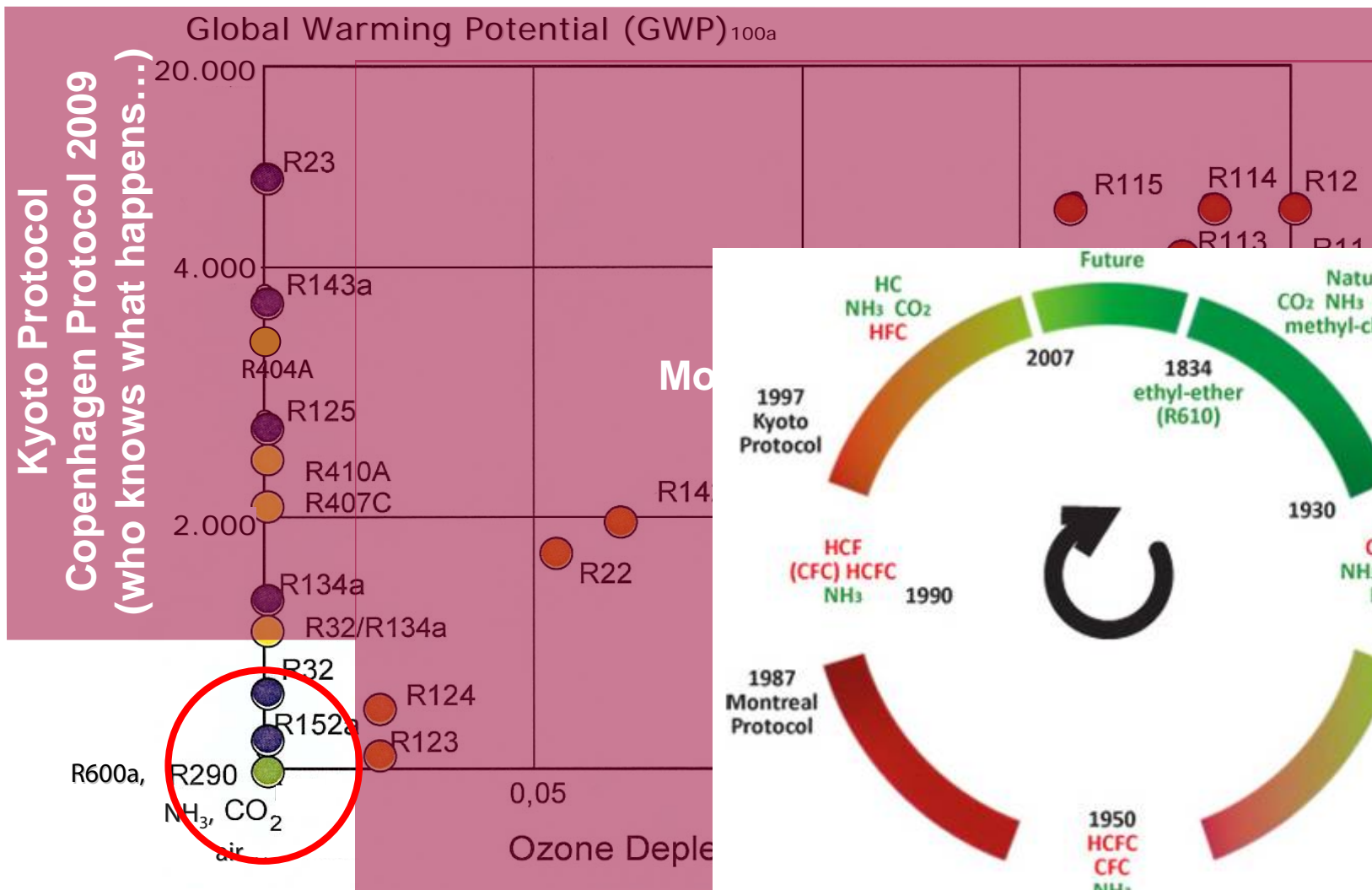
CO<sub>2</sub>

## **CO<sub>2</sub> Refrigeration Perspectives**



## Refrigerant Focus

*Danfoss*







# Drivers for future refrigerant choice

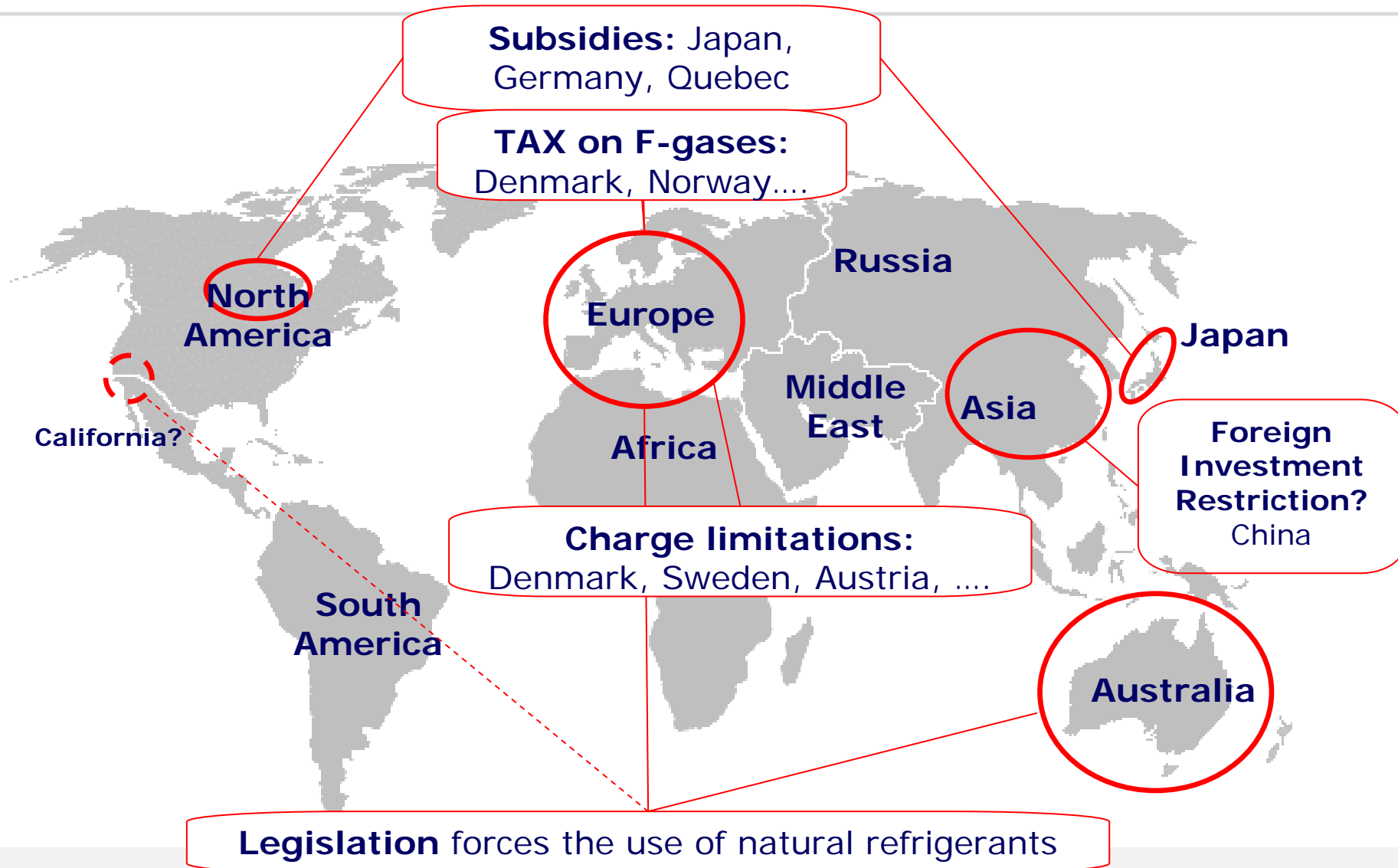


# Refrigeration and Air Conditioning

*Danfoss*

Segment	Household Compressors	Commercial Food / Retail	Industrial Refrigeration	Petro Chemical & PRS systems
				
Refrigerant	CO <sub>2</sub> Transcritical Hydro Carbons CFC - HCFC - HFC	CO <sub>2</sub> sub critical CFC - HCFC - HFC	CO <sub>2</sub> sub critical Ammonia CFC - HCFC - HFC	Ammonia Hydro Carbons
System size	Small	Medium	Large	Large
Valve size and quantity	<ul style="list-style-type: none"> <li>Small valves made of e.g. brass, copper</li> <li>Valves are <b>NOT</b> applicable for Ammonia</li> <li>Large quantity</li> </ul>		<ul style="list-style-type: none"> <li>All valves are suitable for Ammonia</li> <li>All valves are in steel</li> <li>"Big" valves in small quantity</li> <li>Requirements for type approvals, traceability etc.</li> </ul>	

