



LOW-GWP TECHNOLOGIES INTRODUCTION AND STANDARDS BARRIERS IN R&AC SECTORS OF CHINA

FECO/MEP
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I. Back Ground



Sector	Sub-Sector
Room Air Conditioner Sector	Residential AC/Split AC
	Dehumidifier & Portable AC
	Domestic Heat Pump Water Heater
Industrial & Commercial Refrigeration Sector	Unitary AC
	Multi-connected Air-Conditioning Units
	Water Chiller
	Refrigeration & Condensing Unit
	Heat Pump Water Heater

Two HPMPs in R&AC sectors, Room Air-Conditioner (RAC) HPMP and Industrial & Commercial Refrigeration (ICR) HPMP in China.



I. Back Ground



Low-GWP alternatives promoted in Stage I&II HPMP:

Sector	Sub-Sector	L-GWP Alternative
RAC	Split AC	R290
	Dehumidifier & Portable AC	R290
	Domestic Heat Pump Water Heater	R290/CO2
ICR	Unitary AC	R32
	Multi-connected Air-Conditioning Units	-
	Water Chiller	R32/HFOs
	Refrigeration & Condensing Unit	NH3, NH3/CO2
	Heat Pump Water Heater	R290/CO2



Room Air Conditioner Sector



R290 RAC Lines Conversion

DEMOS:

Gree demo project (GIZ), finished in 2011;

Midea demo (MLF), finished in 2013;

STAGE I HPMP:

Contracts of total 17 lines to be converted from R22 to R290 signed and 1 line to be signed soon; most of the lines have been converted to R290

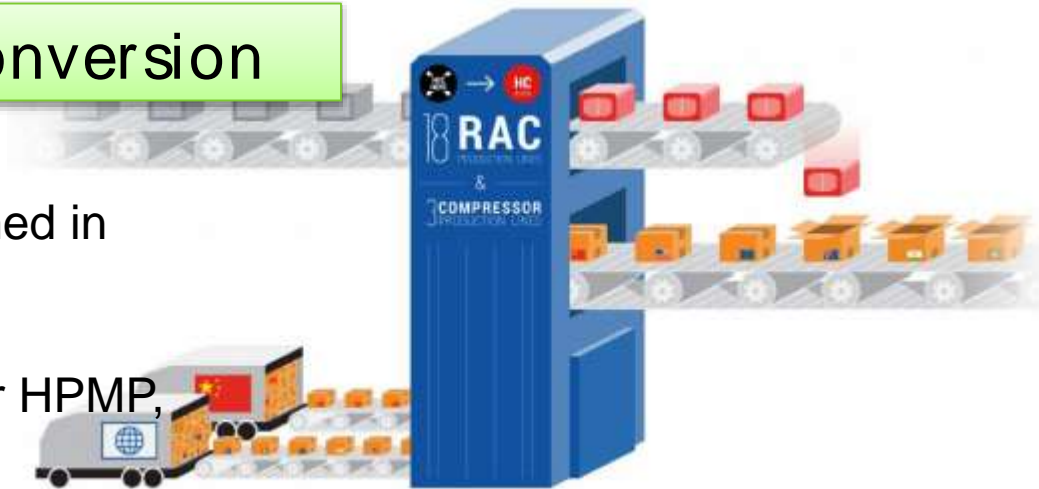
R290 Compressor Lines Conversion

DEMOS:

Meizhi R290 compressor demo, finished in 2014.

STAGE I HPMP:

Contracts of total 3 lines signed under HPMP, and all converted;



