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sphere

Linking Low Charge Ammonia Packaged Systems to HVAC Applications

Mike Kallas, E.I.T.
Applications Engineer
Azane, Inc.
w: azane-inc.com
w: star-ref.co.uk
t: 406-490-0082

The Azane logo, featuring a green star shape to the left of the word "Azane" in a green, serif font.

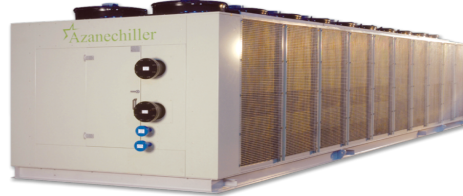
Azane

STAR
REFRIGERATION

1990

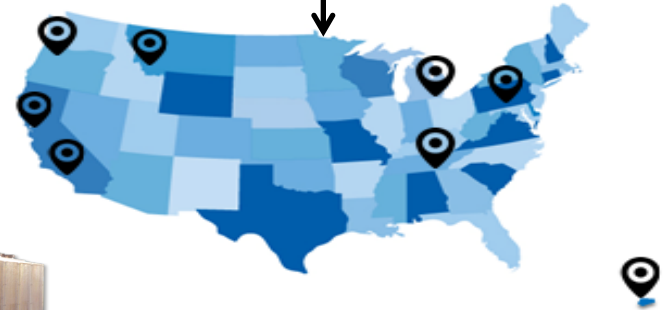


2005

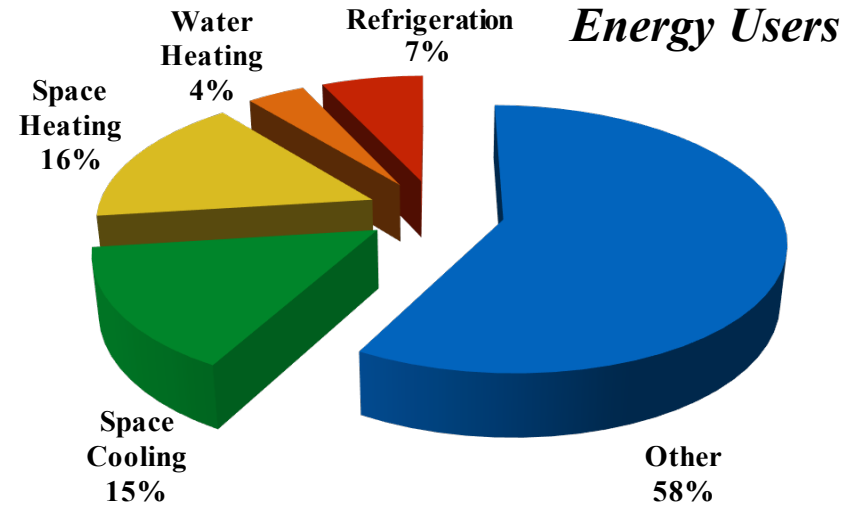
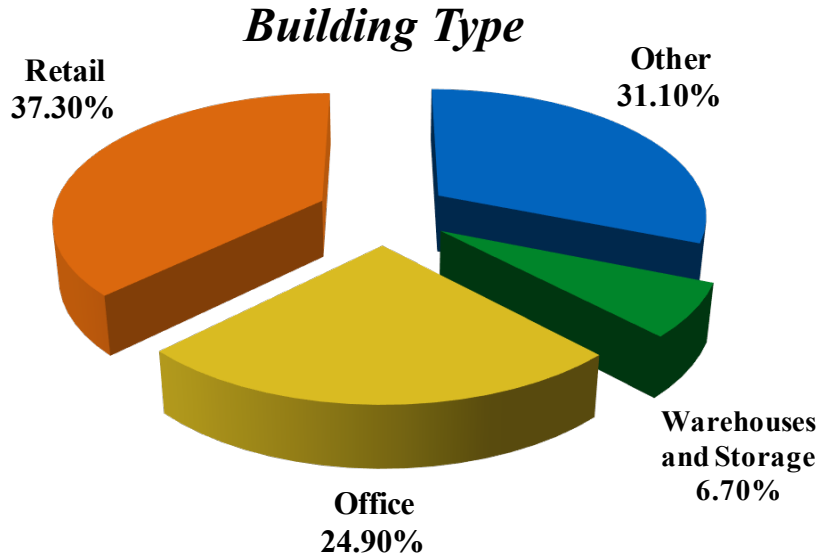


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2017



Opportunity



Data from: <https://www.slideshare.net/SpeakingGreenCommunications/speaking-green-communications-opportunities-in-sustainability-in-commercial-buildings-10-152015-final>

Why hasn't Ammonia been used in HVAC?

- Opportunities to address safety concerns
- Bring economies of scale
- Correct misconceptions
- Address training issues

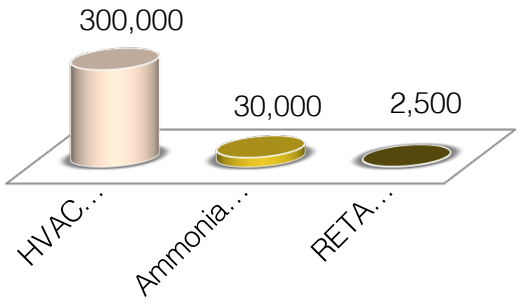


Image from: <http://www.foodengineeringmag.com/articles/94662-the-shift-to-natural-cooling-systems>



A vertical green sidebar containing five white circular icons: a balance scale, a leaf, a server rack, and a network diagram.

