TOROMONT CIMCO

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New Development in Natural Refrigerant Equipment

MAYEKAWA MYCOM

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Newton Technology

New Technology available on the market

- *HCFC and HFC are on a time scheduled to be banned depending on each Country*
- *Japan has shorten the deadline and had created incentive to help the market move from R-22 to NR*
- *Intensive research and design had been undertake using ammonia and CO2 brine system*
- *Many successful project had been implemented using this Technology in Asia*
- *Cimco had partnered with Mycom to introduce the Newton product to the North American market*

The Problems and Solutions Facing Giant NH3 Plants

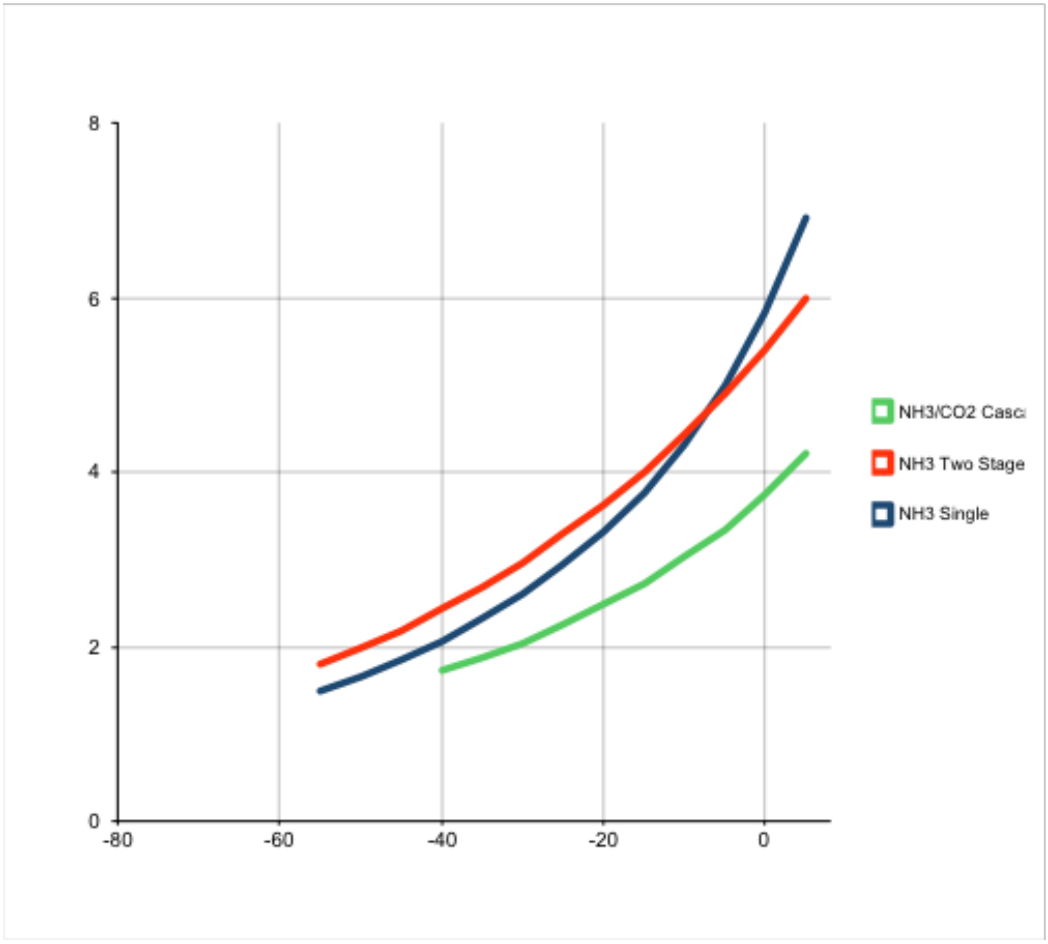
The construction of giant NH3 refrigeration plants presents various problems.

1. It is becoming increasingly harder to find experienced operators or trained technicians that can construct, operate, and maintain NH3 plants, which makes it difficult to provide a satisfactory system.
2. The construction and operation of a large-scale NH3 plant presents a managerial risk from the perspective of costs, time, and materials.
3. Large-scale NH3 plants must be charged with a large amount of NH3, which presents a considerable risk to the workers.
4. Many workers and a great deal of equipment are required to operate and maintain a complex NH3 plant.

