

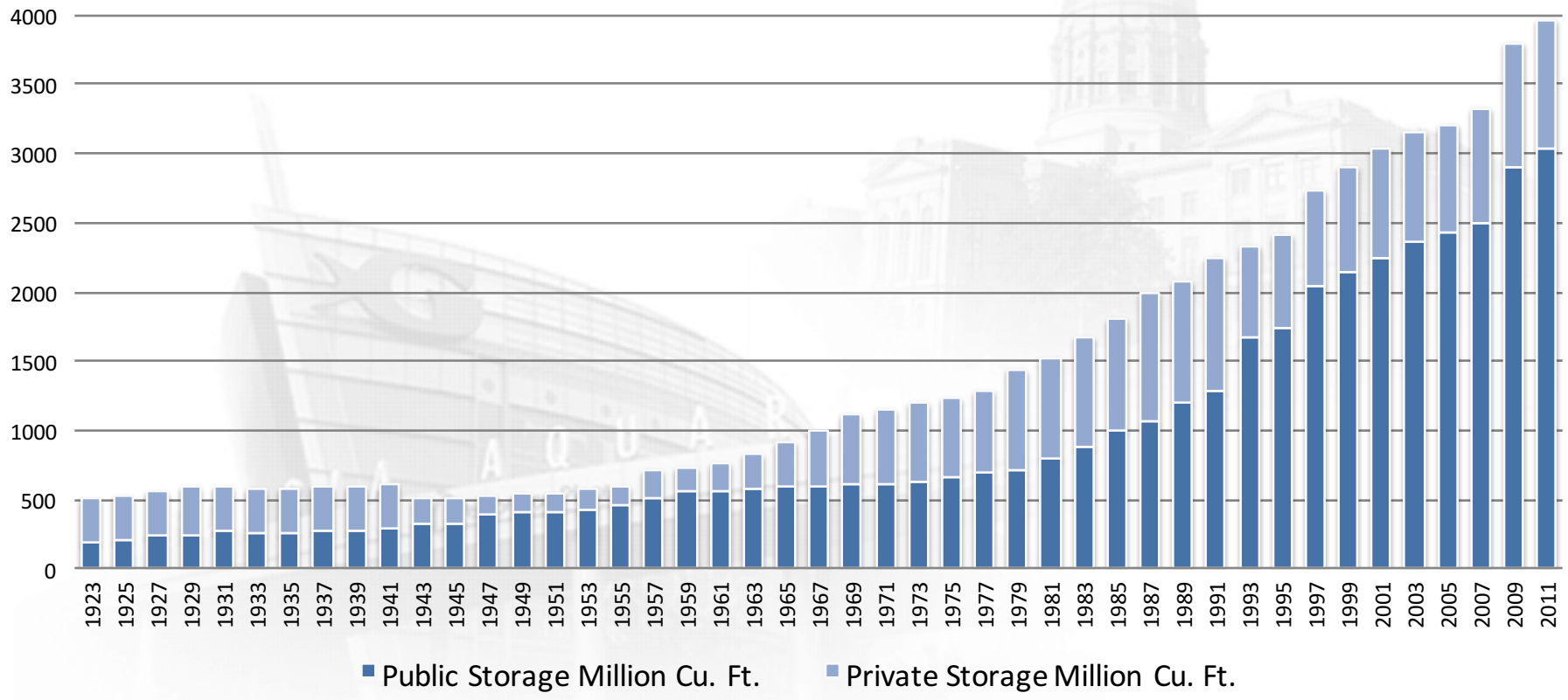
 **ATMO**  
**sphere**  
business case  
**natural refrigerants**  
25 & 26 June - Atlanta, Georgia



*Next Generation Refrigeration*

Cold Storage Market Business Opportunities  
NEXTCOLD™ Ultra-Low Ammonia Charge Technology