# CO<sub>2</sub> Drivers: Legislation, Subsidies, & Taxes



# Why is CO<sub>2</sub> interesting for Supermarket Refrigeration?

# Global warming in perspective



How far can you drive a Volkswagen Golf 2,0 TDI\* to emit an amount of CO<sub>2</sub> equivalent to 1 kg of R404a?

**30 000 km!**



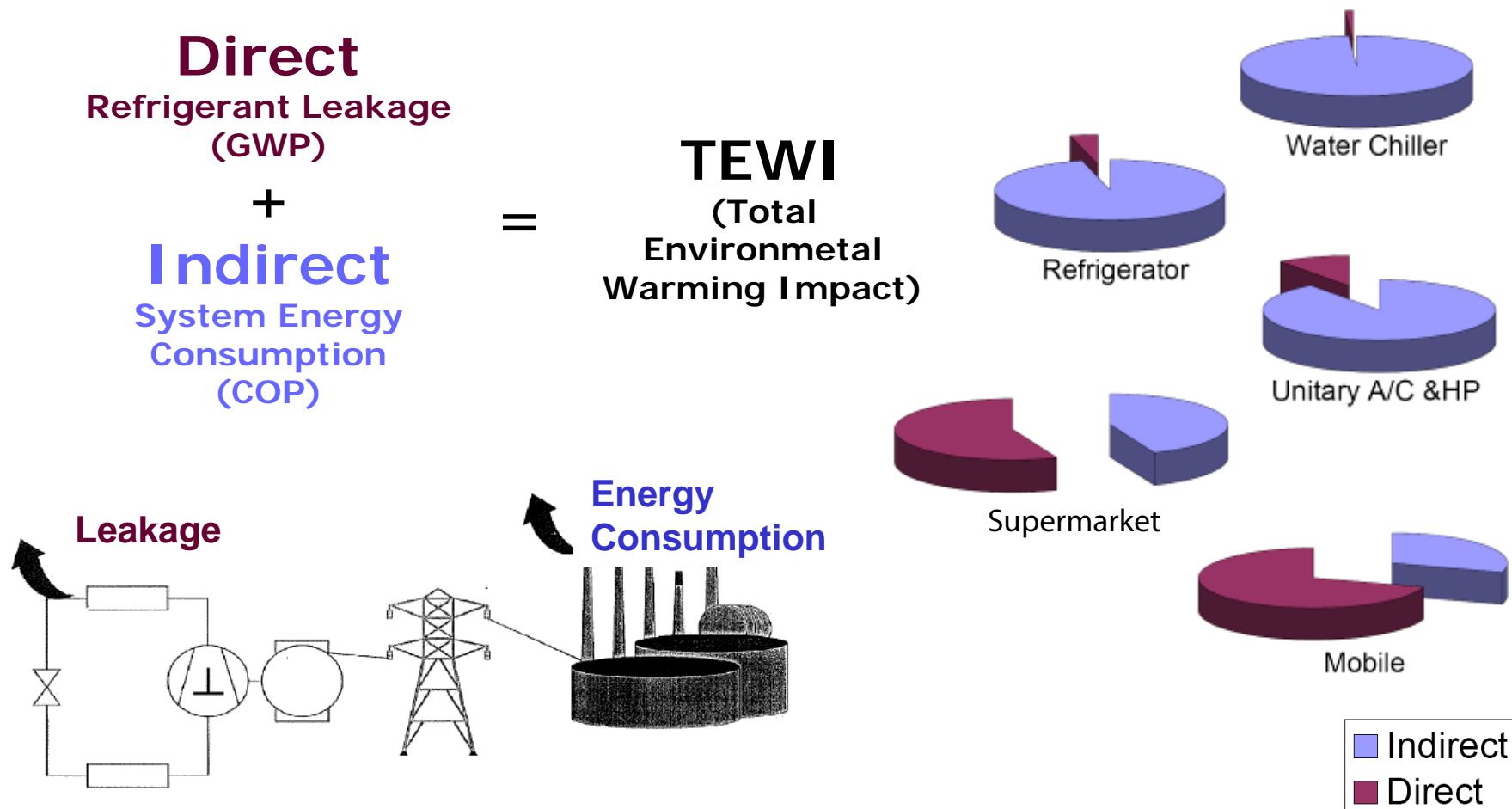
A supermarket with 500 kg charge of R404a and 20% annual leak rate equals 3.000.000 km\*\* or 100 cars driving the same year.

