Commitment on Natural Refrigerants

NATURAL FIVE

- NH_3 Semi-Hermetic Screw Compressor Unit
- CO_2 Commercial / Industrial Eco-Cute System
- H_2O Adsurption Chiller
- HC Commercial / Industrial Air-Conditioning / Water-Supply Heat Pump
- Air Dehumidifying Air Refrigerant System [Air Ref]

http://www.mayekawa.co.jp/en/special.html

"Natural Five" Refrigerants and Product Solutions

Refrigerant (Natural Five)	NH_3 R-717	CO_2 R-744	HC Hydrocarbon	H_2O R-718	Air R-728
90℃ / 60℃ / 10℃ / -15℃ / -25℃ / -40℃ / -50℃ / -60℃ / -100℃	Utility hot water Heating; Chilled water Ice making; Cold storage, Freezer, Fish boat; Specific Refrigeration needs; Freezer, Freeze-dry, Super Low temp storage	Utility hot water; Chilled water Ice making; Specific Refrigeration needs; Freezer, Freeze-dry, Super Low temp storage	Utility hot water Heating HVAC; Specific Refrigeration needs; Freezer, Freeze-dry, Super Low temp storage; Cryogenics	Heat recovery; Chiller	Cryogenics
Notes	・Conventional system ・National Projects	・Eco-Cute	・Nat'l Proj. ・Butane + Propane	・Nat'l Proj. ・Adsorption ・Heat recovery	・Nat'l Proj. ・Air-cycle

Semi-hermetic Refrigeration Package

2007 Ministry of the Environment
[Enterprise of Technical Develpment Against Global Warming]

NewTon3000 Life Cycle Assessment (LCA)

Mayekawa has had ample experiences in thermal engineering and its brand name "MYCOM" has long been synonymous with high quality compressors for any person in the industry.

Now we offer a new NH3 compressor specially for cold storage refrigeration as a result of pursuing high efficiency and energy saving.

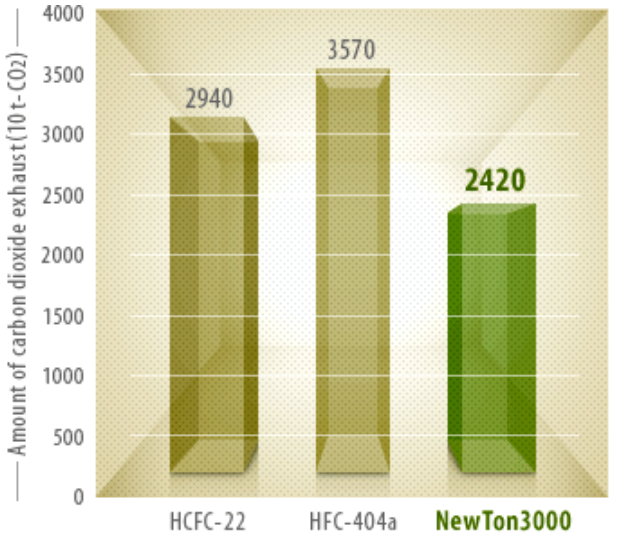
Compared with conventional HFC refrigerators, we successfully reduced 20% of power consumption. While Life Cycle Assessment (LCA) shows 33% of CO2 emission reduction by comparison with the case using HFC-404a.

For higher safety we employed indirect method using CO2 as secondary working fluid and limit the amount of NH3 refrigerant to approximately one sixes.

LCA Comparison with Chemical Refrigerants (t-CO_2)

Refrigerants	Production	15years Operation Period*	Waste & Disposal	Total
HCFC-22 Machine	5.05	2940	0.065	2945.115
HFC-404a Machine	5.05	3570	0.065	3575.115
NewTon3000 (NH_3/CO_2)	**7.96**	**2420**	**0.083**	**2428.043**

