

## 2023 ASHRAE–UNEP Lower GWP Refrigeration And Air-Conditioning Innovation Awards

ASHRAE and UN Environment Programme (UNEP) have announced project selections for the 2023 ASHRAE-UNEP OzonAction Lower-GWP Refrigeration and Air-Conditioning Innovation Awards. The award promotes innovative technology developed by teams based in developing countries to minimize the use of higher global warming potential (GWP) refrigerants through refrigeration and air-conditioning applications.

“When it comes to life-cycle carbon emissions for air-conditioning and refrigeration equipment, high GWP refrigerant emissions rank second only to system energy use,” said Bill McQuade, P.E., Fellow ASHRAE, ASHRAE Treasurer. “Over the next decade, as the electric grid becomes ‘greener’ with renewable sources, the transition to low GWP refrigerants will become essential to meeting our decarbonization goals. This award celebrates the significant contributions these individuals have made toward a net zero emissions future.” The four projects selected are showcased here:

### HC-290 (Propane) as an Alternative Refrigerant in Commercial Applications

This cold store project used HC-290 as an alternative refrigerant in commercial applications, resulting in a 36% reduction in energy consumption and a 41% decrease in total equivalent CO<sub>2</sub> emissions. The project also strengthened local technical capacity and provided inputs for updating regulations on flammable refrigerants. A flammability risk assessment was performed following the refrigeration safety standard (EN-378) and the explosive atmospheres standard (EN-1127-1) to identify possible sources of ignition and then implement actions to eliminate those potential sources of ignition, including the use of HC-290 sensors.

*Project Team: Rodrigo Serpa, Fernando Del Castillo, Omarly Acevedo and Ana Correa (Ecuador)*

### Flammable Refrigerant Use in a Draft Beer Machine

A new heat exchanger composition for draft beer machines was developed by this team, allowing for the use of flammable refrigerants and improving

cooling efficiency. The new design reduces the refrigerant charge, eliminates oil accumulation issues and enhances heat exchange between fluids and the intermediate material. The project achieved lower energy consumption and CO<sub>2</sub> emissions while maintaining the size and usability of the equipment.

*Project Team: Eduardo Arjona Esteves, Lucas Cavalin, Roberto Cavalin, David Fernando Marcucci Pico, Davi Telles and Enio Pedone Bandarra Filho (Brazil)*

### Ammonia Use in Multipurpose Cold Storage

The project is a multipurpose cold storage using a low-charge DX ammonia system with air-cooled condensers and electronic expansion valves, a first of its kind in India. This system allows for the storage of perishable produce in both chilled and frozen conditions, offering flexibility and economic viability. The project had a positive environmental impact while reducing water and energy consumption through the use of adiabatic precooling systems.

*Project Team: Harshal Surange and Arvind Surange (India)*

### Propane Chiller Use in a Convenience Store

This team developed a modular low-charge refrigerant chiller using propane as a replacement for HCFC in Brazilian commercial facilities. Innovative features included a centralized control system, capacity control by mass flow variation and the use of low internal volume evaporators and condensers to minimize refrigerant charge. The modular system allows for easy replacement of faulty equipment and eliminates the need for field maintenance. The adoption of a control and pumping unit separate from cooling modules enhanced safety since all electrical power and control parts were separated from the propane circulation environment, thus avoiding possible generation problems.

*Project Team: Fernando Sayols Marchioro, Éder Paluch and Elielton Polityto (Brazil) ■*

For more information on the 2023 ASHRAE-UNEP Lower GWP Refrigeration and Air-Conditioning Innovation Award, selection criteria, judging and how to submit your own project for the 2025 award, please visit <https://tinyurl.com/4ve9ej2b> or [ashrae.org/lowerGWP](http://ashrae.org/lowerGWP)