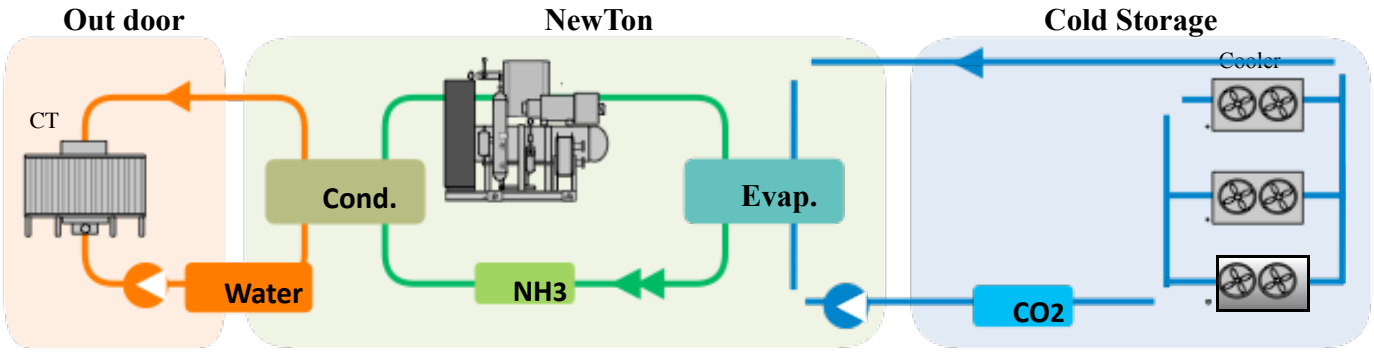
One solution is to use a "prefabricated package."

1) The NH3 refrigeration cycle is completed at our factory, tested, adjusted before shipping.
2) The package is standardized and built to the same package everywhere.
3) The onsite construction time is shortened because only minimal piping and wiring is required.
4) The amount of NH3 charging is minimized and is completely automatic control.
5) The capacity of compressor is optimized to load of plant, allowing for increased energy savings

Comparison of theoretical COP



Basic Concept of *NewTon*



Water cooled

- Energy saving
- NH3 charge min.
- Free layout
- Easy Maintenance

NH3 Package

- New Screw compressor
- Semi-hermetic IPM motor
- Flooded Evaporator
- Double economizer
- Automatic operation