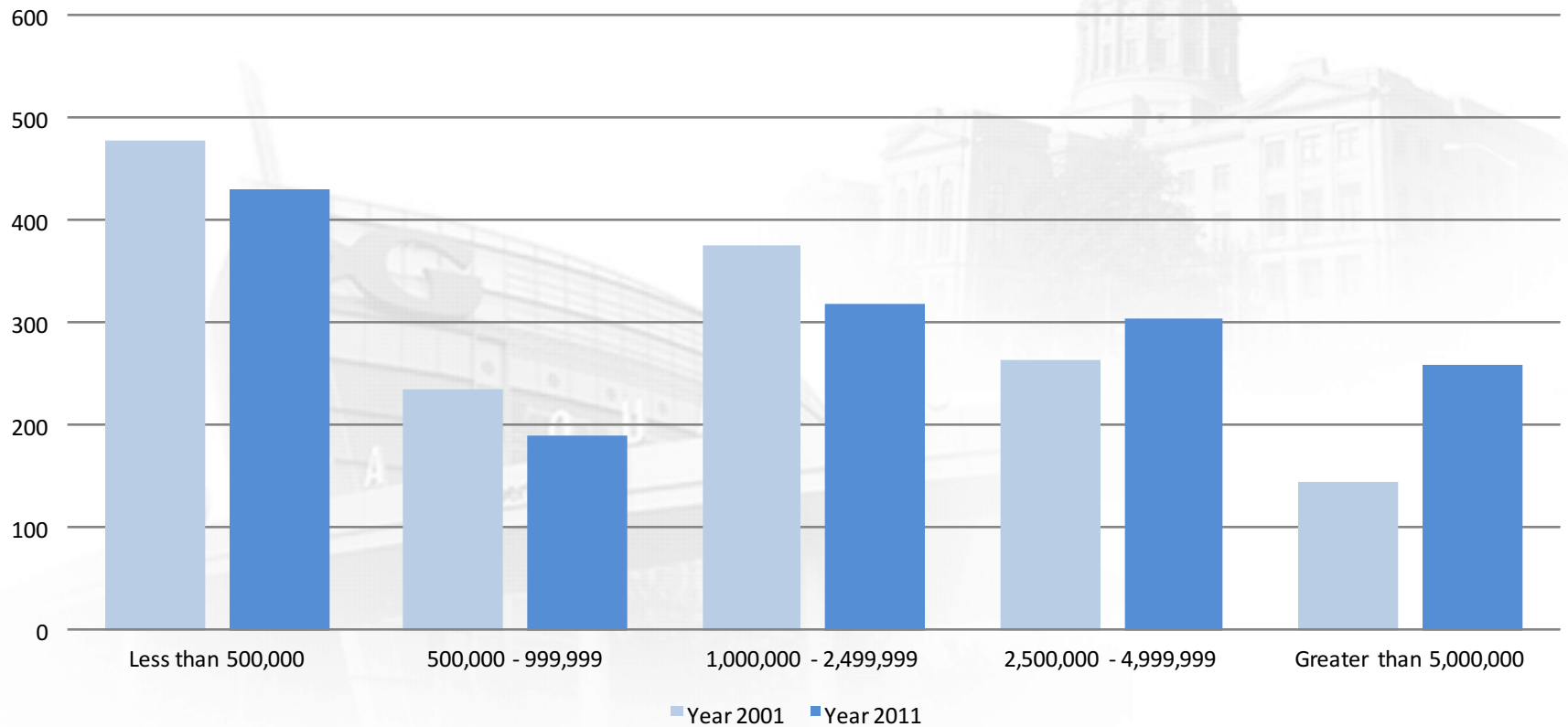
U.S. Total Refrigerated Capacity



# #2 Where we have been

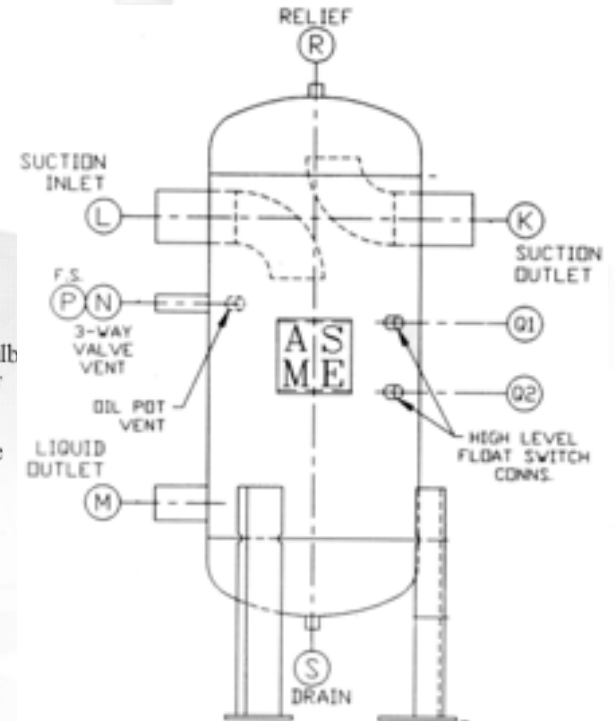
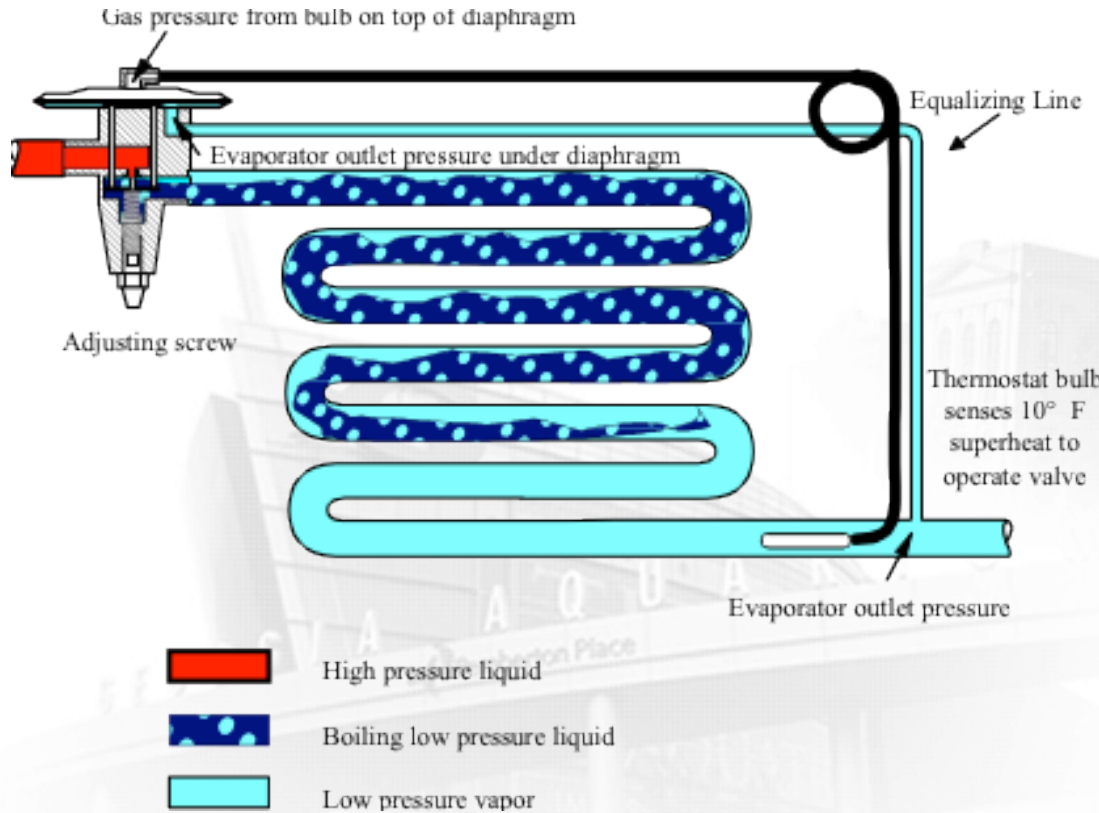
## Cold Storage Market Business Opportunities

