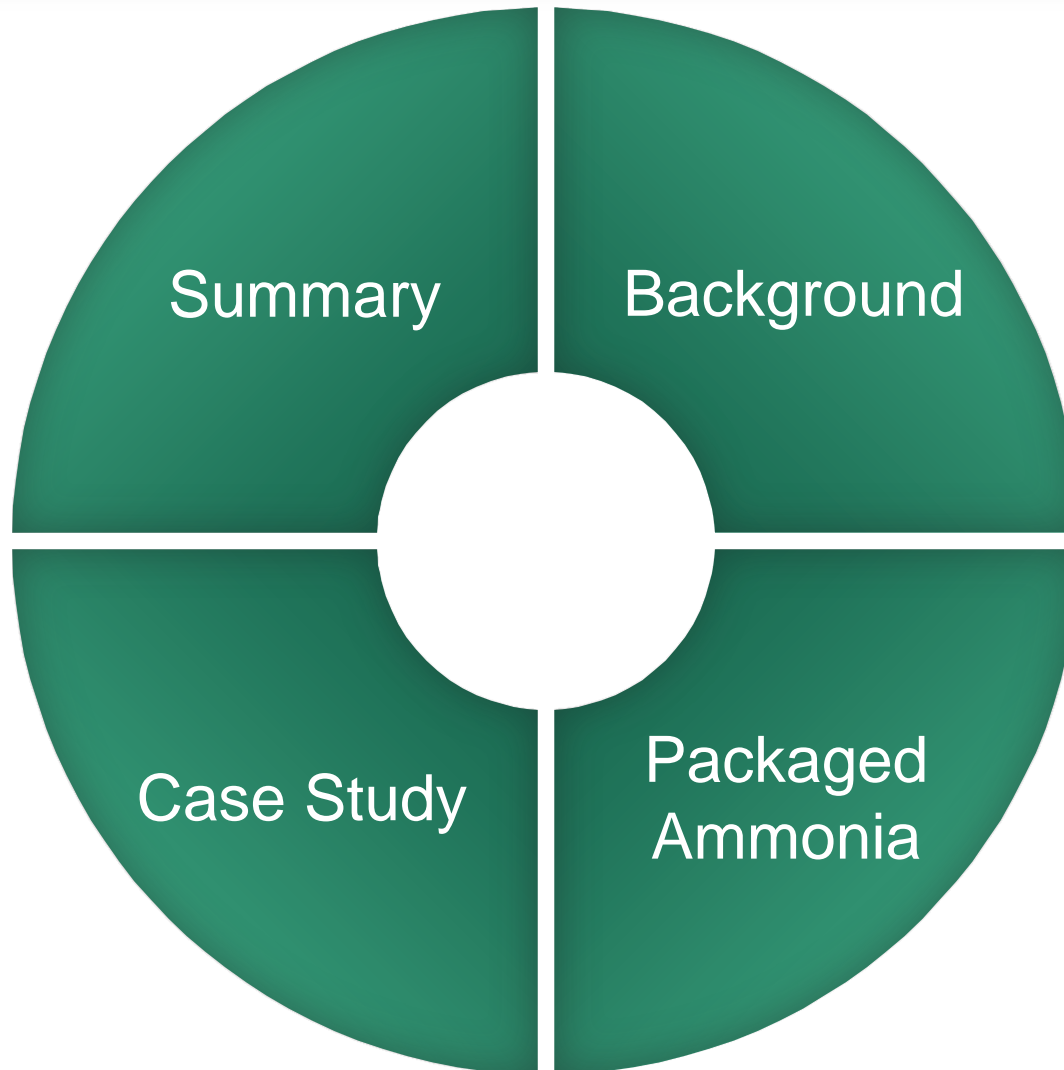


Low Charge Ammonia Condensing Units for The US Market

Derek Hamilton CEng
US Business Development Manager
Star Refrigeration



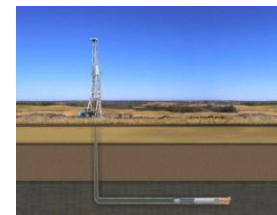


R22 Phase Out

HFC Phase Down

Water Supplies

Energy Prices



Low Charge, Packaged Ammonia

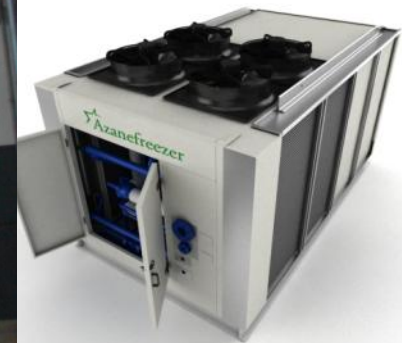
Totally natural

Low charge

Factory built and