ICR Sector

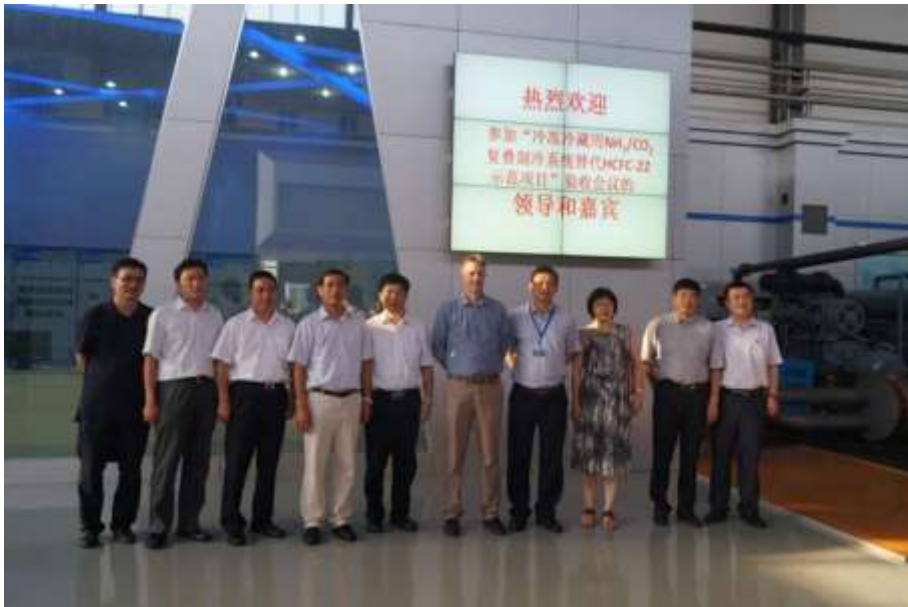


Lines Conversion

DEMOS:

Yantai IceMoon, NH_3/CO_2 cascade, used for cold storage systems, finished in July 2013;

Tsinghua Tongfang, R32 used for water chiller, finished in December 2013.



ICR Sector



Lines Conversion under HPMP

Industrial water chiller (heat pump)

Domestic and commercial water chiller (heat pump)

Alternative	R32	R410A	R134a	NH ₃	CO ₂
Consumption/MT	4,104	2,161	385	95	-
Lines	13	5	4	1	-
Compressor Lines	1	-	-	-	1

Piston compressor for water chillers

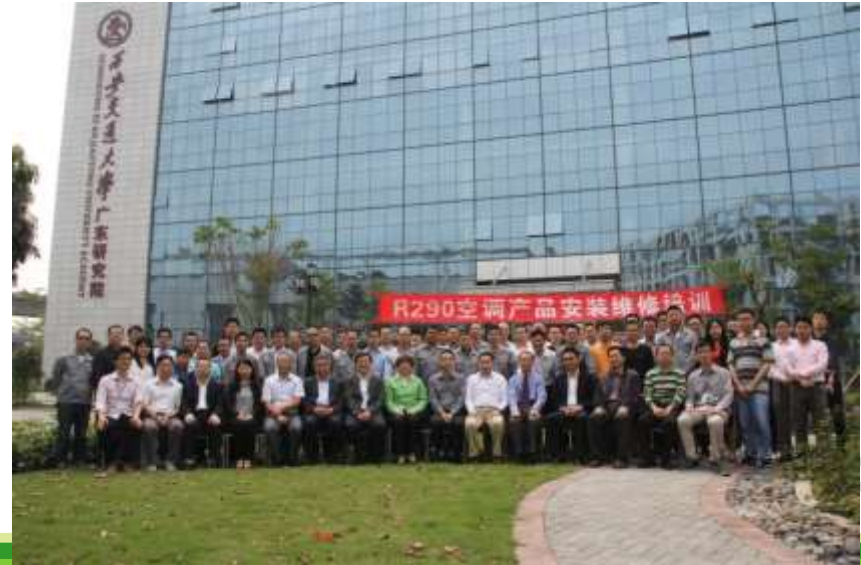
Compressor for cold storage
or process systems



Training



A three-days' training was held in Guangdong from 31st April, 2015. Those trainers from the manufactures were trained with the maintenance of R290 split RACs.



Training Centers



Total 19 training centers on the environmental protection, safety and good practice

2 national centers for trainers

17 local centers for technicians



Risk Assessment on R290



Risk Assessment

Conclusions

(A split air conditioner with the LEAKAGE amount of 382g R290)

1. During the normal usage conditions, the probability of a fire or explosion is 10^{-9} /year, lower than the one of lightning strike, 5×10^{-7} ;
2. In the worst case, the power of the explosion, maximum 0.006 bar, is in the lowest damage level 0.004-0.006 bar, which had not broken the window glass, 0.68m far from the explosion point, during the test.