### U.S. Number of Facilities by Size

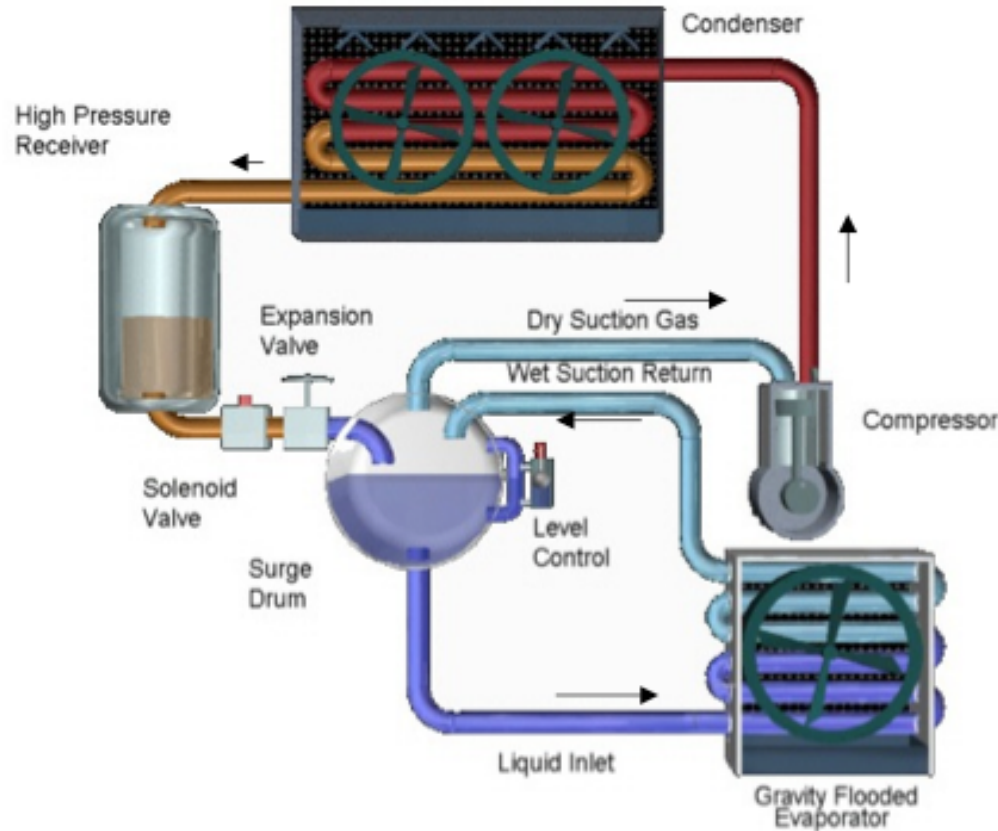


# #3 Where we have been

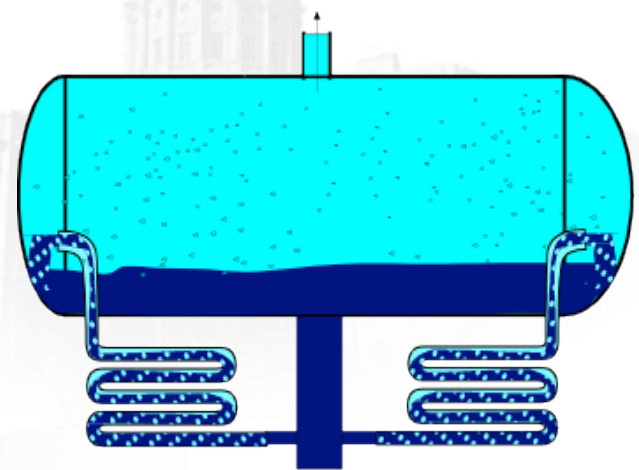
## Cold Storage Market Business