Plug and play

Optimised energy



Low Charge, Packaged Ammonia



Reverse Cycle Defrost

Single 4-way ball valve

Reverses plant operation

Electrically actuated

Rapid defrost



Aluminum Coil Evaporator

Excellent heat transfer



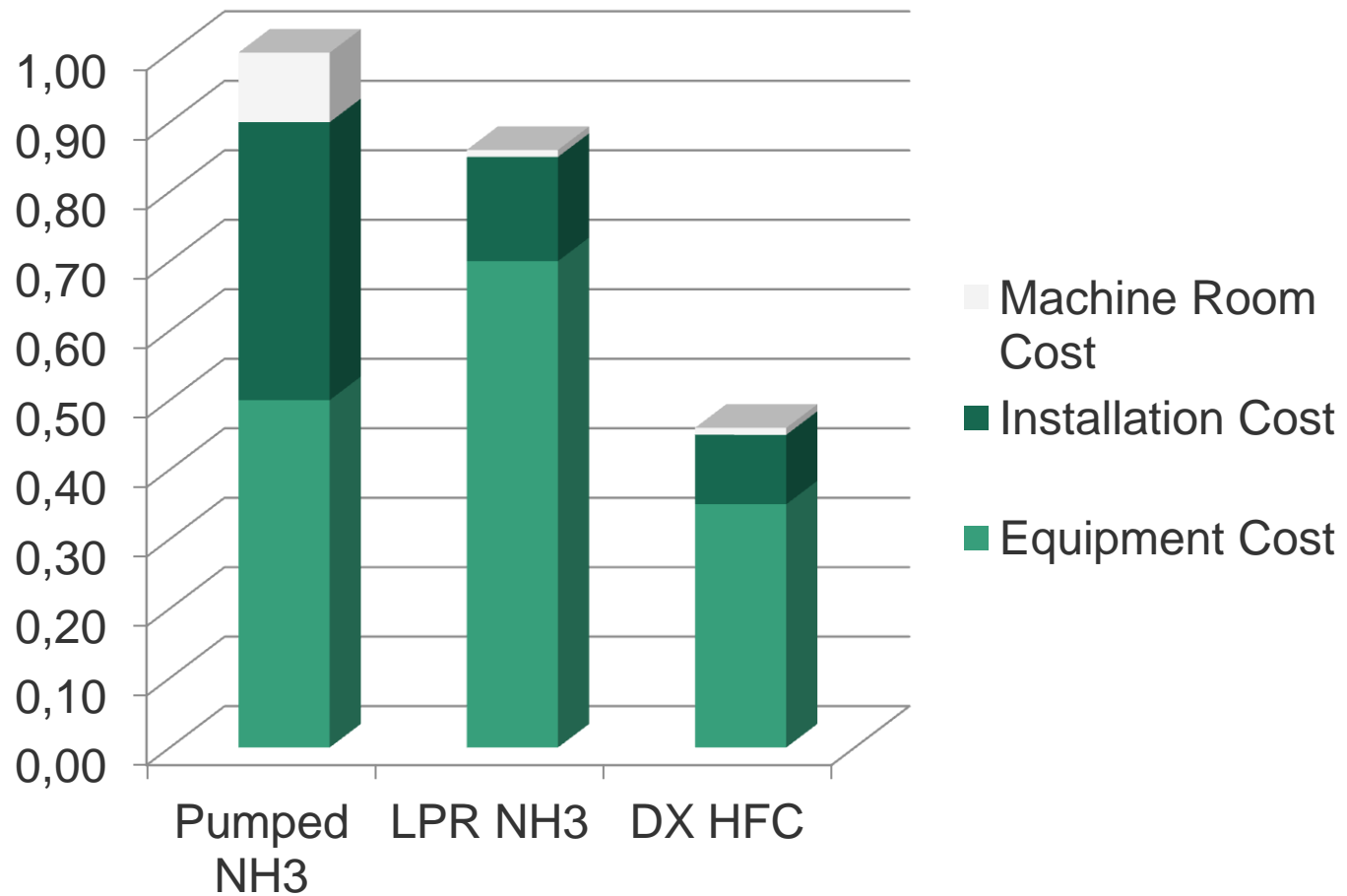
Cost and Performance Comparison



System	Suction Temperature	Running Cost (vs pump circ)	Capital Cost (vs pump circ)	Refrigerant Charge
