AHRI Low-GWP AREP Conference
AHRI Low Global Warming Potential Alternative Refrigerants Evaluation Program

Welcome to the Conference

New York, NY
16-Jan-2014
Low-GWP AREP Introduction

- Cooperative research & testing program to identify suitable alternatives to high GWP refrigerants
- Evaluation of candidates strongly desired by OEMs
  - assess research & development needs
  - accelerate industry’s response to environmental challenges
  - avoid duplicative work
- The program is NOT to prioritize refrigerants, rather test and present objective results in a consistent manner
- The program started in March 2011
- Final reports available to the public
  - AHRI web site: Home page > Resources > Research
Low-GWP AREP Introduction

- Solicited the industry for a list of low-GWP refrigerant candidates
- Solicited organizations for test plans
  - Testing companies propose test plans according to their individual interest
  - Testing companies directly report test results to AHRI Low-GWP AREP Technical Committee
Overview of Testing (Phase I)

- Sixteen (16) U.S. companies/organizations and five (5) international companies/organizations are conducting tests
- Six (6) refrigerant producers supplied thirty-eight (38) refrigerant candidates
- Tests cover the following applications
  - Air-conditioners and heat pumps (air-source, water-source, VRF, unitary, mini-split) (18)
  - Chillers (screw (3), centrifugal(2))
  - Refrigeration (commercial refrigerator (2), ice machine(3))
  - Transport refrigeration (1)
  - Bus air-conditioning (1)
  - Compressors (24)
Tests Conducted (Phase I)

- Compressor calorimeter test (18 reports)
- System drop-in test (20 reports)
  - only minor modifications are allowed
- System “soft-optimization” test (3 reports)
  - systems are modified for the alternative refrigerants using standard production line components
Next Steps (Phase 2)

- **Repeat the process again!**
  - New candidates already proposed, some Phase 1 candidates are available again for additional testing
  - AHRI will solicit test plan proposals in the coming weeks
  - If specific gaps in published literature are identified, heat transfer testing will be considered for Phase 2
Acknowledgments

➤ U.S. Testing Entities:
- Carrier Corporation
- Climate Master
- Daikin Applied
- Emerson Climate Technologies
- Follett Corporation
- Goodman Manufacturing
- Hussmann (share results)
- Johnson Controls, Inc.
- Lennox Industries Inc.
- Manitowoc Ice, Inc.
- Oak Ridge National Laboratory
- Tecumseh Company Co.
- Thermo King / Ingersoll Rand
- Trane/ Ingersoll Rand
- University of Maryland

➤ International Testing Entities
- ARMINES-MINES ParisTech
- Daikin Industries Ltd
- Embraco Brazil
- Embraco Slovakia Sro
- GD Midea Air-conditioning Equipment Co.,Ltd
- Shanghai Hitachi Electrical Appliances CO.,LTD

➤ Refrigerant Suppliers
- Arkema, Inc.
- Daikin Industries Ltd
- E.I.du Pont de Nemours&Co
- Honeywell International, Inc
- Mexichem Fluor, Inc
- National Refrigerants, Inc