



TRUE MANUFACTURING'S LOW GWP JOURNEY

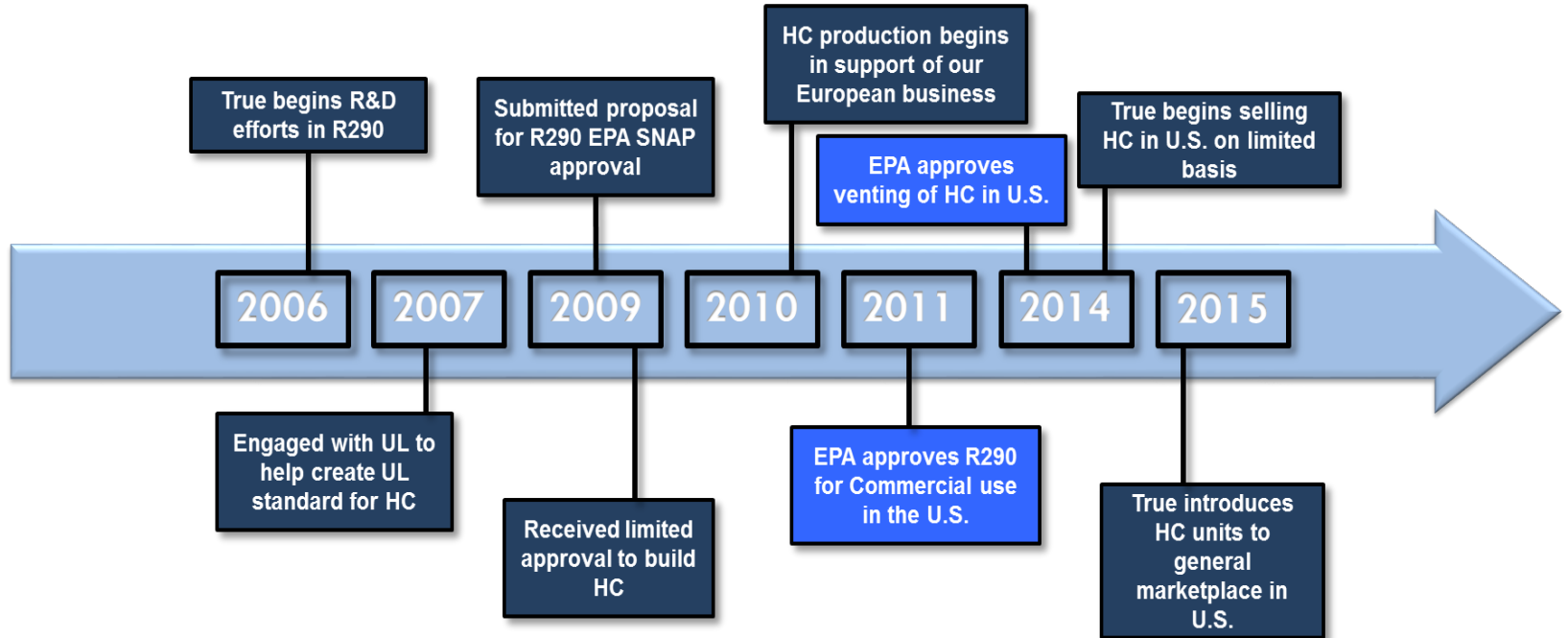


ATMO
sphere

Business Case for
Natural Refrigerants

June 5-7, 2017 / San Diego

TRUE & HYDROCARBON | HISTORY OF DEVELOPMENT



HYDROCARBON (R290)

IT'S NOT NEW

Safe/Proven Technology



- 1.5+ BILLION DOMESTIC HC REFRIGERATORS AND FREEZERS WORLDWIDE
- 40% OF ALL GLOBAL HOUSEHOLD REFRIGERATORS USE HC REFRIGERANTS
- EUROPE ADOPTED HC REFRIGERANT FOR COMMERCIAL USE TWENTY YEARS AGO

Mature Supply Chain



- PROVEN TECHNOLOGY
- RELIABLE COMPRESSOR SUPPLY CHAIN
 - *Multiple suppliers, numerous sizes*
 - *Committed to future development*
- MARKET PROVEN COMPONENTS
 - *Motors, switches, controllers*



SNAP REGULATORY OVERVIEW

CHANGING REFRIGERANTS

Low GWP Refrigerant Alternatives

- R290 PROPANE (60% SMALLER CHARGE SIZE)
- R600A ISOBUTANE (50% SMALLER CHARGE SIZE)
- R744 CO2

REFRIGERANT	GWP	ODP
R404A	3922	0
R134a	1430	0
R290 PROPANE	3	0
R600A ISOBUTANE	3	0
R744 CO2	1	0

Global-warming potential (GWP) is a relative measure of how much heat a greenhouse gas traps in the atmosphere. It compares the amount of heat trapped by a certain mass of the gas in question to the amount of heat trapped by a similar mass of carbon dioxide.



ENERGY SAVINGS AND DoE

TRUE UPRIGHT REACH-IN FREEZERS



MODEL
ENERGY (HFC / R290)
DIF (kWh/d %)
YEARLY SAVINGS

T-23F	T-49F*
5.69 4.36	12.94 8.46
-1.33 -23%	-4.48 -35%
\$48.55	\$163.52



R-290 BENEFITS NOTICED BY REGULATORS

EPA ENERGY STAR EMERGING TECHNOLOGY AWARDS

- 2014 & 2015 High Efficiency Residential Dryers
 - 3 Awards were given out in 2014 & 4 Awards in 2015
- 2015 VFR Commercial Kitchen Ventilation Systems
 - 4 Awards were given out
- 2016 Innovative Refrigerant Systems
 - 2 Awards were given out for Residential Refrigerator/Freezers
 - 42 Awards were given out for Commercial Refrigeration
 - ALL 42 Awards were presented to True Manufacturing





THANK-YOU