*15years life cycle

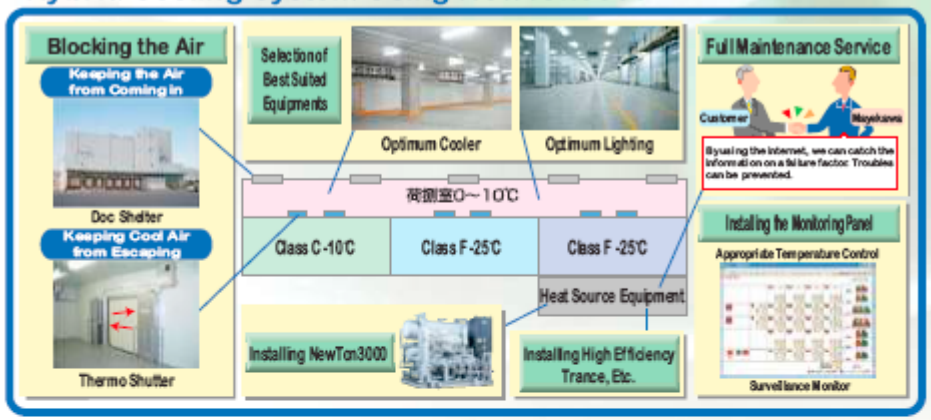


Installation in Japan

Distribution center

30% Reduction of CO2 Emission

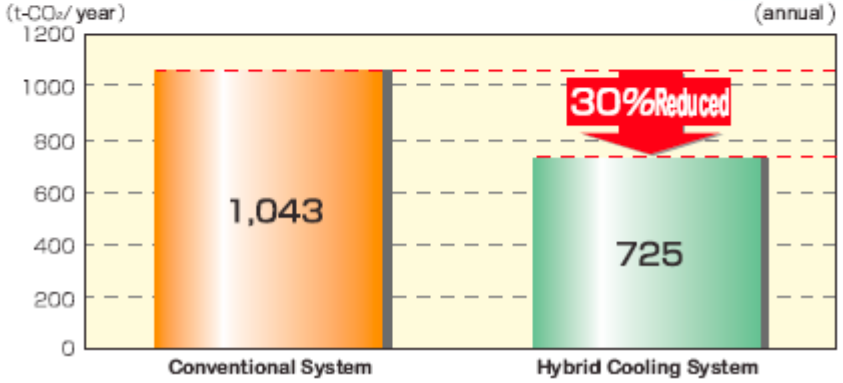
Hybrid Cooling System Using NewTon3000



Target : Industrial Refrigerated Warehouses (for Class F)

- ■ Improved Safety : By developing [Semi-hermetic compressor], Mayekawa improved the problem of refrigerant leak.
- ■ Non-Freon : A system in which ammonia circulates as the primary refrigerant and CO_2 as the secondary refrigerant.
- ■ Energy Saving : As a unit exclusively for the refrigerated wahrehouse, CO_2 2.0 at Class F. Compared to conventional Freon refrigerants, about 20% energy saving.

Efforts to Reduce CO2



Case Study

10,000t Refrigerated Warehouse

Inside Temperature: -25℃

Power Consumption

< Conventional System >	< Hybrid Cooling System >
317kW	222kW

Industrial Hot Water Production Package

Awarded for: The 7th Electric-Load Leveling Equipments / systems [Heat Pump Thermal Storage Development Awards]

Water-Source Type is also availabe.

CO2 Heat Pump in Switzerland

ZÜRCHER UNTERLAND MEDIEN

Zürcher Unterländer Die Tageszeitung für das Zürcher Unterland und amtliches Publikationsorgan der Bezirke Bülach und
redaktion@zuonline.ch sport@zuonline.ch abo@zuonline.ch

FRONT ZU
Schlagzeilen
Blickpunkt
Kommentare
Foren

REGIONAL
Furttaler
Glattaler
Rümlanger

RESSORTS
Sport
Mixer
Agenda

UMFRAGEN
Aktuelle
Bisherige

LINKS
ZU-Links
Leserlinks

MARKTPLATZ
BranchenBox
Online Inserate
Fotomanager

Donnerstag, 15. Dezember 2005

Niederhasli: Warmes Wasser im GC-Campus durch moderne Technologie

CO2-Wärmepumpe installiert

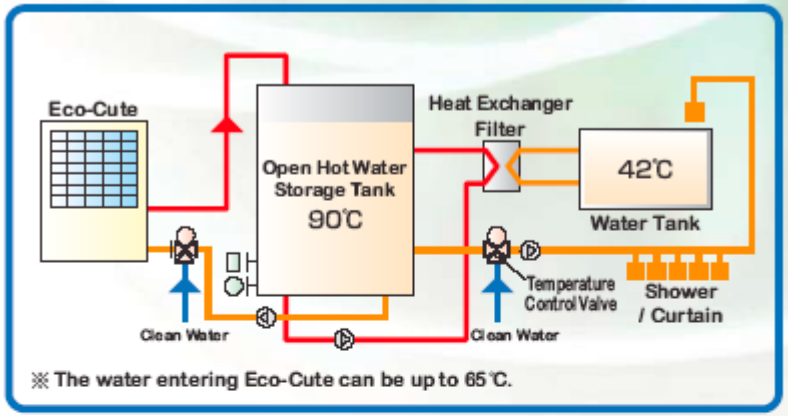
Im GC-Campus in Niederhasli liefert eine der ersten CO2-Wärmepumpen in der Schweiz pro Tag 4000 Liter Warmwasser. Die Maschine stammt aus Japan.