Pumped Circulation	-23°F	0%	0%	746lb
DX (HFC)	-28°F	+20%	-50%	500lb
LPR	-21°F	-5%	-15%	330lb

Based on -10°F store temperature

Capital Cost



Case Study: Cold Storage

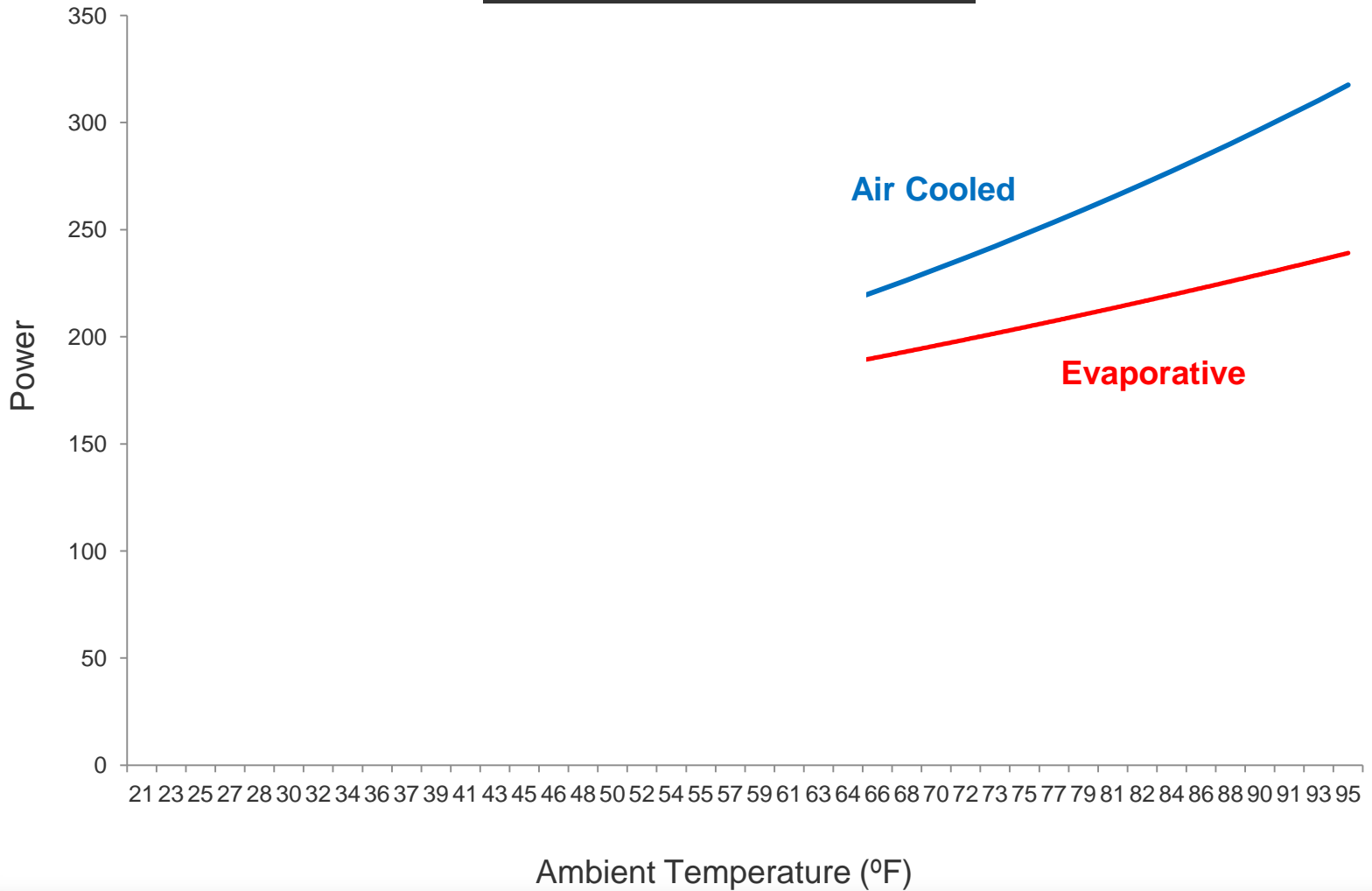
Customer	Freezer Operator
Project type	R22 replacement
Application:	Cold Storage
Store size:	10,000ft ²
Store temperature:	-10°F
Cooling Load:	35TR
Solution:	1 x Azanefreezer
Charge:	330lb