By Tianjin Fire Research Institution, Ministry of Public Security

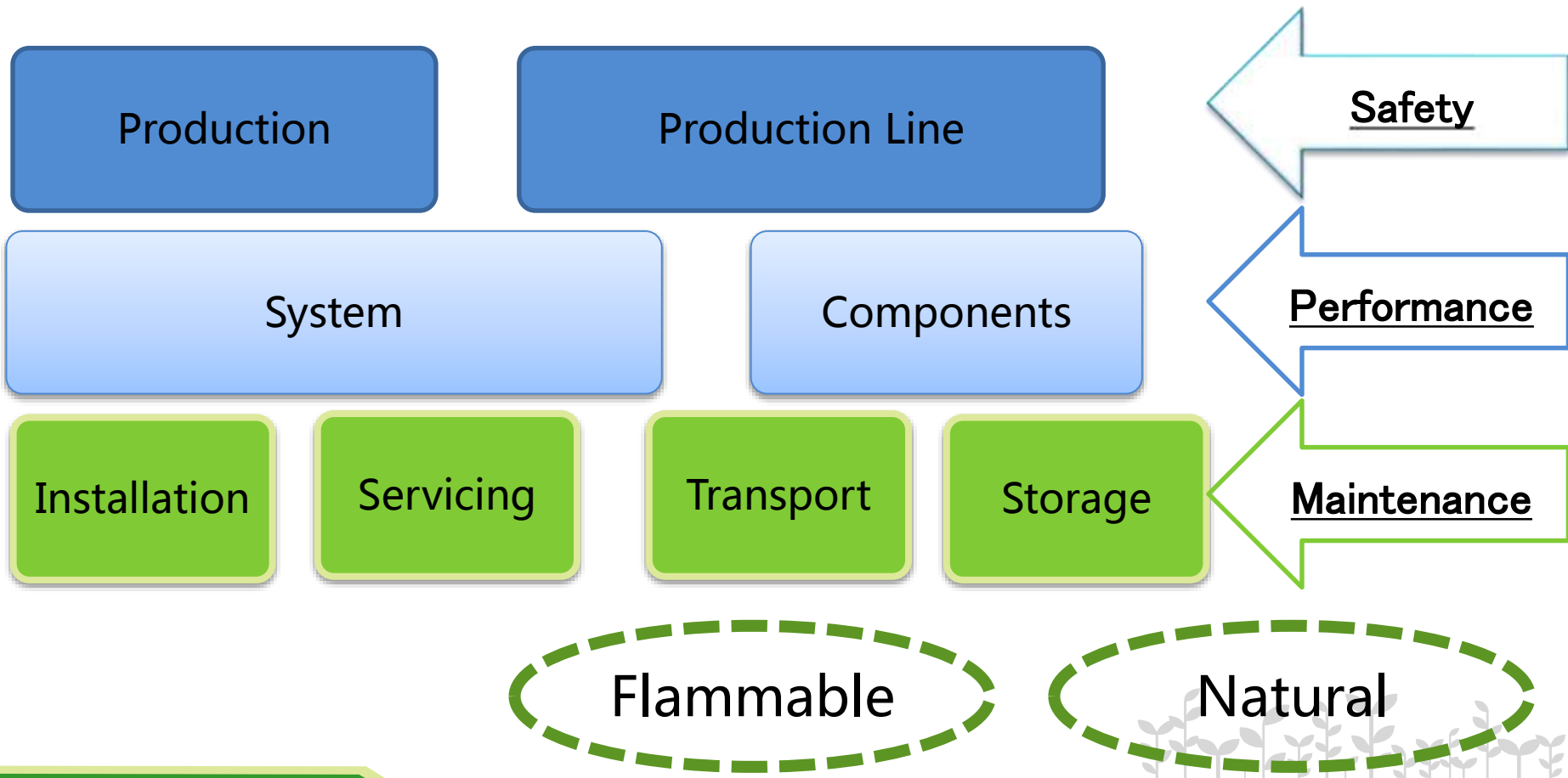
More studies on the installation and servicing are going on now.



