



Business Case for  
Natural Refrigerants

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**11-12/04/2018 – Beijing**



## **Barriers for uptake of R-290 based residential A/C's**

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## Background

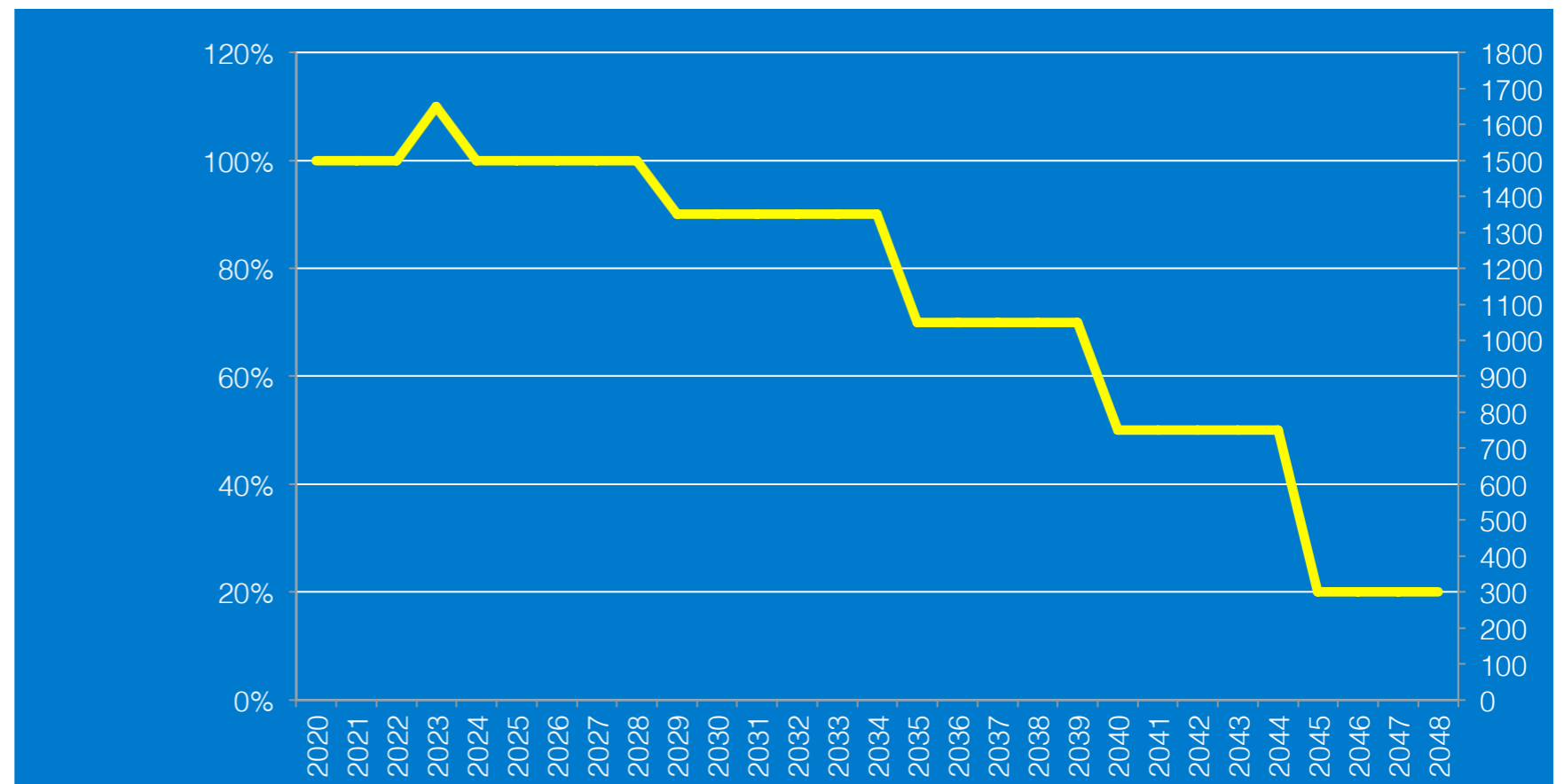
Montreal Protocol priority: Phase-out of strongest ODS first

- Foam sectors – low-GWP technologies available
- Refrigeration and A/C – some uncertainty on final technologies

## Kigali Amendment

- Avoid 0.5 deg GW
- Key sector: A/C

## Regulatory certainty



## Current UNIDO portfolio in A/C sector

- China HPMP stage I: R-290/R-410; stage II: R-290/R-744
- Midea (demo), GMCC (demo): R-290
- Argentina, Jordan, Syria: R-410;
- Algeria, Bahrain: R-290/R-32;
- Brazil, Pakistan, Saudi Arabia (demo), Tunisia: R-290
- Several in pipeline
- Many industries in developing countries depends on SKD/CKD kits from China



## R-290 sales (only China)

Very modest:

- Split A/C: low 5 digit;
  - Portable A/C and dehumidifiers: lower 6 digit;
  - Compressors: 6 digit (large portion for export).
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- India/Godrej: 400,000+ split A/C

## Global barriers for market introduction of R-290 A/C's

### Restrictive standards:

- R-290 charge limitations;
- Current upper limit for R-290 is 7 kW;
- R-290 products sensitive to charge in terms of energy efficiency.

### Marketing:

- No financial incentive to market R-290 as a gas;
- Consequently no technical support from R-290 manufacturer;
- Technical expertise at A/C manufacturer level.

## Barriers for market introduction of R-290 A/C's

### Liability:

- Flammability;
- Difficult to control use/maintenance/EOL for manufacturer;
- Uncertainty on skill level of service technicians.

### Cost:

- Technical solutions to mitigate flammability risks has extra costs;
- Not yet reached the level of economy of scale;
- Additional operations needed for installation and servicing.



## Still enthusiasm

Commitment from Chinese industries:

- Support is against R-22 phase-out;
- Still interest in undertaking additional conversion projects.

Commitment from Chinese government :

- Constantly seeking solutions to overcome barriers.





## Solutions

International standards are under revision:

- Possibly relaxation of R-290 charge limitations;

Incentive schemes:

- Utilization of IOC to off-set additional costs short-term;

Approaches to increase sales:

- Selected export markets;
- Specific areas within China; e.g. near manufacturer;
- OEM / B2B.



## MLF support

MLF can support A/C manufacturer in developing countries:

- Conversion from R-22 to R-290;
- Conversion from R-410 to R-290 (demonstrations).

MLF supports:

- Incremental capital costs; and
- Incremental operating costs (time limited)
- Based on cost effectiveness (US\$ per kg R-22 or R-410 phased-out)

MLF support request:

- Requires government request to implementing agency.





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**Thank you very much!**