Energy and Cost Comparison



Total Plant Power Consumption



Total Cost of Ownership

Capital cost

Electricity consumption

Maintenance cost

Gas top-up cost

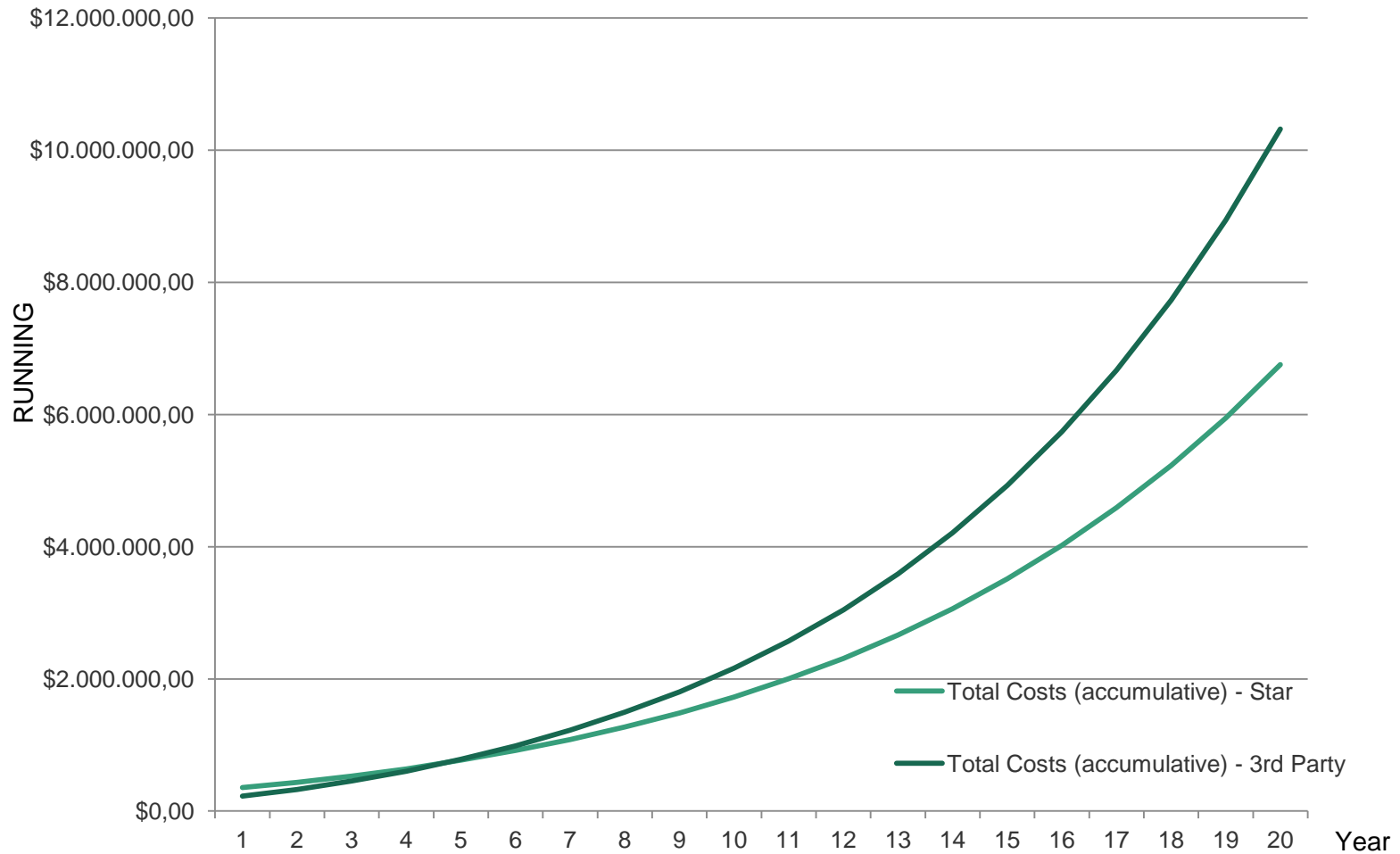
COP degradation



Total Cost of Ownership



TOTAL ACCUMULATIVE RUNNING COST OF CHILLERS v YEARS



Total Cost of Ownership

20 Year life cycle

Save \$3,700,000

