The selection takes into account the following criteria:

- Extent of need;
- Innovative aspects in transforming conventional practices;
- Technical replicability to developing countries; and
- Economy feasibility to developing countries.

The award is only presented to individuals and to teams of individuals who are involved in the research, design or introduction of the technology used in the project. While one or more individuals may be involved through their work with institutions, private sector organizations, or firms, awards is only made to and in the name of individuals rather than to their firms or other types of employers.

For Next Cycle, Visit: ashrae.org/lowerGWP

Panel of Judges:

**Co-Chairs**

- James S. Curlin (UNEP)
- Sheila J. Hayter (ASHRAE)

**Judges**

- Nesreene Ghaddar (Lebanon)
- Steve Gill (UK)
- Roberto Peixoto (Brazil)
- James Wolf (USA)
Residential Applications

**HFC-161 Application Technology Development for Replacing HCFC-22 in High Cooling Capacity Household Air Conditioners in China**

*Panel of Judges*
- Sheila J. Hayter (ASHRAE)
- James S. Curlin (UNEP)
- Steve Gill (UK)
- Ayman El-Talouny (Egypt)
- Roberto Peixoto (Brazil)
- James Wolf (USA)
- Nesreene Ghaddar (Lebanon)

*Contact Information*


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**About the Project:**

The central objective of the project was to develop a household air-conditioning system with a large cooling capacity that replaced the use of HCFC-22 for HFC-161 as a refrigerant. The project provides solutions to the high use of HCFC-22 in China through replacement technologies that meet the latest environmental protection requirements for the domestic household air-conditioning industry. HFC-161, with ODP value of 0 and GWP value of 4, can be one of the solutions to comply with the HCFC phase-out commitments while leapfrog the use of higher GWP alternatives in line with the Kigali Amendment.

**Project Team:**

Zhang Jianjun
Zhang Lei
Zhang Mingjie
Xie Pinzan
Guo Zhikai

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*“Schematic diagram of the combustion limit test bench”*

1-test container; 2-air storage tank; 3-vacuum pump; 4-filter; 5-stirring device; 6-temperature measurement system; 7-resistance heater; 8-ignition system; T1, T2- thermometer; U1, U2- mercury pressure gauge

Parameter test device for gas dust explosion under special conditions

![HFC-161 stability in lubricating oil](https://www.ashrae.org/lowerGWP)

![HFC-161 stability at different temperatures](https://www.ashrae.org/lowerGWP)
Residential Applications

Low Charge Ammonia Vapor Compression Refrigeration System for Residential Air-Conditioning in India

Effect of condenser inlet air temperature

About the Project:

This project was envisaged to develop an ammonia vapor compression refrigeration system of 3 TR capacity for residential air conditioning and to analyze the minimum possible charge in order to reduce leakage hazards associated with the system. Ammonia is an environmental friendly solution with zero ODP and zero GWP values.

Project Team:

Rajesh Kumar N
D. Mohan Laal
Kamalakannan R

2019 ASHRAE-UNEP Lower GWP Refrigeration and Air-Conditioning Award
About the Project:

The Crocodile Project is a CO₂ transcritical refrigeration system developed for high humidity and ambient temperature environments. It mainly consists of 2 parts: refrigeration and extraction. The refrigeration part is for the office building’s air-conditioning system. The system will produce ice in the ice bank only at night, and the chilled water derived from this will be pumped to serve the air-conditioners during the daytime. The benefits of running at night is not only because the electrical demand charge is less, but because the ambient temperature is also lower, hence better system performance.

Project Team:

Kittitach Chumnarnwat
Wallop Lamlertpongpana
Warot Lamlertpongpana
Jittakorn Sukjareon
Packaged Chillers with Integrated Air Handling Units Using HFC-32 and HC-290 in Saudi Arabia

About the Project:
The main goal for this project or research is to develop, design, manufacture and test a new large cooling capacity packaged air-conditioner (packaged chiller with integrated air handling unit) with a cooling capacity of 40, 70 and 100kW respectively, using low GWP refrigerants (A3 and A2L) at standard and high ambient temperature conditions. The two refrigerants are HFC-32 which is A2L mildly flammable and HC-290 which is A3 highly flammable refrigerant, also the main challenge of this research is to address the safety requirement for each prototype and adopt this safe design and components in the prototypes.

Project Team:
Samer Hamed Alfetiany
Samir Hamed Alfetiany
Husam Quedan
Low Charge Propane Chiller for a Supermarket Commercial Refrigeration System implemented in Brazil

About the Project:
The goal of this project was to develop a natural refrigeration system to use in supermarkets. The propane chiller cools a secondary fluid, glycol, which is then used to cool medium temperature cabinets and cold rooms. For low temperature cabinets and cold rooms, CO₂ is condensed by the same glycol (subcritical system).

Project Team:
Gustavo Galdi Heidinger
Rogério Marson Rodrigues
Cassio Lucio Simonetti
Edgard Soares Pinto Neto
Ivair Lucio Soares Junior