

Sustainable Refrigeration Summit

Connecting the Pieces for Supermarket Refrigeration Solutions



NORTH AMERICAN
**Sustainable
Refrigeration
Council**

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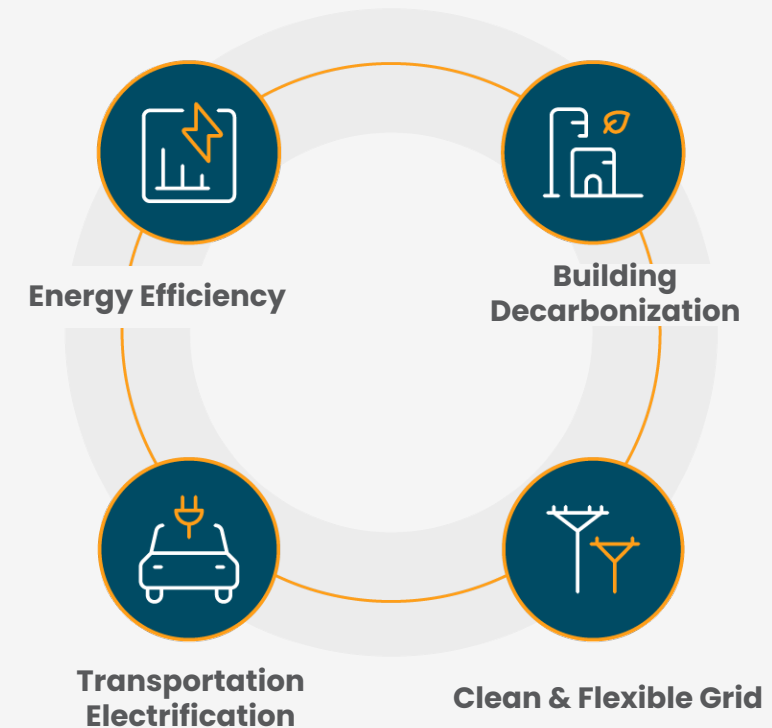
Embedding Refrigerant Management into Utility Decarbonization Strategies

October 28th, 2022

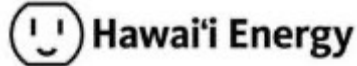
VEIC offers high-impact energy solutions that decarbonize buildings, transportation, and utility grids, today.

- **Nonprofit founded in 1986** with a mission to generate the energy solutions the world needs
- **National consulting practice working across over 75% of the country** advising states, utilities, Federal agencies, nonprofit organizations, and businesses
- **Program design & implementation for award winning energy efficiency and clean energy programs** including program administrator for Efficiency Vermont & the DC Sustainable Energy Utility; on administration team for TECH Clean California (statewide building decarb), CalNEXT (statewide electric emerging tech), Hawaii Energy, and Focus on Energy (WI)

Making an impact within each dimension of energy



Some clients who are making an impact



Demonstrated Impact

Since 2000

GHG reduced

107
Million Metric
Tons

kWh saved

2.7
Billion

Customer savings delivered

\$4
Billion

Managing
Refrigerants
Creates Results
by All 3 Metrics

Our refrigeration story

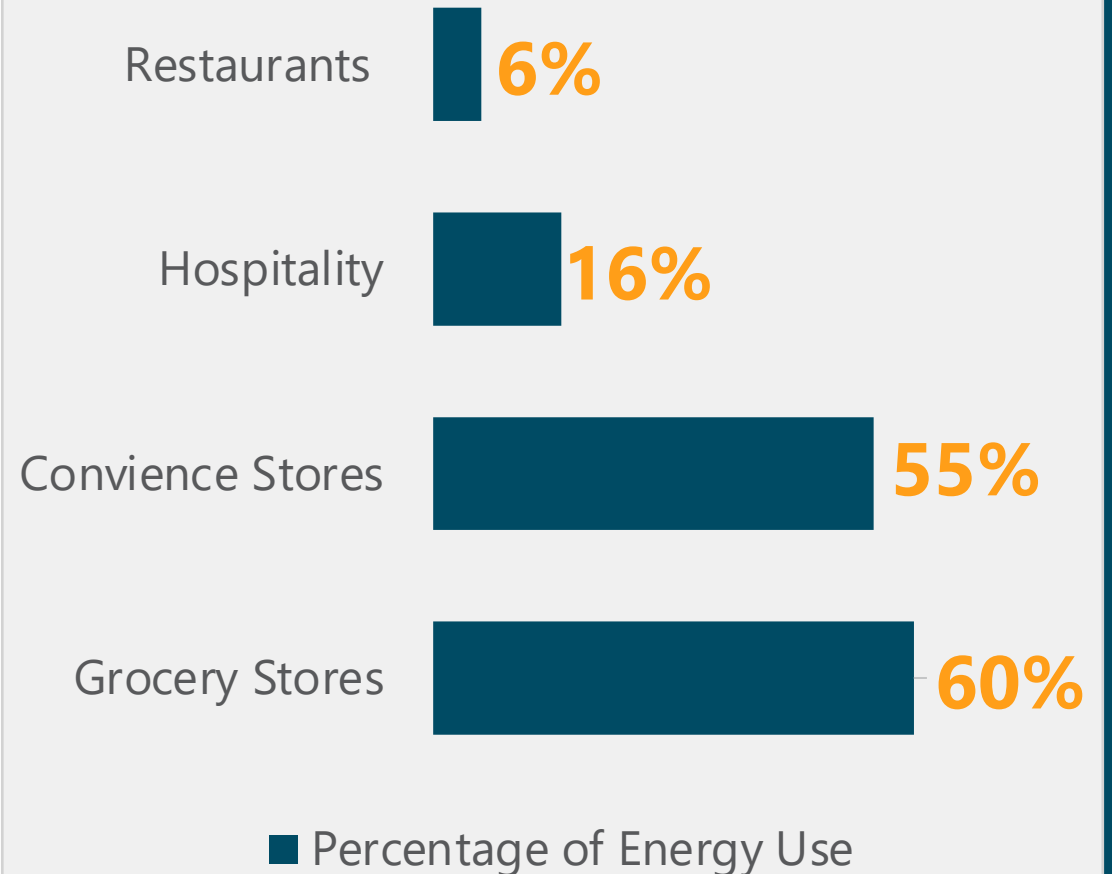
It all started in 2000...