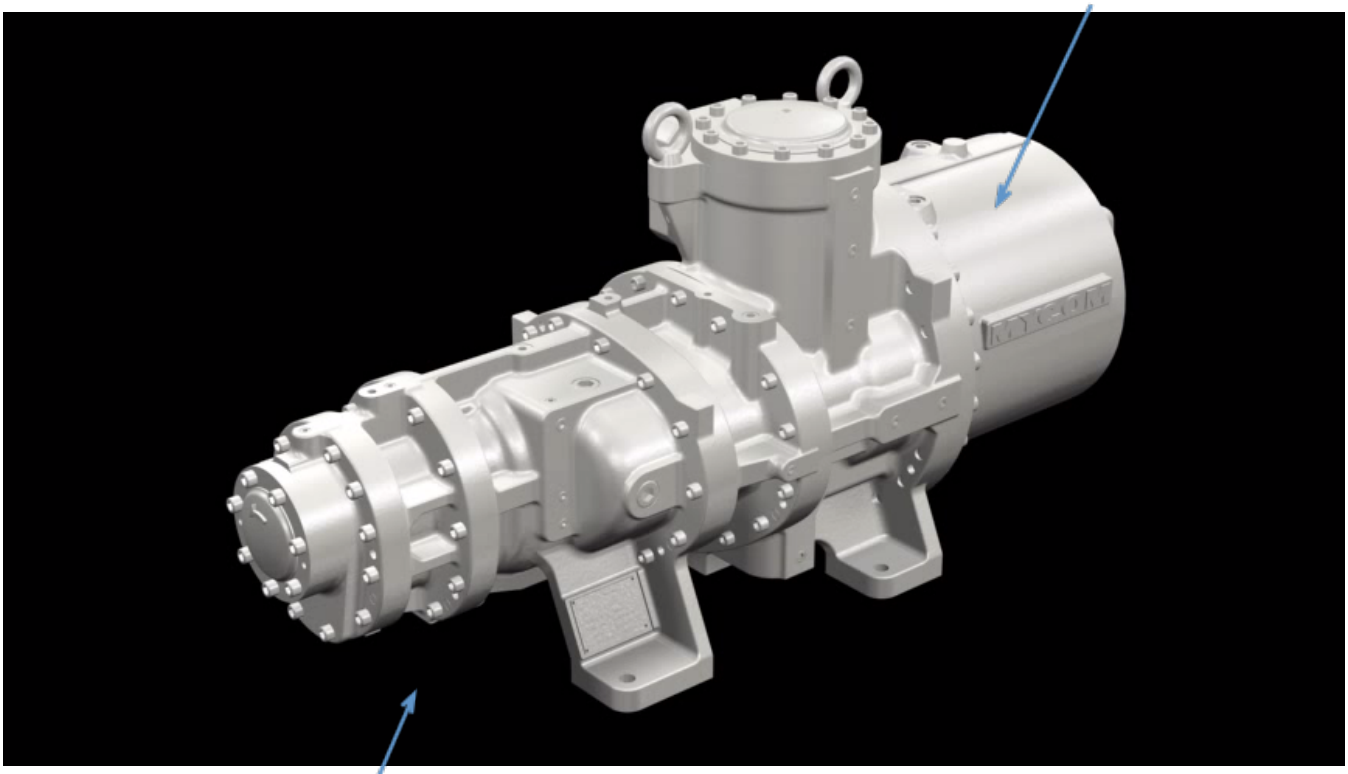
CO2 brine

- Safety
- Low pump power
- No trouble by oil
- High heat transfer

「Safety」 「Energy saving」 「Easy maintenance」

NH3 New Screw Compressor

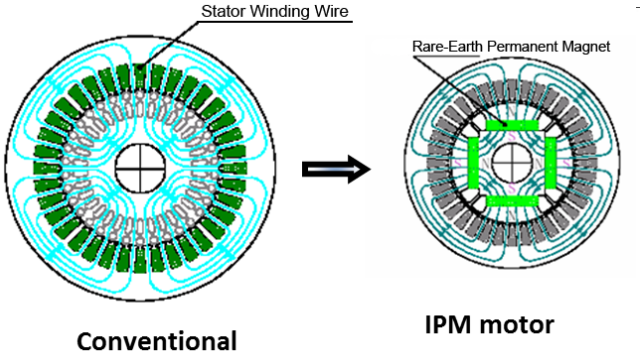
Semi-hermetic IPM Motor

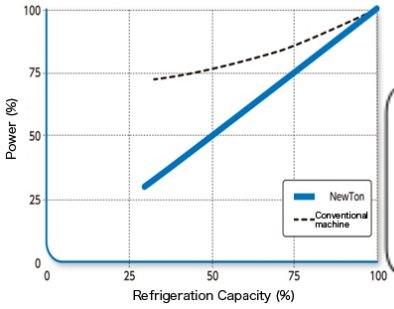


Two stage compound Screw

High Efficiency Motor（IPM motor）

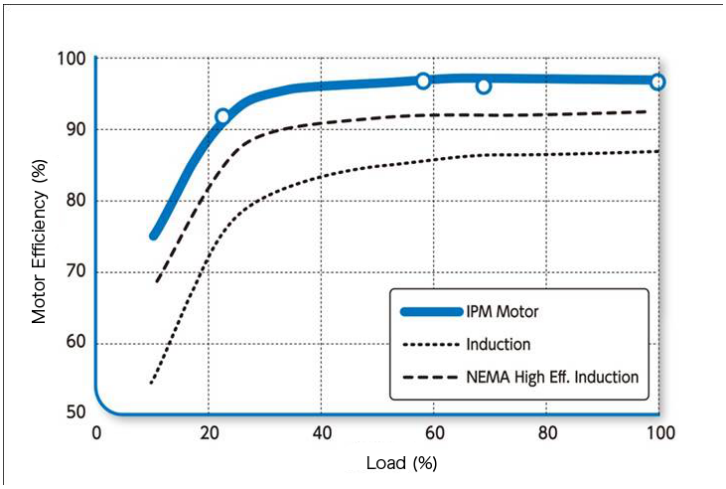
- Semi-Hermetic for NH3 -



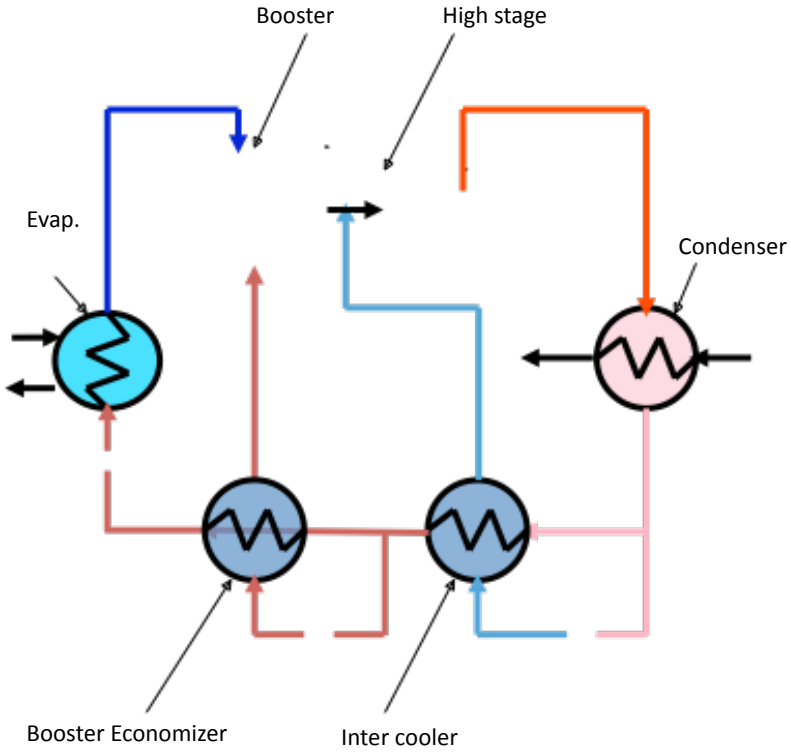


Benefits of IPM motor

- 5～10% **better in efficiency**
- **40% smaller in size**
- **High speed is possible**



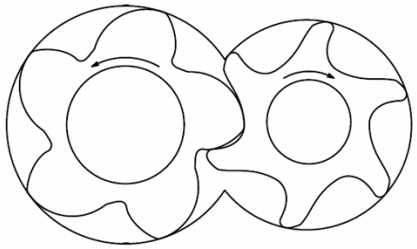
New rotor profile and Double economizer system



Double Economizer

Features

- **High efficiency: Less gas leakage**
- **Quiet: Low noise, low vibration**
- **High reliability: Use of proven bearings**



Main Installations of *NewTon*

User	tons	Newton sets	installed
Nissui Logistics kawasaki	14,000 ton	3	2008
Igarashi reizo Hidaka	15,000 ton	4	2008
Toyo suisan Nagoya	32,000 ton	9	2009
Kowa reizou Nagoya	8,500 ton	4	2009
Coop Tosu	50,000 ton	1 2	2009
Hosui Atsugi	8,000 ton	2	2010
Yokohama reito Osaka	27,000 ton	8	2011
Matsuoka Kawasaki	80,000 ton	1 1	2013

