



TECHNOLOGY and MARKET TRENDS

Industrial Refrigeration

Eric DELFORGE

Corporate Business & Policy Officer
MAYEKAWA EUROPE



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TECHNOLOGY and MARKET TRENDS Industrial Refrigeration



3 - 4 June 2013 Vienna



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Industrial Refrigeration

MARKET and TECHNOLOGY TRENDS

Industrial Refrigeration

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The context

Also refrigeration is related to global events

- **Population & food**
- **Energy & pollution**
- **Geo-politics & economy**



Furthermore,

New “game changing” evolutions are ahead

- **Fossil fuels – threaten world stability**
- **Interconnectivity – always, everywhere**
- **Centralized vertical organizations ?**



Market trends for Industrial Refrigeration

1. Agro

Chilling, cooling and freezing of food at large

- Food production increases
- **Need for dramatic decrease of spoiled food**
- Frozen food market potential
- Domestic > Industrial prepared meals

Trend : Ever MORE Refrigeration



Agro and Refrigerants

Ammonia :

Oldest common used refrigerant

Historically most used refrigerant

Accounts for most of CFC/HCFC conversions

Recently followed by HFC's

CO2 :

Settling in negative temperature applications

HC & Air :

Very low temperature applications





Pascal Air system





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Industrial Refrigeration

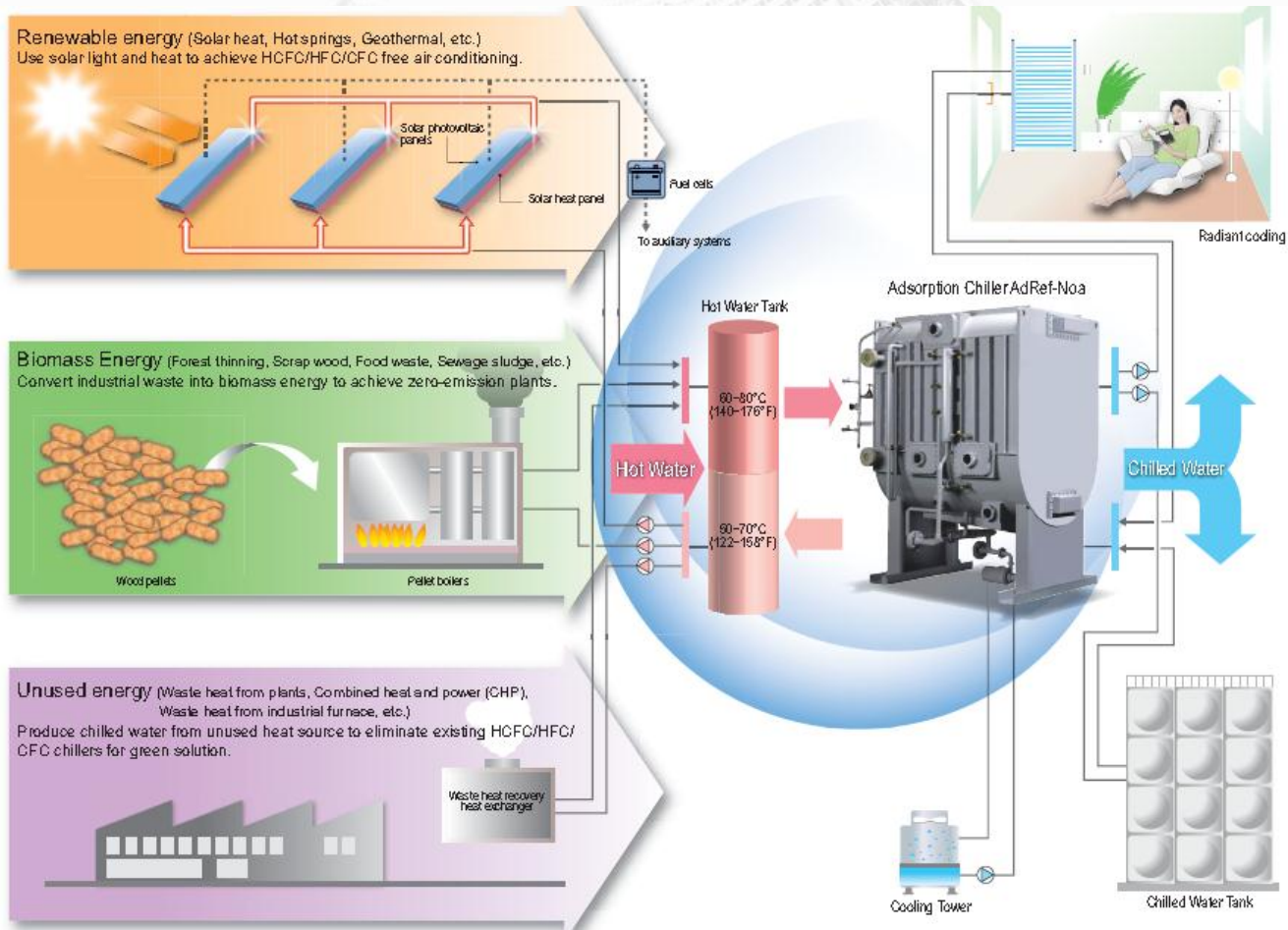
Agro and Refrigerants

Water : Adsorption





Adsorption cooling systems





Adsorbtion cooling system





2. Chemical and Process

- HC's are main refrigerants
- Ammonia historically also very strong
- Large refrigerant plants on CFC/HCFC convert to natural ref.



Technological trends for Industrial Refrigeration

Mayekawa/Mycom

- 90 Years experience with NH₃
- About 40 years experience with CO₂ and HC's

Industrial Refrigeration = Mayekawa's core business

- New generation of screw & piston compressor blocks

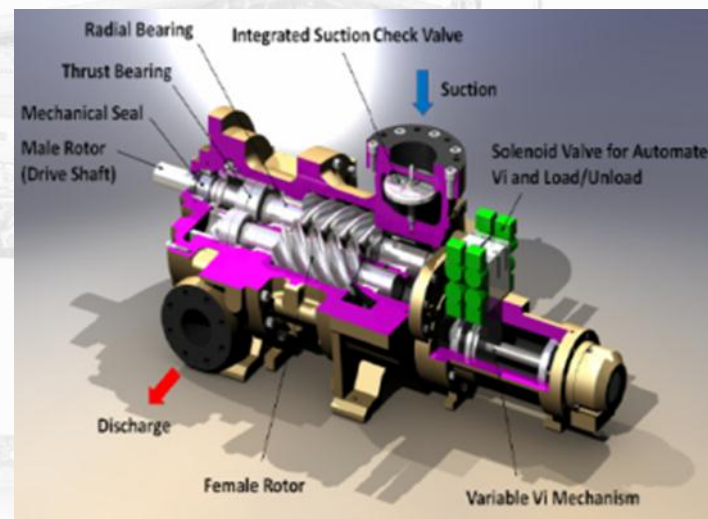
New screw compressor model-J



New profile rotors (5 × 6)
High efficiency +10%



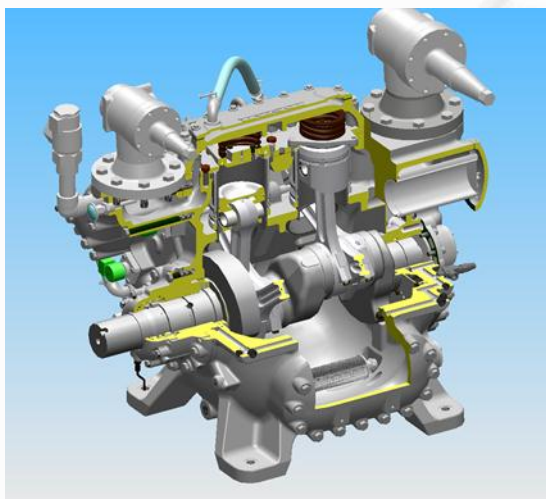
"Vi" automatic variable
Optimized operation control
Low vibration, low noise
Flanged motor