Opportunities





## Basic Direct/Dry Expansion System



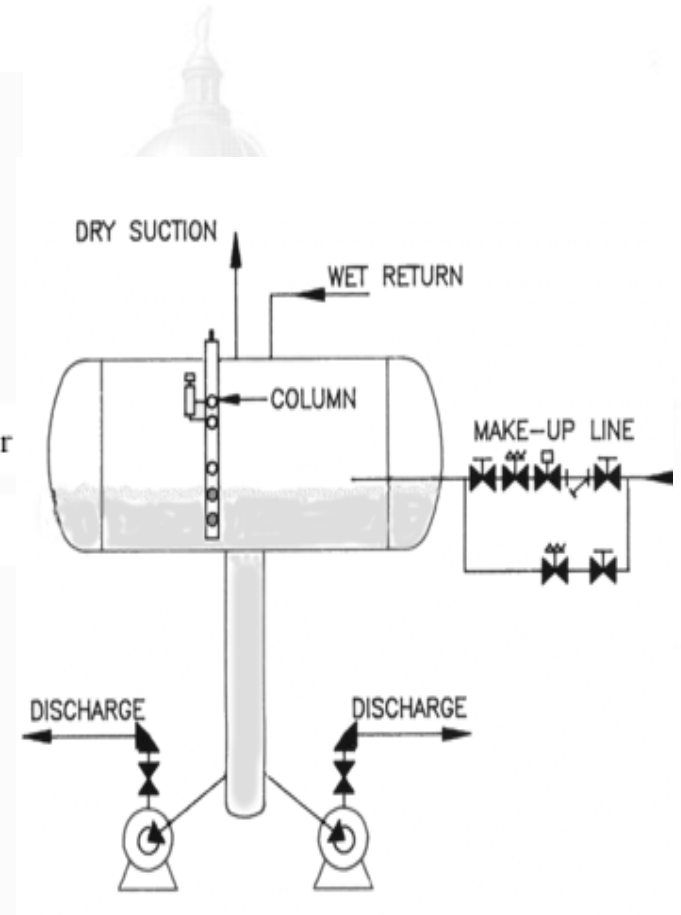
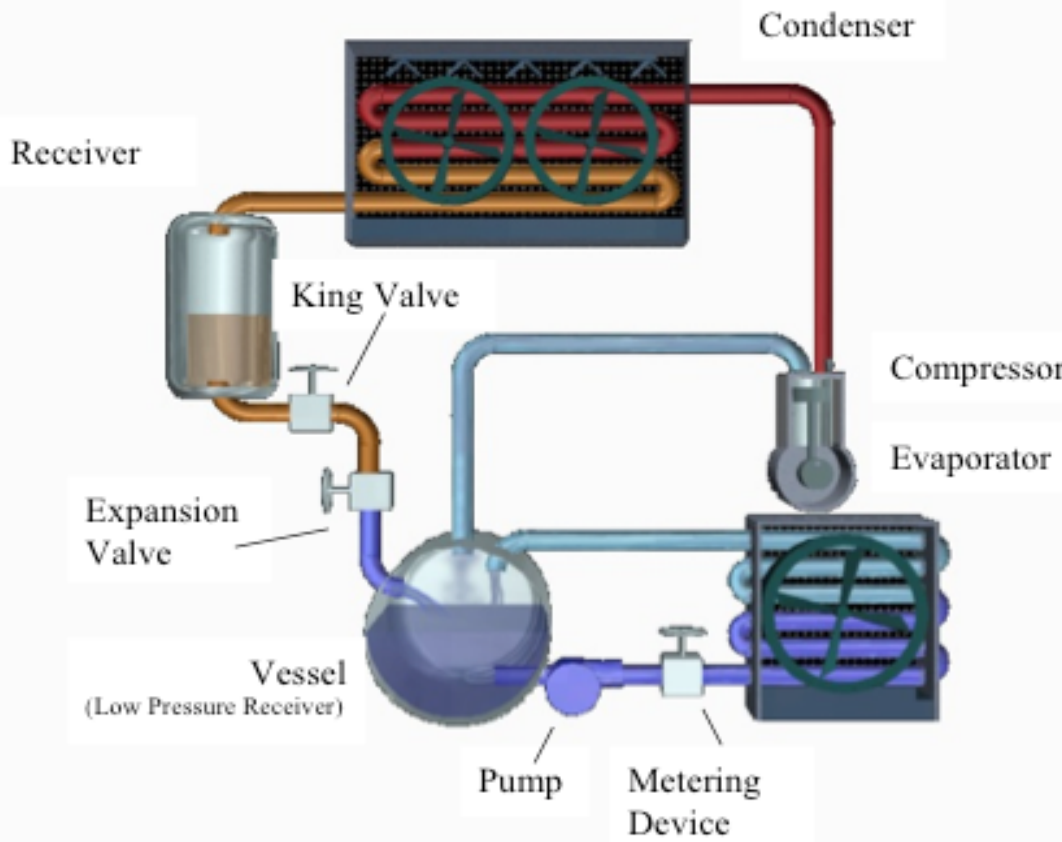
Two Evaporator Coils Fed From One Vessel