Save 1,500,000 lb of CO₂

Save 542 car journeys around the world



Summary – Packaged Ammonia

Simple to Install

Low Charge

Lower Energy Consumption

Lower TCO

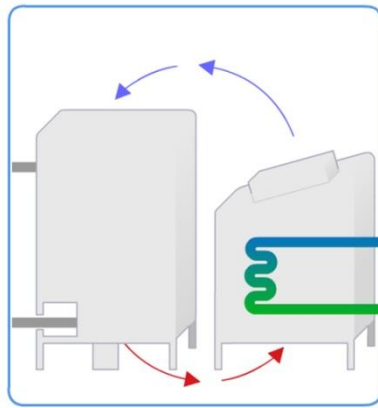
Future Proof



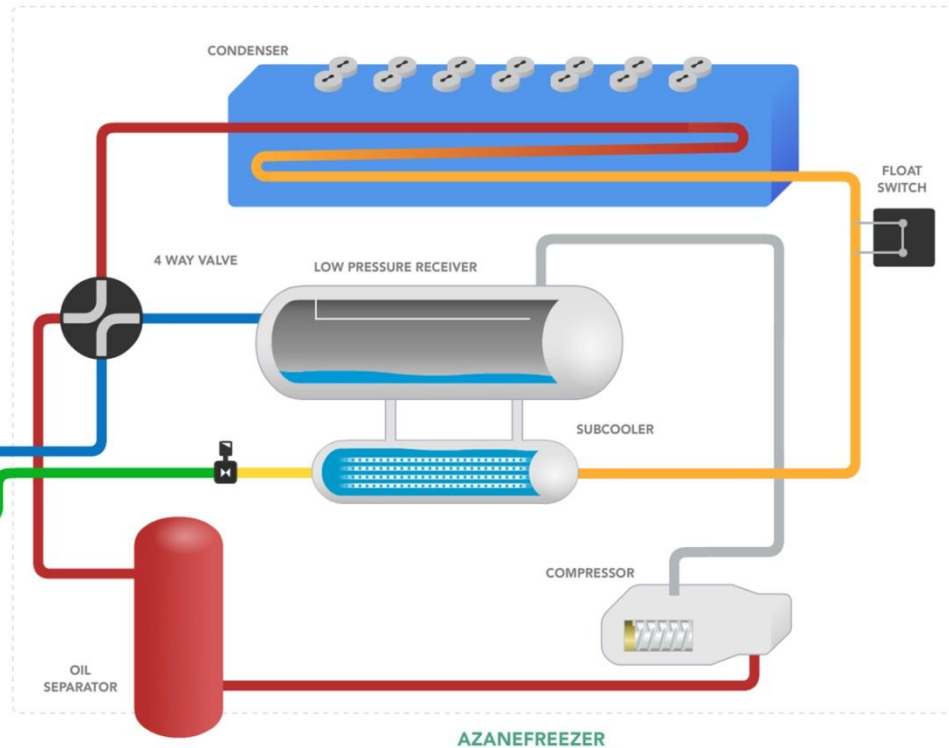
Packaged Ammonia: Food Production

Glacier System flow animation

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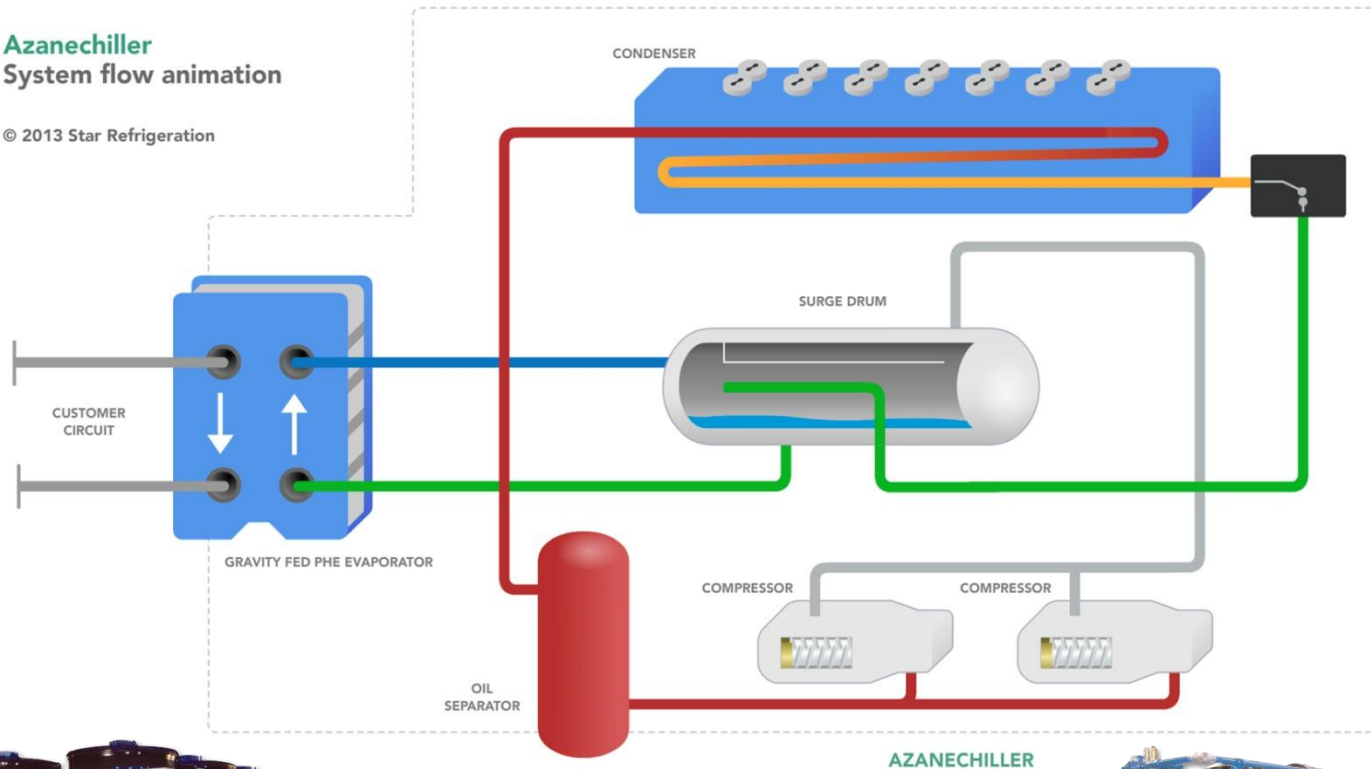
STARFROST FREEZER



Packaged Ammonia: HVAC

Azanechiller System flow animation

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The logo for ATMOsphere, featuring a green square with a white curved line and the word "AMERICA" in white, sans-serif font below it.

ATMO
sphere
the Business Case
natural refrigerants

Thank you!