\* CO<sub>2</sub> emission pr. km. 129 g/km

\*\*GWP of 404a is 3983 according to IPCC AR4 (100 year radiative forcing)

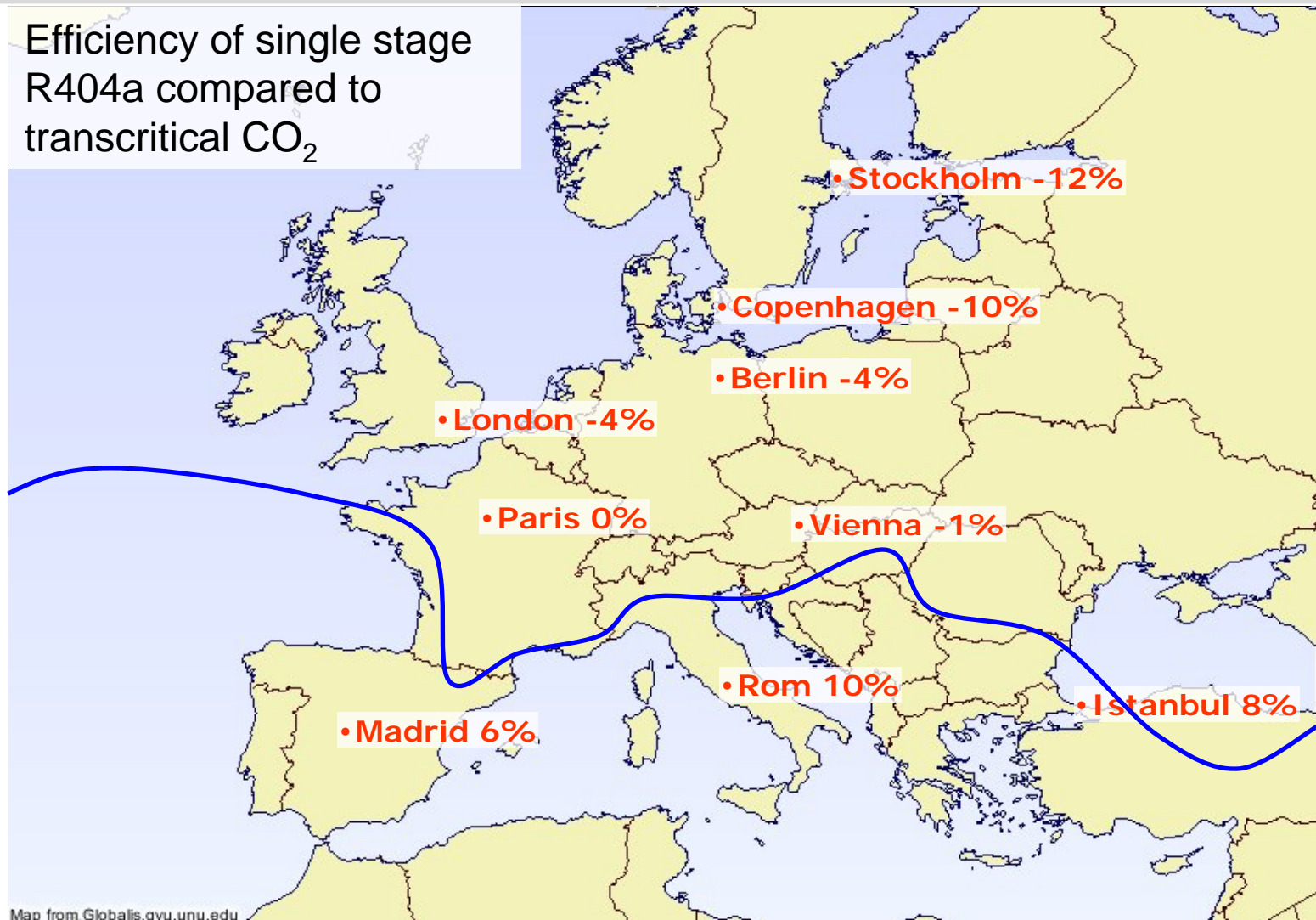


# Direct Emissions are very high for