



***“The use of Natural Refrigerants in  
Colombia – status quo and experiences”***

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**ALFRIO  
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# COLOMBIA

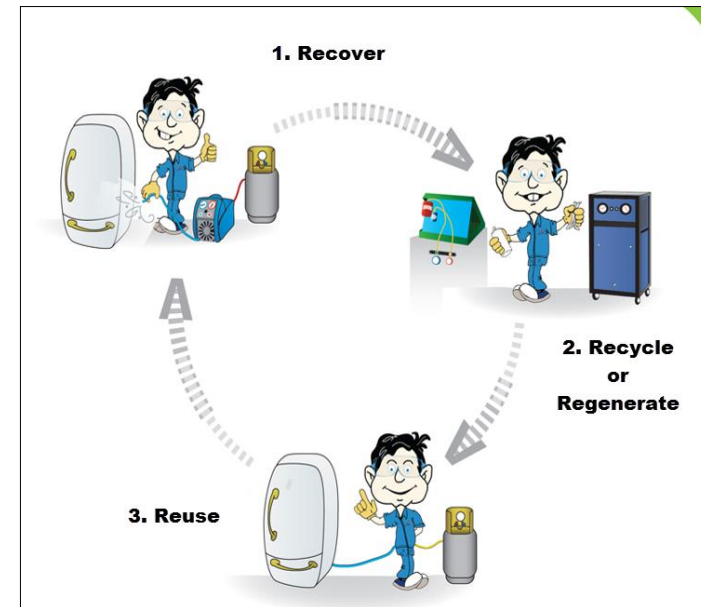
## Country Background:

- Located in NW Corner of South America
- Tropical Climate, depending on altitude
- Natural Resource Rich
- GDP = ~U\$350 Billion
- Population = 48 Million



# COLOMBIA REFRIGERANT REGULATIONS

- Special Unit within the Ministry of the Environment (UTO) is responsible for implementation of Montreal Protocol as Article 5 country.
- Strict import regulations and quotas for CFCs, HCFCs, and HFCs.
- Recovery and Regeneration Centers
  - 18 Recovery centers
  - 5 Recycle sites



# EXPERIENCE WITH NATURAL REFRIGERANTS

- Ammonia has been widely used in Industrial Refrigeration Applications:
  - Beverages: 7 large beer facilities and one malt plant (largest 3.500 RT)
  - Soft drinks : 21 facilities
  - Dairies : 25 facilities
  - Poultry: 18 facilities, two under construction
  - Beef and pork: 12 facilities, one under construction
  - Fish : 10 facilities
  - Frozen storage (Rental): 10 facilities, two under construction
  - Chemical : 3 facilities, one 2.500 RT
  - Others : 50 facilities

# EXPERIENCE WITH NATURAL REFRIGERANTS

In the last few years, there have been several large Ammonia projects:

- Soft Drinks Bottling Plant in outskirts of Bogota (U\$200MM; 1,800 TR first phase)
- Several Cold Storage Projects in Caribbean Coast for Import/Export of food products.

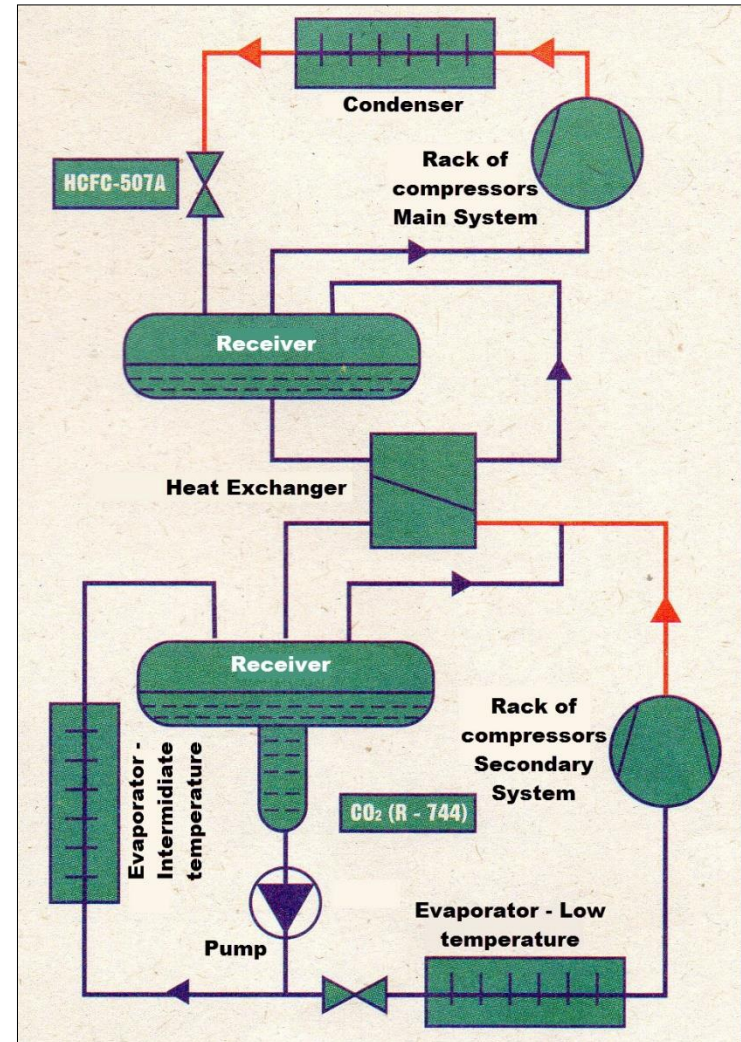
**CHALLENGES for Ammonia: Regulatory Difficulties, Skilled Labor, High Upfront Cost**

# EXPERIENCE WITH NATURAL REFRIGERANTS

CO<sub>2</sub>

- Price Smart Inc. is an American supermarket chain and the largest operator of membership warehouse clubs.
- It has 5 facilities with CO<sub>2</sub> cascade systems in Colombia.
- Within its policies stands its commitment to environmental care, especially reduce carbon footprint.

Challenges: Cost, Skilled Labor



# REFRIGERANT COSTS

Refrigerant	ODP	GWP	Price [Dolllar/Pound]
R-410	0	2100	3.90
R-404A	0	3900	5.26
R-407C	0	1800	5.51
R-22	0.055	1810	4.87
R-422A	0	3100	9.32
R-507	0	4000	4.99
R-134a	0	1300	3.61
R-717	0	0	1.00
R-744	0	1	0.39

[5] ALFRÍO, 2016

# Air Conditioning and Refrigeration Association “ACAIRE”

- Founded: 1980
- Active members: 190
- Members in Refrigeration Chapter: 35
- Joint Venture with IIAR for seminars and publications in Spanish
- Renewed Initiative for Training and Certifications





# First Industrial Refrigeration Educational Center

- RSIS- located in Bogota. Started 2 years ago.
- Private school to promote education and training for ammonia plant operators. Different levels.



# Future of Natural Refrigerants in Colombia

- There will continue to be more projects with ammonia to freeze foods and vegetables, specially for export.
- HFCs will continue to be used for small and mid-size projects.
- More interest in education and training for ammonia systems.



THANK YOU

A background image showing several large, jagged icebergs floating in a dark blue ocean under a clear blue sky. The icebergs are white and have sharp, pointed peaks. The water is dark blue with some ripples.

**eurammon is available as your sparring partner at any time when it comes to questions about refrigeration with natural refrigerants.**

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