Inga Struve

EWZ-Projektleiter Georg Dubacher (von links), Masao Maekawa, Vorsitzender der japanischen Firma Mycom, und EWZ-Direktor Conrad Ammann erläutern die CO2-Wärmepumpe. (David Baer)

GOOG
WEIT
Niede
Wasse
durch
Bülac
Zwisch
Arbeits
Planun
Bülac
Compu
Priman
Steinn
Gemüs
werder
beheiz
Obere
Ferien
Embra

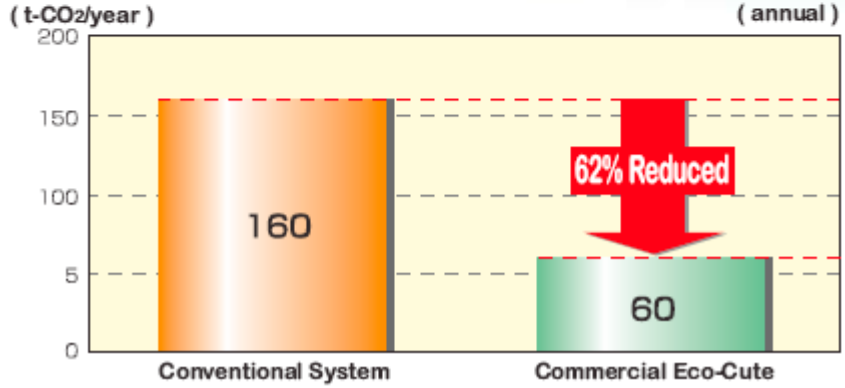
62% Reduction of CO2 Emission



Targets: Hospitals, hotels, welfare institutions, sports facilities, bathing facilities, facilities for boarding, food factories, etc.

- The best water supply ability in Japan (Air heat source 80kW, water heat source 90kW).
- Very little CO_2 emission, compared with equipments run by burning the energy source. Emission could be cut by more than 60% than heavy-oil boilers.
- 循環 heating operation (Water entering Eco-Cute at 65℃, exiting at 90℃).
- Flexible design of water supply system and storage tanks to meet your needs.
- Entering medium to large-scale water supply market as the electric equipment replacing hot-water boilers. The complete electrification is possible.

Efforts to Reduce CO_2 Emission



Case Study

A Comapny Housing where Hot Water Supply is 20m³/day
The Number of People: 200

<Conventional System> Fuel Oil Boiler Crude Oil Equivalent	<Commercial Eco-Cute> Crude Oil Equivalent
59,040 ℓ /yr	22,153 ℓ /yr

Adsorption Chiller Packaged Unit

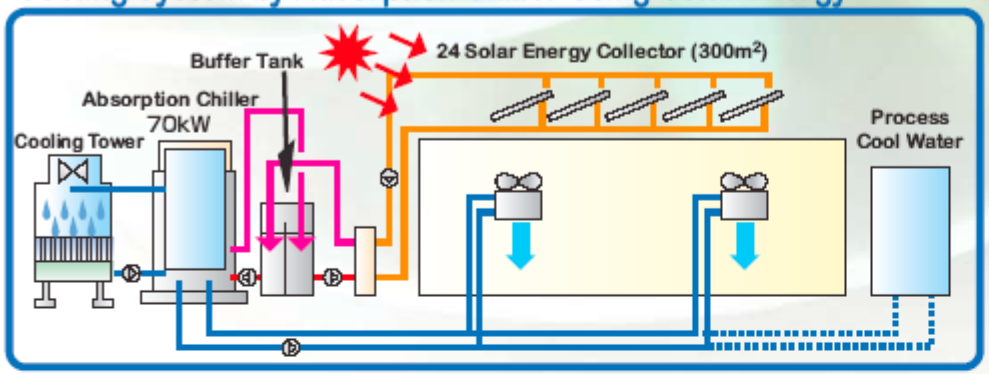
2005 ~2007 NEDO [Research and Development of New System Utilizing Solar Energy]