Boiling Refrigerant bubbles upward through the coil circuit and out the outlet back into the vessel

-  Boiling low pressure liquid
-  Low pressure vapor

## Basic Gravity Flooded System

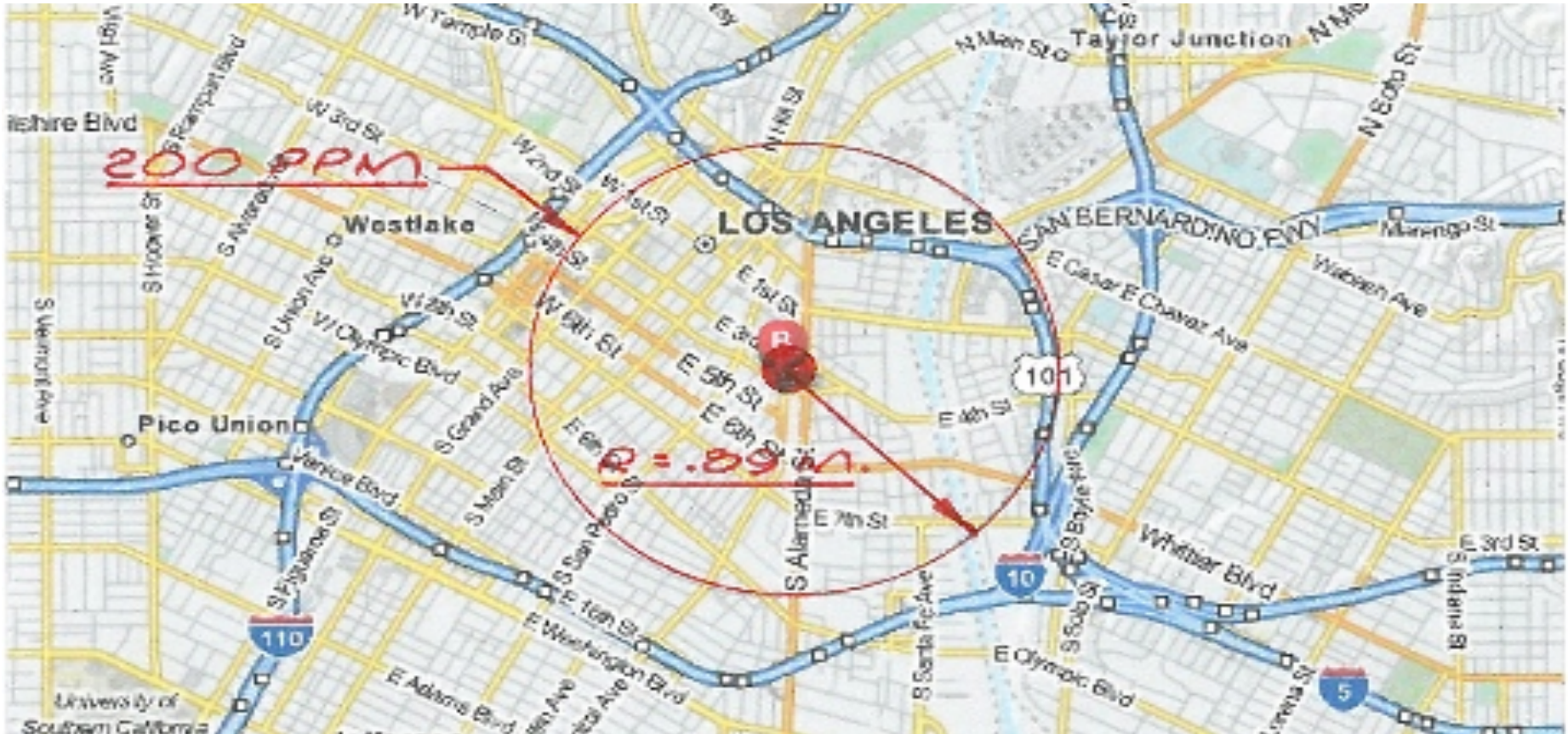