Benefits of Ammonia in HVAC?

100% Natural

Future proof

High efficiency

Opportunities for lowest TCO



Ammonia chiller HVAC Applications

Cooling & Dehumidifying

Heat Reclaim

Dehumidification reheat

Water heating

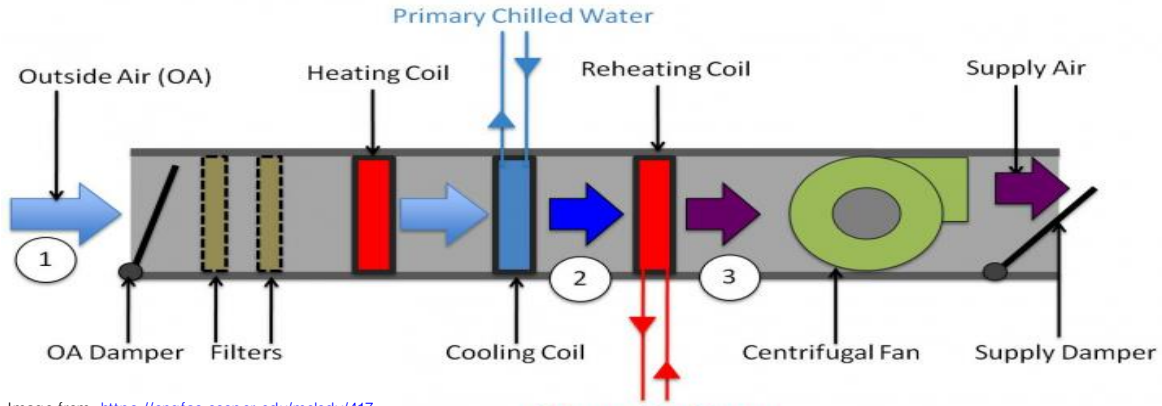
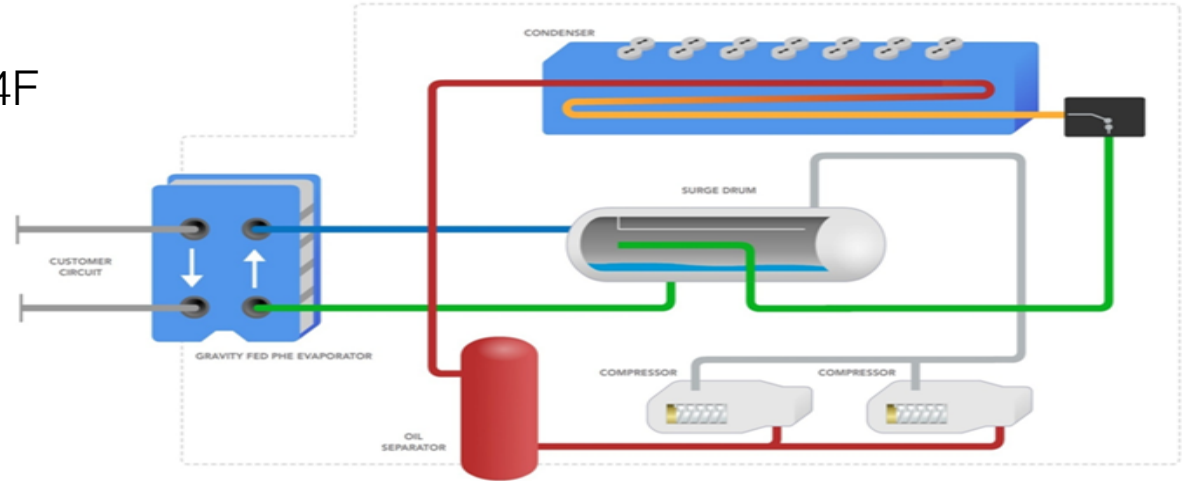


Image from: <https://engfac.cooper.edu/melody/417>



Case Study – Bakery in Portland, OR

- Air Conditioning
- Provided chilled water at 44F
- 900 TR load requirement
- Air-cooled condensing
- Ground Installation
- Flooded PHE
- NH3 charge/chiller of 450 lbs → 1.5lb/TR
- Populated area



Case Study – Department Store

- Air Conditioning
- Provided chilled water at 43F
- 160 TR load requirement
- Air-cooled condensing



- Rooftop Installation
- Flooded PHE
- Total NH₃ charge of 213 lbs → 1.3lb/TR



Case Study – Food Manufacturer in Napoleon, OH

- Air Conditioning
- Provided chilled water at 42F
- 300 TR load requirement
- Air-cooled condensing
- Ground Installation
- Flooded PHE
- Total NH3 charge of 450 lbs → 1.5lb/TR



Conclusions

Opportunity exists for NH₃ in HVAC

This is not a new concept

Address short term hurdles

Choose a future proof 100% natural solution



*“In the middle of every difficulty
lies opportunity”*

- Albert Einstein



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Thank you very much!

