



# 9<sup>th</sup> Working Group Meeting on Stage II HCFC Phase-out in Brazil

## RAC Manufacturing Sector Proposal for Stage II

Ole Reinholdt Nielsen  
Sao Paulo, 20 March 2014



# Outline

- Presentation of UNIDO team for Brazil;
- Preliminary findings on RAC Manufacturing Sector; and
- Challenges and opportunities.



# UNIDO Team for Brazil

- Raquel Aledo;
- Clovis Zapata;
- and:





## Prelim findings for Brazil

- Air conditioning sector:
  - Concentrated in Manaus;
  - Assembly of CKD/SKD kits - China (split A/C);
  - Window A/C with Brazilian components;
  - Several chiller manufacturer;
  - App. 30 companies (14 larger):
    - 8 A-2 ownership (US, Japan, Korea, Sweden);
    - 6 A-5 ownership (Brazil, China);
  - Most are using both HCFC-22 and HFC-410.



## Prelim findings for Brazil

- Commercial refrigeration sector:
  - App. 90 companies (large or SME)
  - Several subsectors:
    - Chest freezers and display cabinets;
    - Ice cream / cube equipment;
    - Specialized equipment (kitchen / hotel);
    - Milk cooling equipment;
    - Beverage cooling equipment;
    - Transport refrigeration;



## Prelim findings for Brazil

- Commercial refrigeration sector (cont'd):
  - Most have national ownership;
  - HCFC-22 components becoming more difficult to source; and
  - Hence, most use mix of HCFC-22 and HFC's.





## Montreal Protocol intervention - refrigerants

Technology	Comments	Safety group
HFC-404A, 410, 407C	GWP	A1
HFC/HFO blends (drop-in)	GWP around 1000, no ICC	A1
HFC-32	GWP = 675	A2L
HFC/HFO blends – several in prep. Two types: HCFC-22 replacements and HFC-410 replacements	GWP in range of 150-300	A2L
CO2 – R-744	Excess pressure	A1
Ammonia – R-717		B2
R-290, 1270 and HC blends		A3



## Challenges for Brazil

- Sectors may transform into HFC by themselves
  - Build-up of large HFC inventory!
- MLF support may not be sufficient
  - Co-financing!
- Baseline equipment
  - Industrial vs service type





## Challenges for Brazil

- Manufacture  
vs assembly  
???





## Opportunities for Brazil

- Some sectors may have a "straight-forward" low-GWP alternative (HC, CO<sub>2</sub>);
- Interest in low-GWP and understanding that also indirect emission is a key feature.



# Thank you for your attention

## Contact

*Ole Reinholdt Nielsen*

Unit Chief, Refrigeration and Aerosols Unit  
United Nations Industrial Development Organization,  
UNIDO

Montreal Protocol Branch

P.O. Box 300, 1400 Vienna, Austria

Tel: +43 1 26026 3036 (direct)

Fax: +43 1 26026 6804

E-mail: [O.Nielsen@unido.org](mailto:O.Nielsen@unido.org)

URL: [www.unido.org](http://www.unido.org)