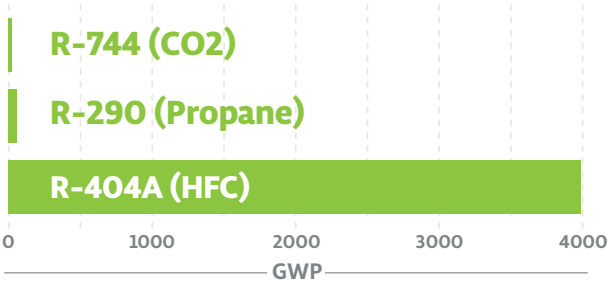
Propane Refrigerant Factsheet

NORTH AMERICAN Sustainable Refrigeration Council

Propane (R-290) is a safe, climate-friendly refrigerant with tremendous potential to reduce greenhouse gas emissions from supermarket refrigeration, but current allowable charge size limits in the U.S. are preventing its full potential as a climate solution.

Global Warming Potential (GWP) Comparison



Propane is a Safe, Cost-Effective, and Climate-Friendly Solution

Propane is a natural, nontoxic refrigerant that has no ozone depleting properties and ultra-low global warming potential. Propane is a type of hydrocarbon refrigerant that has excellent thermo-dynamic properties and is more energy efficient than HFC refrigerants. Propane is one of the best solutions to reduce HFC emissions in grocery stores.

Name	Classification	Ozone Depleting Potential (ODP)	Global Warming Potential (GWP)	ASHRAE Refrigerant Class
Propane (R-290)	Hydrocarbon Refrigerant	0	3	A3 (non-toxic, flammable)

Propane Applications in Supermarkets

Propane and other hydrocarbon refrigerants are already safely used in billions of self-contained refrigerated cases, also known as stand-alone or integral units, around the world today.

Global Technology Adoption (Propane & Hydrocarbons)

+2 Billion household refrigerators and freezers

+4 Million commercial units

+900,000 units in U.S. supermarkets and grocery stores

Benefits of Propane Self-Contained Refrigeration Systems

An emerging trend for supermarkets is a system of self-contained refrigerated cases , also known as a Micro-Distributed System (MDS), to replace a traditional remote system. Propane self-contained refrigeration systems offer many potential benefits over HFC systems.

- **Increased energy efficiency**
- **Reduced cost of installation**
- **Reduced cost of service and maintenance**
- **Lower refrigerant leak rate**
- **Significantly lower GHG emissions (CO2e)**
- **Cost-effective solution to transition existing facilities away from HFCs**

Comparison of System Types Direct Annual GHG Emissions	Traditional HFC Remote System (R-404A)	Self-contained Refrigeration System (R-290)
Refrigerant GWP	3,921	3
Total Refrigerant Charge (lbs.)	3,500	50
Avg. Annual Leak Rate	25%	1%
Direct Annual GHG Emissions (MT CO2e)	1,556	<0.001

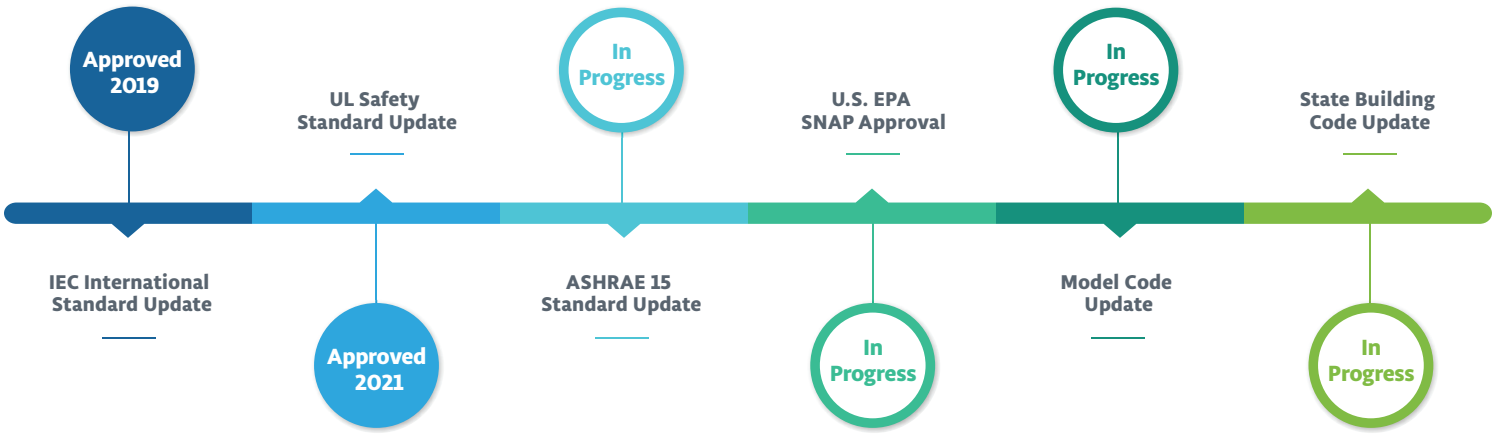
99.9% reduction in direct annual GHG emissions compared to a traditional HFC remote system

Allowable Charge Sizes Are Limiting Propane's Benefits

Currently, propane technology solutions are restricted to a maximum quantity (charge size) of 150 grams of refrigerant per circuit in the U.S., limiting opportunities to improve both cooling capacity and upfront costs. Higher charge sizes are expected to improve energy performance, further reducing their total carbon footprint. Charge sizes up to 500 grams per circuit have been used safely in other parts of the world for years and safety has also been proven through additional testing in the U.S.

Building Code Updates are Needed to Unlock Propane's Potential

The UL 60335-2-89 safety standard was recently updated to allow the safe use of propane in self-contained cases up to 300 or 500 grams in the U. S. **There is an urgent need to update remaining safety standards, EPA SNAP approval, and building codes as quickly as possible to enable a swift, safe, and cost-effective transition away from HFC refrigerants.**



NORTH AMERICAN Sustainable Refrigeration Council

The North American Sustainable Refrigeration Council (NASRC)

The NASRC is a 501(c)(3) environmental nonprofit working to advance climate-friendly natural refrigerants and reduce greenhouse gas emissions caused by traditional hydrofluorocarbon (HFC) refrigerants. We collaborate with stakeholders from across the industry, including over 38,000 food retail locations, to eliminate the barriers to natural refrigerants in supermarkets.