New piston compressor M-type

High efficiency : +10%
Wider operation range
Bigger capacities





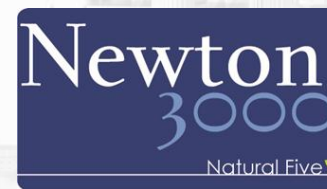
Technological trends for Industrial Refrigeration

Mayekawa/Mycom

- 90 Years experience with NH₃
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Industrial Refrigeration = Mayekawa's core business

- New generation of screw & piston compressor blocks
- Hermetic and semi-hermetic compressors



& K-type



Ammonia semi-hermetic piston chiller





Newton 3000 Modular Skid





From trend to mainstream

Minimize refrigerant charge :

- **Cascade systems**
- **Brine systems**
- **Inovative heat exchangers**

Increase efficiency :

- **Frequency control**
- **Indirect cooling**
- **Cascade cooling & cooling load separation**



Trends for industrial heat pumps

1. NH3

Hot water temperatures up to 100° celcius

- Using condensing waste heat
- Using thermal heat (w/w)

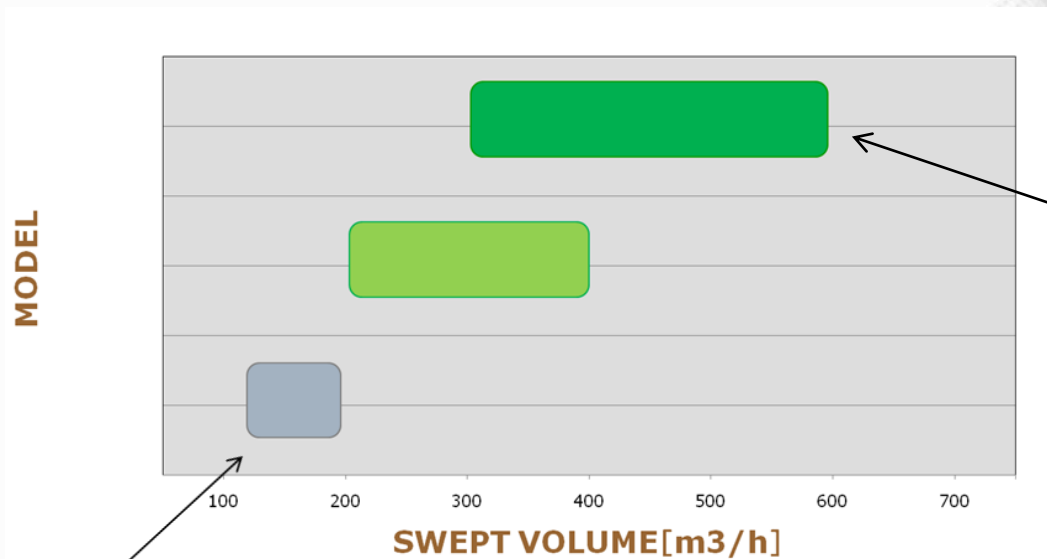
Applications:

- Industrial hot water
- District heating

Succes : dependents on Gas vs. Electricity price evolutions



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6HS





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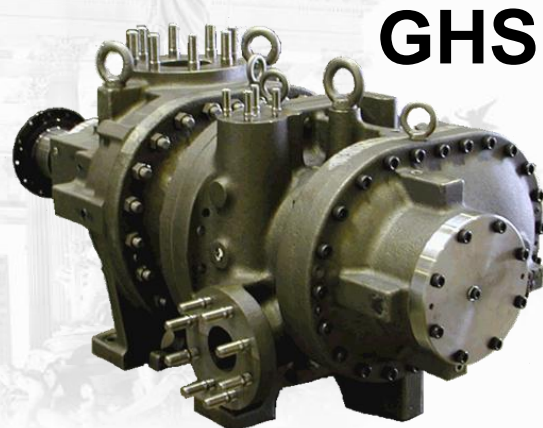