II. Standards Barriers



Standards Should be Considered



Room Air Conditioner Sector



Specific standards for R290 RACs

Production safety standard:

National Standard GB 4706.32, following IEC 60335-2-40, has been issued in May 2013, which allows the flammable refrigerant in domestic room air conditioners with safety measures

Installation and servicing standard & storage and transportation standard:

Sectoral standards, both were approved by the Standard Committee in July, 2014, expected to be issued this year

Production line safety standard:

Sectoral standard, was approved by the Standard Committee in April, expected to be issued next year

Study on the energy efficiency standard:

Feasibility study on the different energy efficiency for different refrigerant, meaning lower requirement on the EE with the lower-GWP refrigerant. Initiated last year





R32

- National Standard GB 9237, is now being revised to follow the newest ISO 5149, which allows the usage of the flammables
- Performance standards of the unitary, chiller and heat pump, are being revised to adopt the R32

Natural Refrigerant

- Three standards are initiated on CO₂ and NH₃:
- *Installation of the CO₂ system for the cold storage or process*
- *Design of the cold storage*
- *Acceptance of the cold storage*



II. Standards Barriers



Safety concern

Cover a series of cooling capacity, at least wall mounted split products.

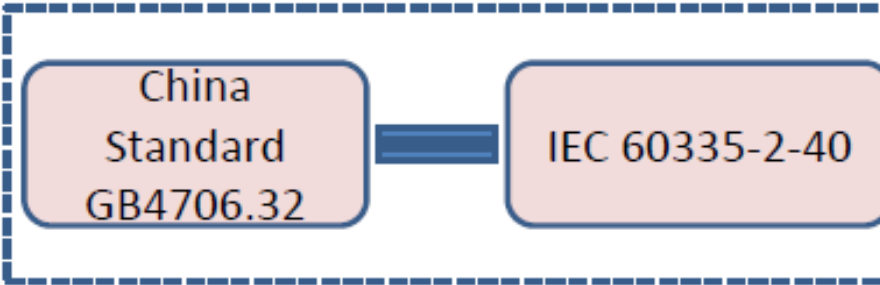
Energy efficiency

Heating performance

Higher cost

Mainly caused by

Unreasonable requirements of safety standard



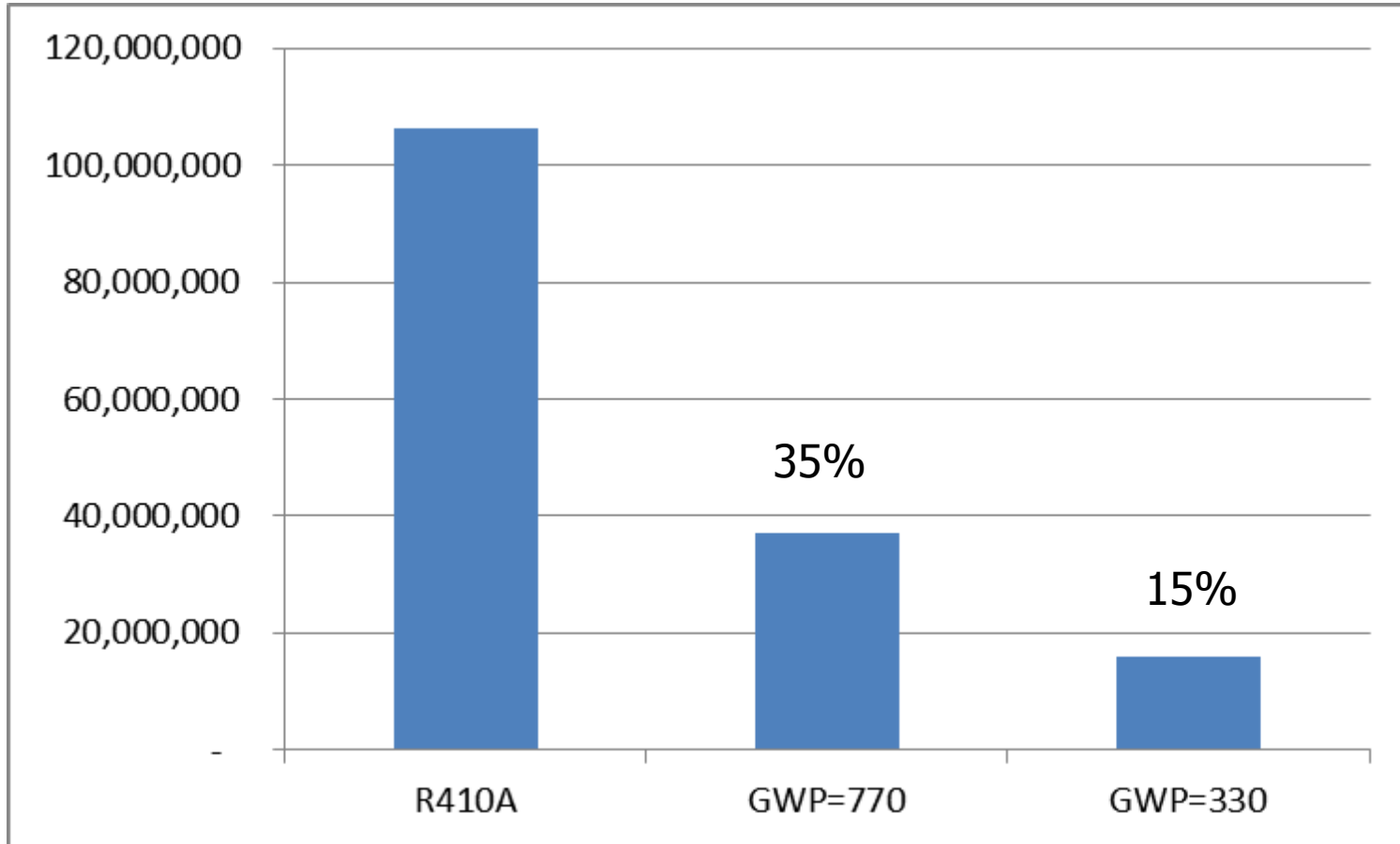
II. Standards Barriers



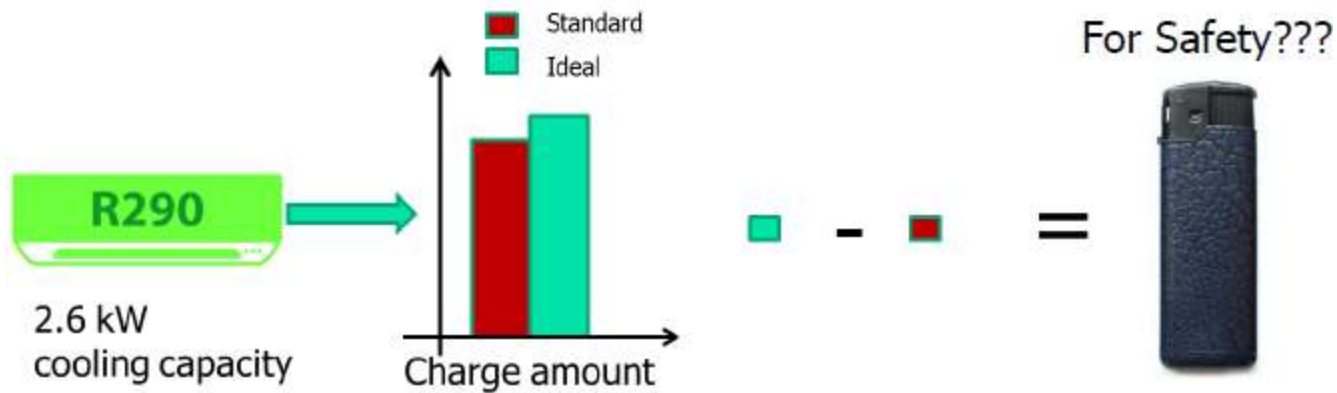
	Canada, Mexico USA	EU	India	Pacific Island Countries
Baseline (GWP Weighted)	Average HFCs consumption and 50% of average HCFCs consumption from 2011 - 2013	Average HFCs consumption and average HCFCs consumption from 2015 – 2016	Average HFCs consumption and 32.5% of average HCFCs consumption from 2028 – 2030	Average HFCs consumption and 65% of average HCFCs consumption from 2015 – 2017
Schedule	2021: 100% 2026: 80% 2032: 40% 2046: 15%	HCFCs+HFCs 2019: 100% First step from 2020	2030: 100% 2050: 15%	2020: 85% 2025: 65% 2030: 45% 2035: 25% 2040: 10%



II. Standards Barriers



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Thank you very much!