Food/Retail applications

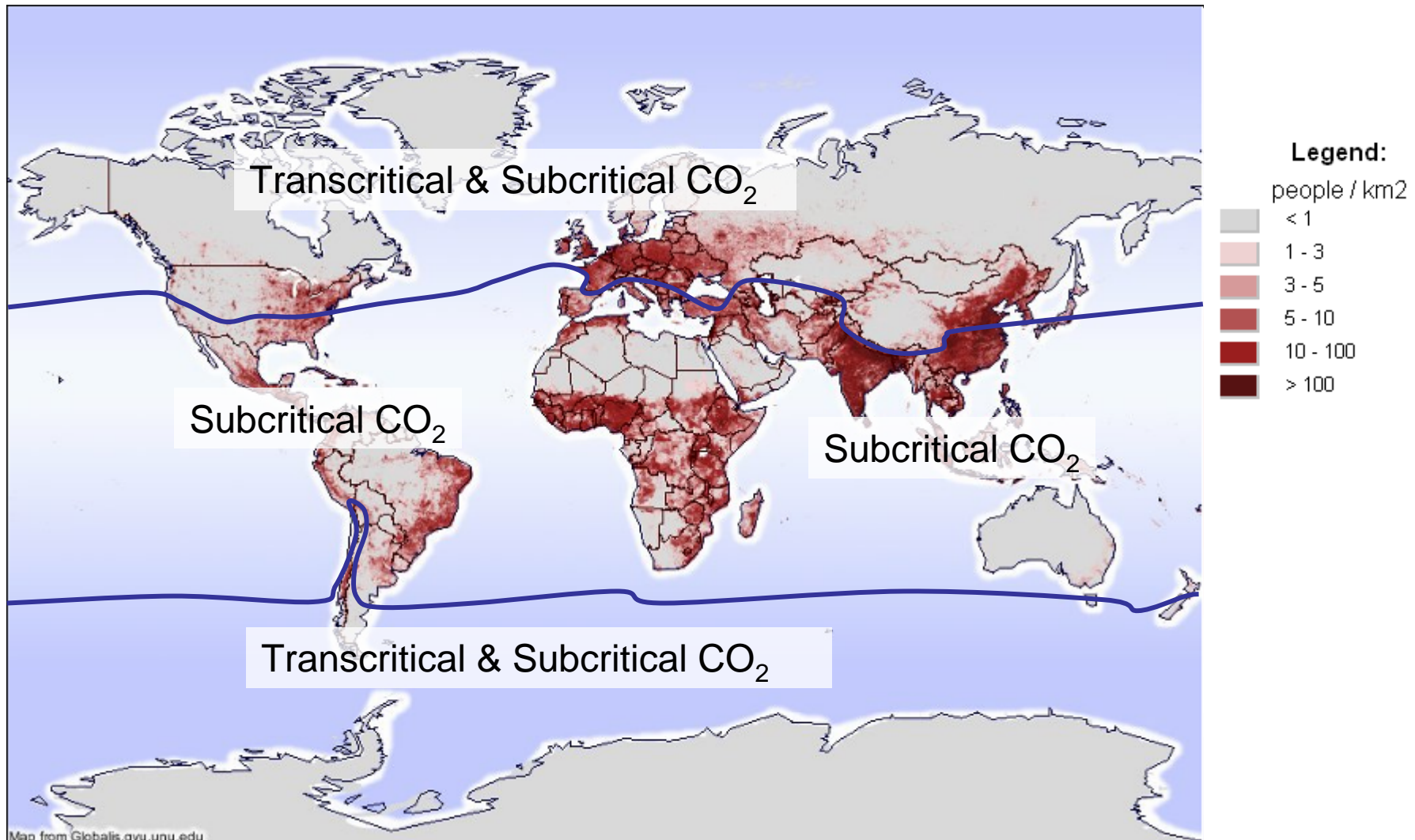


**In food/retail applications emissions from refrigerant leakage are larger than the indirect emissions from energy consumption.**