Installation in Japan

Air conditioner for shopping mall

64% Reduction of CO2 Emission

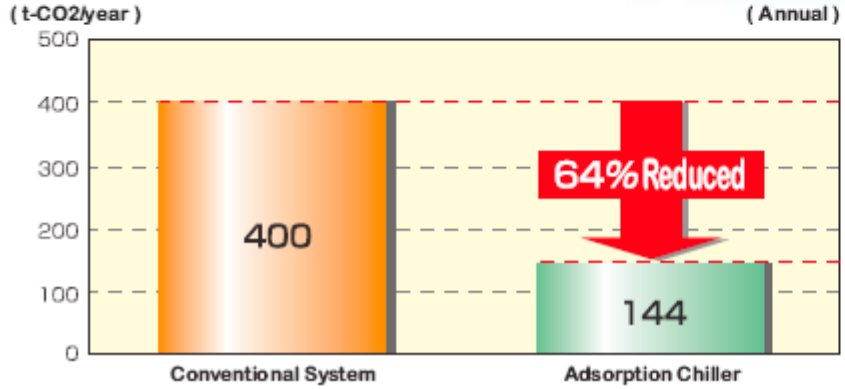
Cooling System by Adsorption Chiller Using Solar Energy



Targets : Industrial furnace, incinerator, distillation tower, air-conditioning or cooling using warm discharged water from cooling water of engines etc.

- produces cool water from low-temperature heat source (below 75℃).
- water as refirigerant, silica gel as adsorbent, therefore environmentally friendly.
- The body itself needs little electricity. Also, almost ZERO meintenance cost.

Efforts to Reduce CO_2 Emission



Case Study

100USRT Industrial Process Cooling
Cold Water Temperature : 9 ℃

Power Consumption

<Conventional System> R134a Cooling Water	<Adsorption Chiller>
100kW	36kW

Hydrocarbon Refrigerant Packaged Unit

2005 ~2007 NEDO [Energy-Saving Non-Freon Air-Conditioning and Refirgeration System]

([Industrial Technology Development Subsidizing Company])

Installation in Japan

At International Media Center of G8 Toyako summit in Hokkaido

Employed a cooling unit taking advantage of 7,000 tons of snow stocked underground, and as its subsystem, our environment-friendly building air-conditioner was introduced

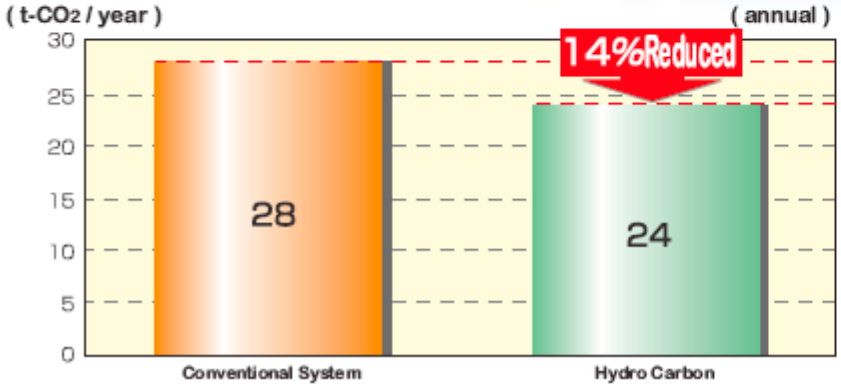
14% Reduction of CO2 Emission

Cooling C O P	COP=3.7 (Air-Cooled)
Heating C O P	COP=3.7 (Air-Source)
Supplying Water C O P	COP=3.3 (Supplying temperature 65℃, air-source)

Targets: Commercial / Industrial Air-Conditioning, Water-Supply

Supply Temperature	Applications	Suitable Markets
70℃	65℃ Hot Water-Supply / Heating System	Food factories, hotels
50℃	45℃ Heating System	Office buildings, factories
0℃	+7℃ Chilled Water Chiller System	Office buildings, factories
-5℃	+2℃ Chilled Water Chiller / SupercoolIce Making System	Food factories
-15℃	Ice on Coil Ice Thermal Storage System	Food factories