## Basic Pumped Liquid Overfeed System



# #6 Where we are now

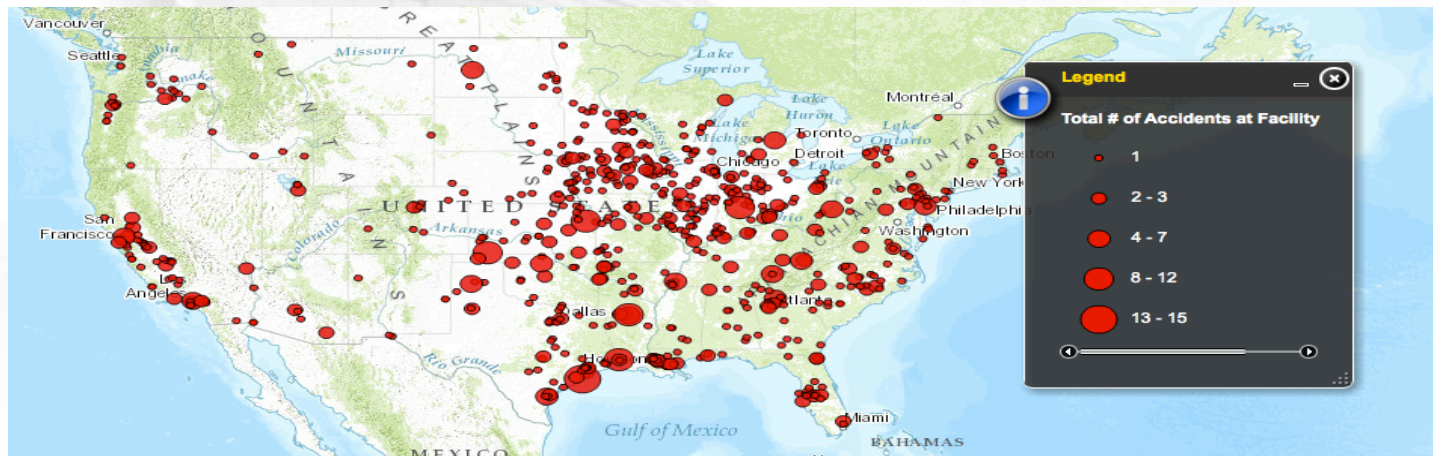
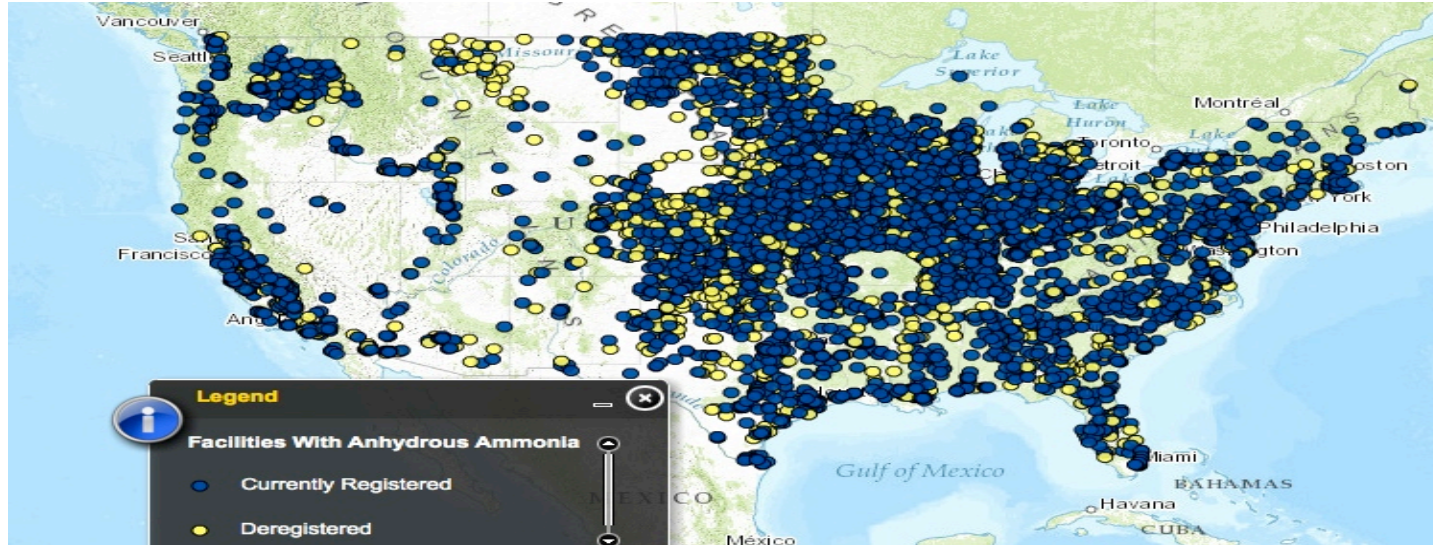
Cold Storage Market Business Opportunities