500 are running

Nisui Log. ／Kawasaki reizo/ Nagoya

Igarashi／Hidaka LCC

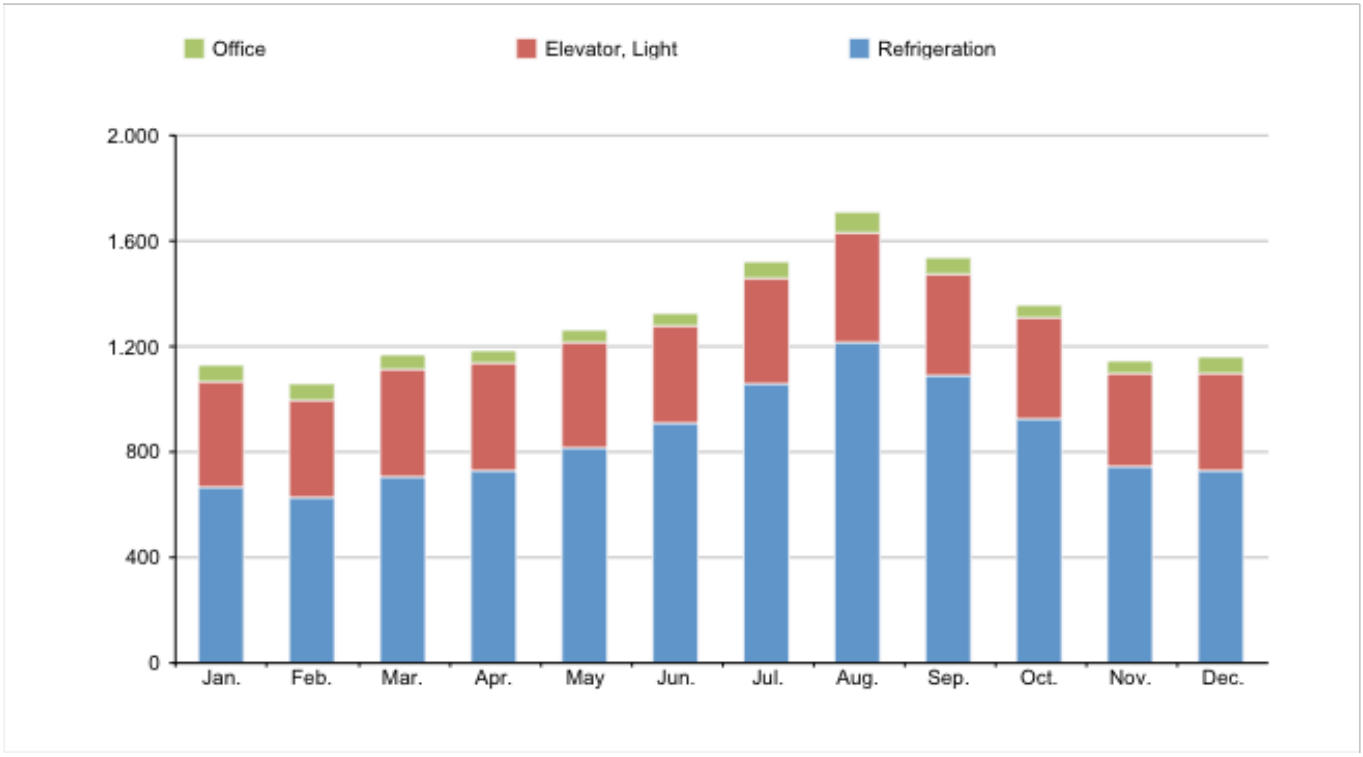
Kowa

Yokohama reizo／Osaka Matsuoka/Kawasaki

COOP／Tosu Log.