Efforts to Reduce CO_2 Emission



Case Study

40USRTChilled Water Supply Machine
Chilled Water Temperature : 7℃

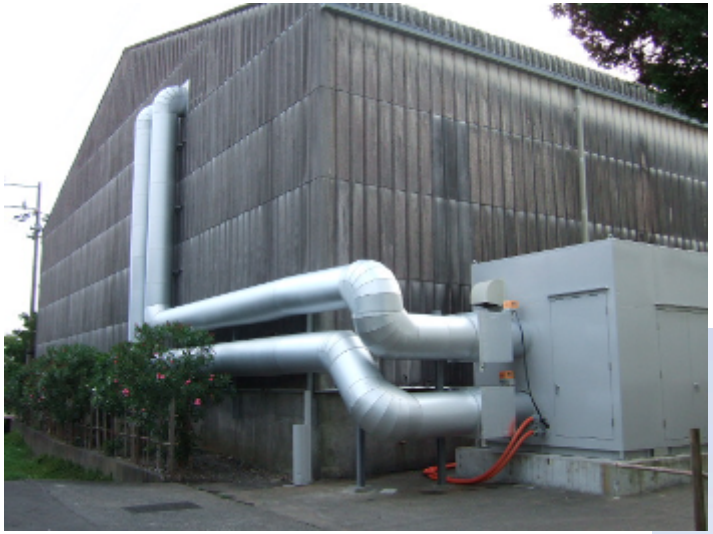
Power Consumption

< Coneventional System > R134a Chilled Water Supply Machine	< Hydro Carbon >
43kW	36kW

Air Cycle Refrigeration Packaged Unit

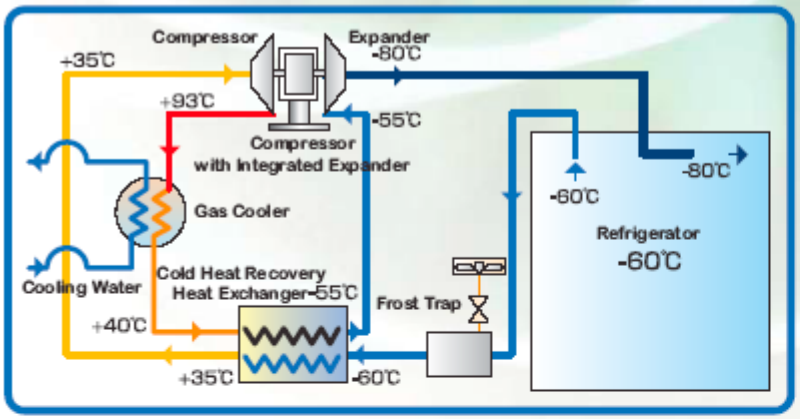
2003 Developed at
~2005 NEDO [Technical Strategy for Rationalization of Energy Consumption Project]

Installation in Japan



−60℃ ultralow cold storage

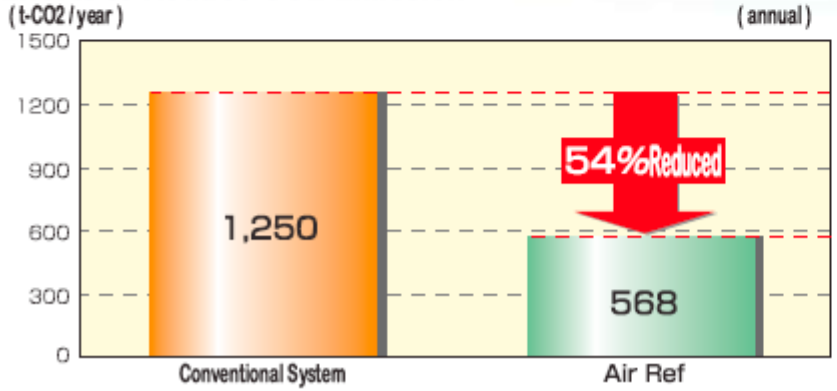
54% Reduction of CO2 Emission



Target: Ultra cold refrigerator for tunas and bonitos, rapid freezer, frost-破砕 etc.

- Using [Air] as the ultimate natural refrigerant, [Air Ref] is safe and eco-/people-friendly.
- Due to the turbo compressor with integrated expander, high COP can be achieved,saving energy by 50% comparing the conventional types.
- Due to its low operating pressure, exempt from legal regulations.
- Directly cooling the air, Air Ref does not require a fan coil unit or piping for refrigerant in the storage.
- Dihumidifying agent reduces frosting in the storage. Defrosting is not required.

Efforts to Reduce CO2 Emission



Case Study

2,000 ton Refrigerator
Interior Temperature : -60℃

Power Consumption

< Conventional System > R22 2 Stage Compression Refrigerator	〈Air Ref〉
281kW	128kW

Conclusion

In the view of prevention of global warming we would like to offer 3 proposals below;

1. Promoting natural working fluids aggressively in the proven industrial field

2. Introducing natural working fluids in the feasible commercial and consumer field

3. Promoting using low GWP refrigerant or CO2 refrigerant as for air conditioning and car air conditioning

Therefore we would recommend tightening of regulations of HFC and encouraging the funding for the prevalence of refrigeration systems using natural refrigerants and its development.