Heating AND Cooling





MYCOM screw compressor heat pump



GHS



Trends for industrial heat pumps

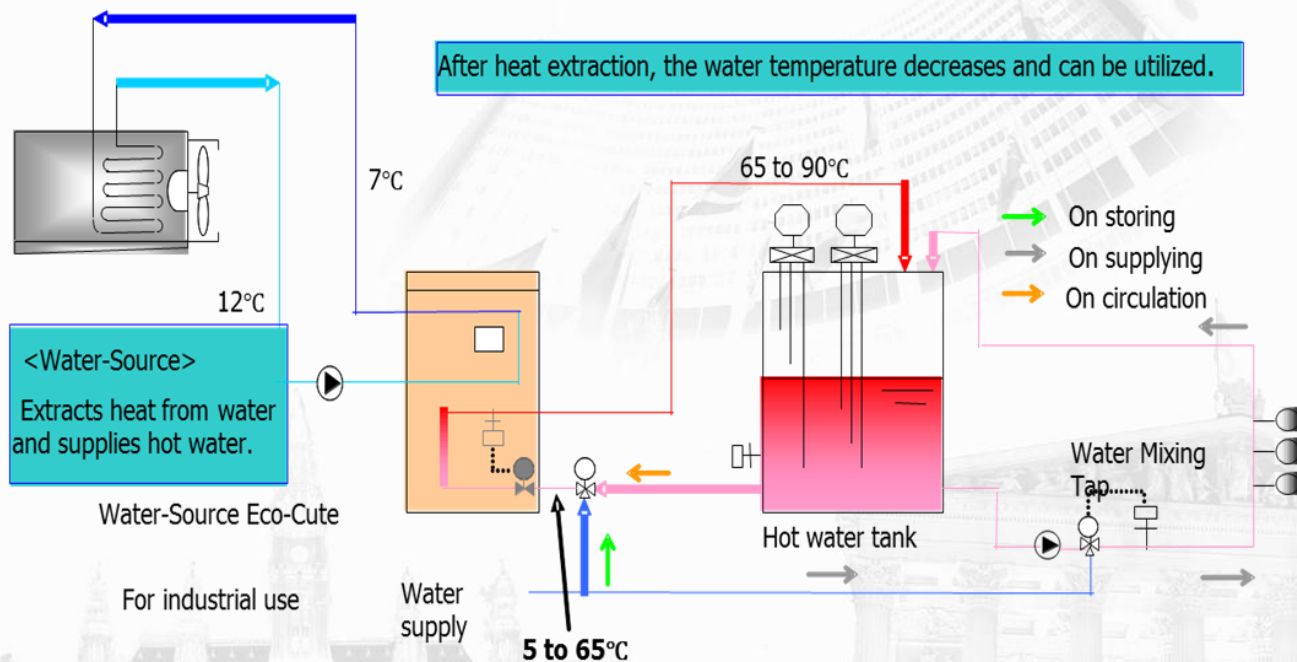
1. NH3

2. CO2





Eco-cute heat pump





Trends for industrial heat pumps

1. *NH₃*

2. *CO₂*

3. *HC's : high temperatures > 120° celsius*



Finally...

- More than 80% of article 5 countries have Mayekawa Compressor units installed on natural refrigerants.
- The knowledge and experience to operate and service natural refrigerant refrigeration installations is present in the field.
- Technology based on Natural Refrigerants will continue to become more efficient and cost effective.
- Food safety and sustainable entrepreneurship are key to Mayekawa, it's customers and end-users.



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Thank you very much for your attention

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A Revolution in Efficiency

At MAYEKAWA, the pursuit of advanced technology never ceases.

The image shows a collection of industrial machinery, including pumps and compressors, arranged on a light blue background. The machinery is primarily white with some red accents. The MAYEKAWA logo is visible on the equipment. The text "MAYEKAWA MYCOM" is displayed in the top right corner of the image area. Below the machinery, the headline "A Revolution in Efficiency" is written in a large, bold, black serif font. Underneath the headline, the tagline "At MAYEKAWA, the pursuit of advanced technology never ceases." is written in a smaller, bold, black sans-serif font.

M-Series

J-Series