Worst Case Release Scenario  
One Facility Refrigerant Charge



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Source: Center for Effective Government



## Changes for the Better

Just for a moment, let us recognize a strange phenomenon — the ironic tendency to resist change. Progress, by definition, involves change. But there is something in human nature that urges many of us to keep still, to stay with what is tried and true — in other words, to stand in our innovative predecessors' footsteps rather than continue the march forward.

This is one natural tendency we must strive to overcome. Since change is inevitable, we owe it to ourselves to recognize and take advantage of it — to benefit from change, not become victims of it.



*John Stirling Scherer*  
May 7, 1991

# #9

## Where we are going

NXTCOLD™ Ultra-Low Ammonia Charge Technology

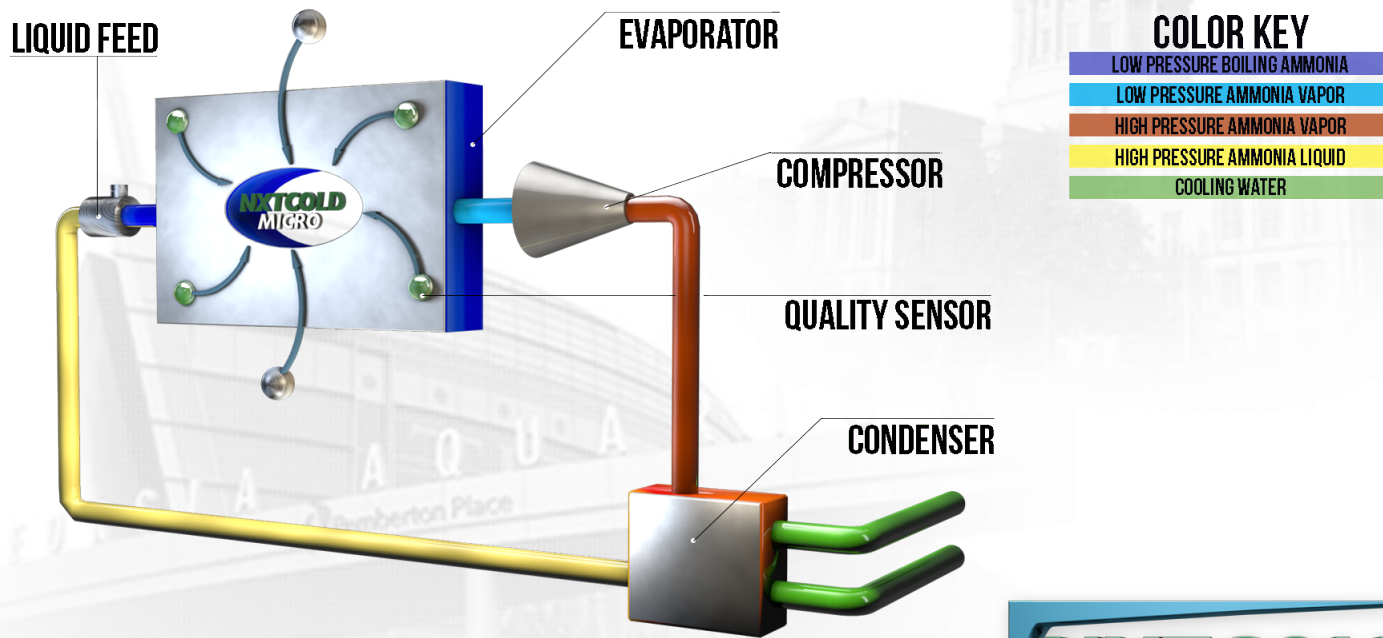




**Complete Self Contained Ultra Low Ammonia Charge Refrigeration System  
50 Tons Refrigeration : 25 Lbs. Ammonia**



**ELECTRONIC REFRIGERANT INJECTION CONTROL (ERIC)**



**COLOR KEY**

- LOW PRESSURE BOILING AMMONIA
- LOW PRESSURE AMMONIA VAPOR
- HIGH PRESSURE AMMONIA VAPOR
- HIGH PRESSURE AMMONIA LIQUID
- COOLING WATER