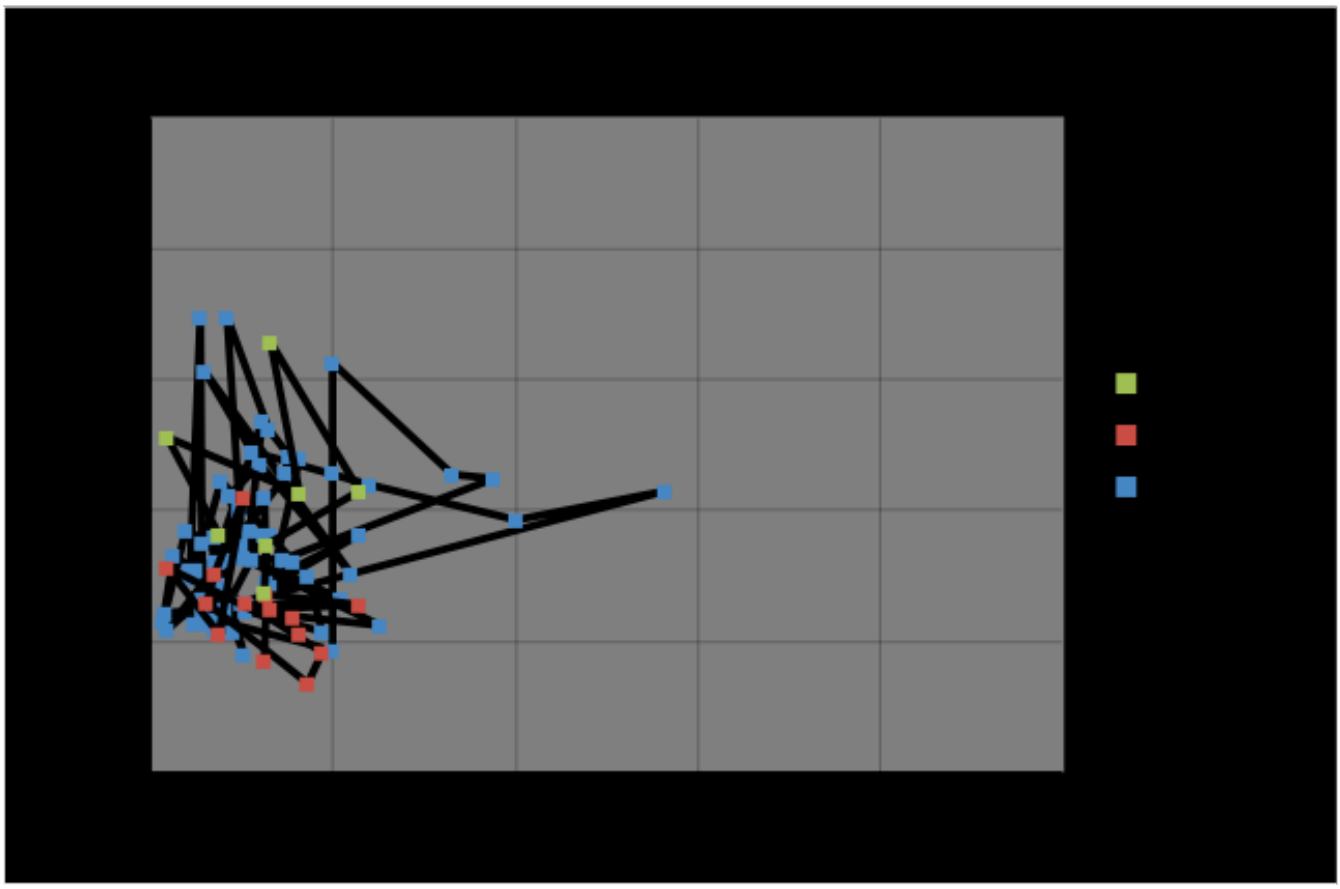
Toyo suisan ／Nagoya

Electric Power Usage in Cold Storage



Refrigeration:65%, Elevator, Light:30%, Office:5%

Specific Power Consumption in Cold Storage



Power reduction through renewal with NewTon

Customer	Volume	Age	Refrigerant formerly used		Power reduction
	(m3)	(year)	Refrig.	Comp.	(%)
Tokyo Toyomi	45,000	29	HCFC-22	Screw	31.1
Niigata Reizo	10,000	33	HCFC-22	Recip.	41.2
QP “Kewpie”	16,250	27	HCFC-22	Recip.	24.9
Sensui Reizo	6,125	38	HCFC-22	Screw	29.3
Ajinomoto	7,500	25	HCFC-22	Recip.	28.0
Gliko	30,000	30	HCFC-22	Screw	19.8
Showa Reizo	32,500	22	HCFC-22	Recip.	28.0
AMB Funabashi	30,000	25	NH3/Brine	Recip.	34.0

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1st North American Installation

Garden City Ammonia Program: Industrial NH3 / R717 / Ammonia Refrigeration Operator Training with Live Hands-On Systems

Garden City Ammonia Program GCAP

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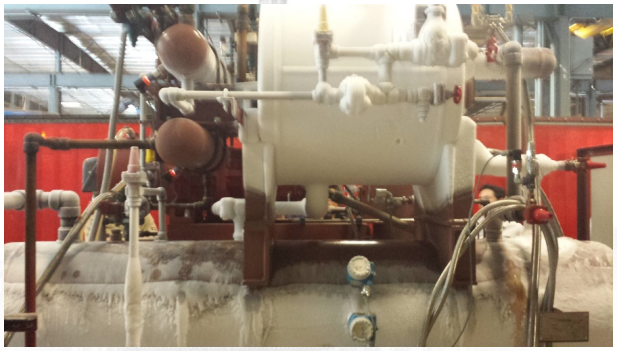
2nd North American Installation



- *California location, NDA for a year*
- *Specialized sweet frozen product*
- *Capacity of 28 TR at -20 F*

- *Installation will have two system install for the same room*
- *One complete R-507 DX system*
- *One Newton R-3000*

- *Both system will be cooling the same room. EPRI will be performing test on both system and measure the actual results of performance in order to be able to fully compare both*

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Barriers and Solutions

- *Resistance from the market on using new technology*
- *Much higher price per Tons (100%) compare to actual ammonia single stage system with Economizer*
- *Adapt the product to the North American standards, rules and regulation.*
- *Short term cost differences*

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Future plans

- *Presently , we have 10 projects on the table with this technology as the first approach*
- *It is easier to clearly identified the potential savings and cost advantages when plan on the initial design stage with the architect: Important cost saving on mechanical room construction, structure and space requirement*
- *We are actively seeking other potential demonstration site in North America*

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Action Plan

1. Our actions

- *The various model are being built, tested and measure one after the other at he Nashville TE plan. Model R-3000 completed, R-6000 on the line and the R-8000 will be for next year*
- *Intensive technical to our organization in order to understand the product and be able to offer it to the market*

2. Needed action

- *Inform the market about this innovative solution*
- *Help the future decision maker to consider the Total Cost of Ownership with this product*
- *Continue to actively promote the replacement of non NR product by being able to offer this new technology*


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