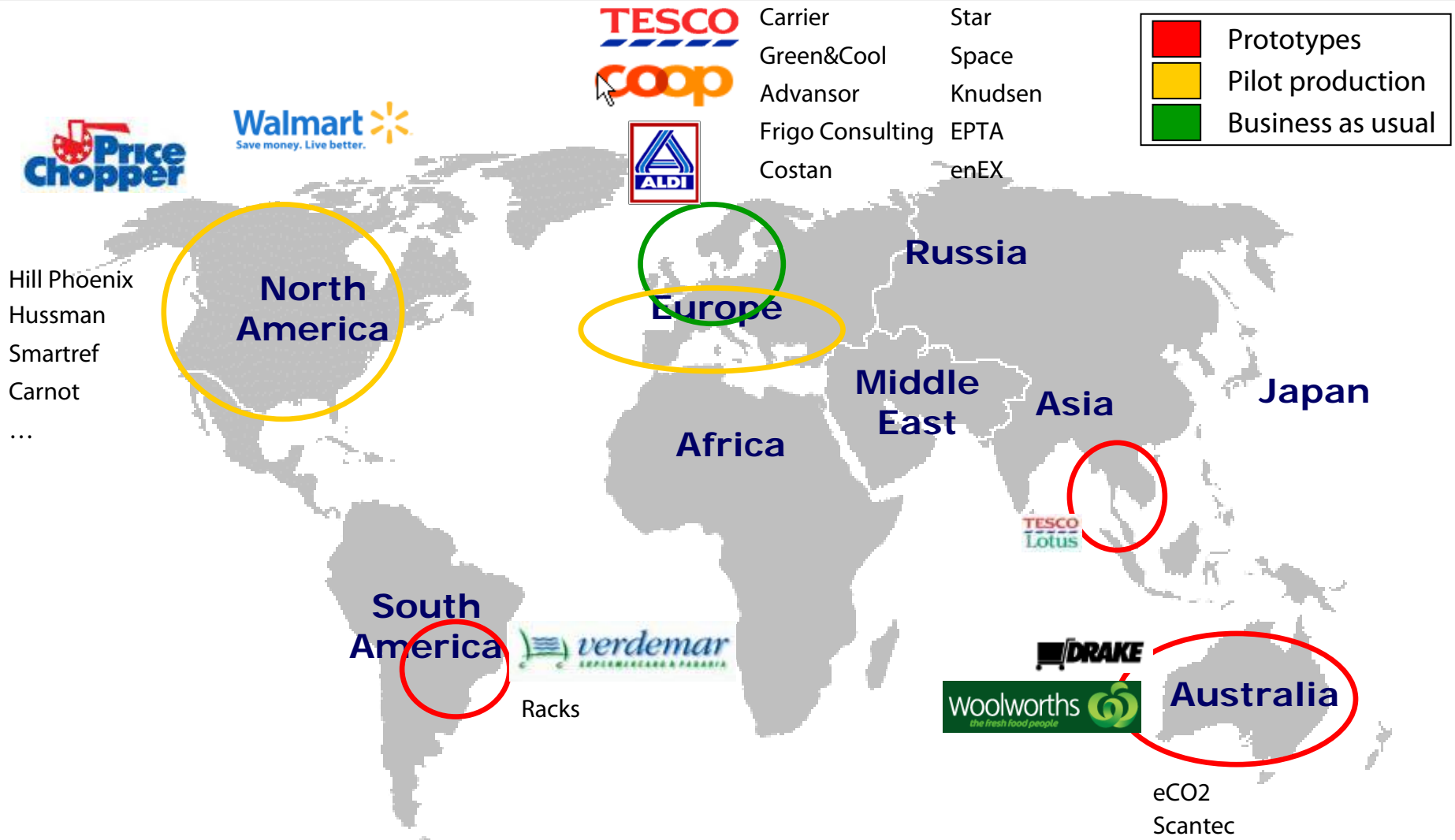
# Transcritical systems popular in europe



**Transcritical should only be used in cold climates (Europe, Canada), but subcritical is efficient in all climates.**



# Status of CO<sub>2</sub> – Food/Retail globally



A large, green, 3D-style text "CO<sub>2</sub>" is centered on the page. The letters have a slight shadow and a gradient, giving them a three-dimensional appearance.

**Read more about Danfoss CO<sub>2</sub> products and solutions**

**– visit us at [www.danfoss.com/CO2](http://www.danfoss.com/CO2)**