NXTCOLD™ PATENT PENDING





# #12 Where we are going

NXTCOLD™ Ultra-Low Ammonia Charge Technology



**Evaporator Frost Pattern**

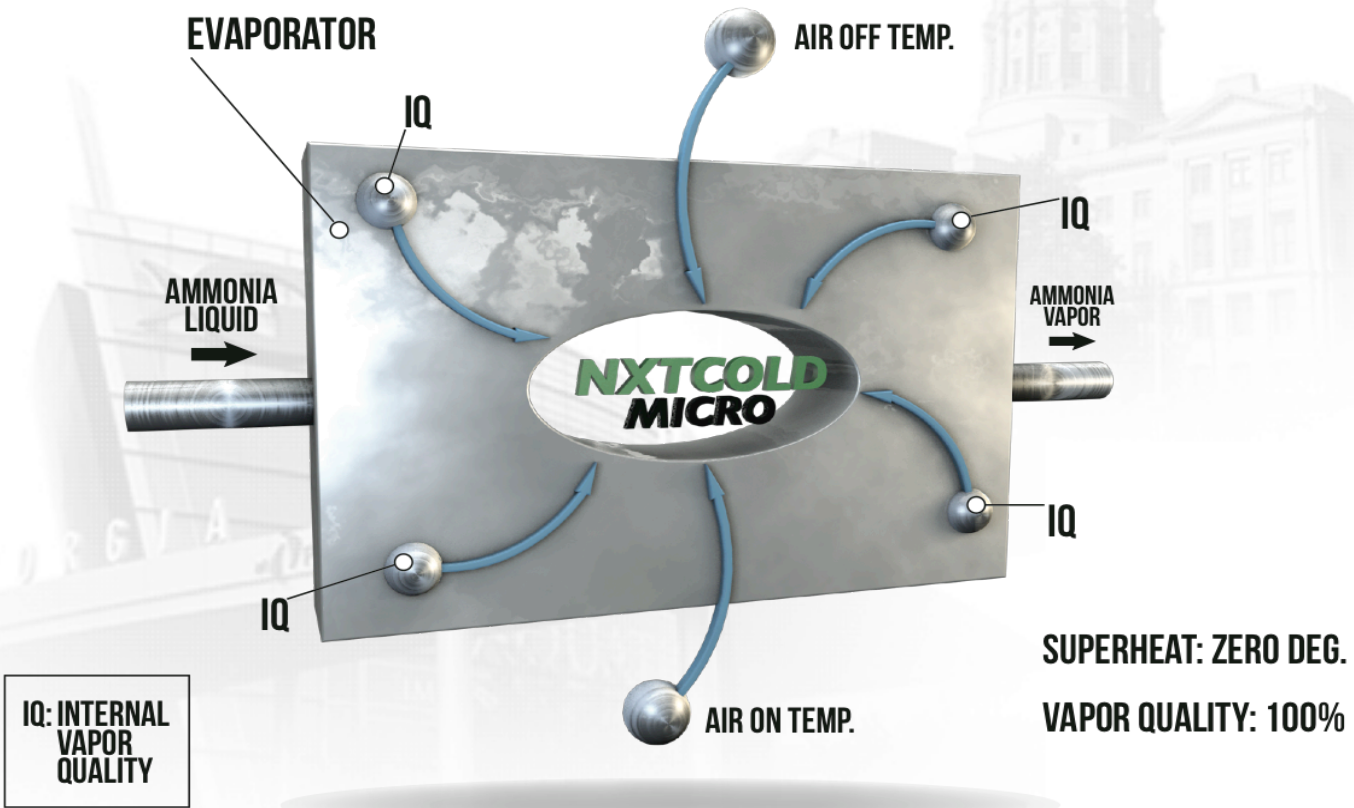
# #13

## Where we are going

NXTCOLD™ Ultra-Low Ammonia Charge Technology



### ELECTRONIC REFRIGERANT INJECTION CONTROL (ERIC)



## **NXTCOLD™ Electronic Refrigeration Injection Control**

### **Industrial Market Potential**

- 100's of NXTCOLD™ units installation planned and 1,000's of NXTCOLD™ units anticipated to be installed by 2020

### **Commercial Market Potential**

- With advent of NXTCOLD™ “Ultra-Low” or “Tiny” ammonia charge technology available, many cooling applications traditionally addressed with HCFC or HFC refrigerants will move to ammonia. A true “divergence” is occurring with unprecedented positive results for industry as well as the public.

### **Environmental, Community, and Business Potential**

- Eliminate need for refrigerants with ozone depleting and global warming potential
- Alleviate concerns locating nearby public services and within neighborhoods
- Improved electrical efficiency equal to or surpassing central engine rooms
- Better upfront costs with single day construction & commissioning
- Lower operation costs without need for full time engineering and technicians
- Reduce rigorous RMP, PSM, CAL ARP, and like regulation requirements
- Reduce expensive equipment and pollution insurance





business case

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**natural refrigerants**

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