Since then, ... from 4,000 hp ammonia engine rooms to 2 hp condensing units in apple storage rooms **we've worked on it.**

Why do we care?

Refrigeration systems use a lot of energy and refrigerants

Refrigeration accounts for 17% of energy consumption worldwide



What is a refrigerant management strategy?

Projects

- Residential natural refrigerant refrigerator
- Commercial – low-GWP condensing units
- Commercial – natural refrigerant rack system
- Commercial kitchen equipment – natural refrigerant freezers & refrigerators
- Replacing high GWP refrigerants with alternatives (retrofit)

Other Activities

- Leak reduction and mitigation (find and fix)
- Contractor training
- Leak-tight tool kit incentives
- Preventative maintenance

Customers

- Residential
- Commercial – grocery, hotels, hospitals, academia etc.
- Commercial - food banks, distribution centers etc.

What's the value prop?

Customer - refrigeration is cheap compared to the product it is storing (equipment reliability, product quality, reduce O&M costs).

Utilities - refrigeration systems use a lot of energy and refrigerants



Refrigerant management in Vermont – Creating a GHG performance metric

- Tracked GHG reductions associated with programs since 2000.
- 2019, created a three-pronged approach to refrigerant management: (1) refrigerant leak detection and repair, (2) charge reduction, and (3) promotion of natural refrigerants for [commercial refrigeration systems](#).
- Demonstrated the value-stack of kWh savings from refrigerant management (direct efficiency benefits and direct emissions reductions).
- Vermont regulators establish a new GHG performance metric and allocate funding specifically to refrigerant management initiatives.
- **The first U.S. incentivized leak repair program, with aggressive financial support and technical assistance for natural refrigerant systems is established.**

Refrigerant management impact in VT: 2019-2021

- 50 projects: 25 large custom, 25 through Prescriptive Leak Repair Program
- GHG Impact/Year: 2450 MTCO₂e/year
- MWh claimed equivalent: 4,900
- Average annual estimated energy savings per project: 25,000 kwh or \$2,500 at \$0.10/kWh
- Average leakage rate reduction: 12%
- *One General Store in rural VT: permanent leak monitoring system prevented multiple catastrophic leaks in 2020 (=\$\$\$\$ product loss mitigated)*



Refrigerant management in Washington, DC - Supporting a 5-year GHG performance metric

- Tracked GHG reductions associated with programs since 2012
- New 5-year contract cycle (FY 2022 – 2026) adopted a formal performance benchmark and set a cumulative MTCO₂e emissions reduction target
- Only ~80% of target can be met with traditional efficiency. Need to find new energy and—GHG-only—savings measures to help meet this goal
- Targeting expansion of existing refrigeration campaign and refrigerant management opportunities



Refrigerant management initiatives in New York –

NYSERDA R&D

NextGen HVAC Innovation Challenge:
A market-based approach to decarbonization
with refrigerant management in commercial HVAC



NYSERDA
Supported

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O&R Rate Case

Ordering Clause 14: "Orange and Rockland Utilities, Inc. shall consult with Department of Public Service Staff and interested parties CASES 21-E-0074 and 21-G-0073 144 on the integration of the Refrigerant Management Initiative into its energy efficiency program, as discussed in this Order."



Refrigerant management strategies – What makes them successful?

REAL world value

- **Focus on customer value** – incentives, stacked value, future proofing systems
- **Address knowledge gaps** - train contractors and introduce best in industry diagnostic tools to support installation, handling, and service of refrigerant-based equipment
- **Engaging technical institutions** – build technical competency, demonstrate career path value, create accreditation and recognition (industry best practice, certification)

Demonstrate & validate

- **Demonstrate** the effectiveness of up-to-date digital installation tools, leak detection or predictive monitoring with field site studies
- Use **evidence-based data** to validate credible economic, and comprehensive and non-energy savings associated with managing refrigerants.

Quantify & share

- **Conduct a market assessment** - identify and demonstrate potential
- Validate and share a **clear methodology** for calculating MWh & MTCO₂e savings
- **Quantify** impact to reinforce a commercial value proposition, regulatory assurance, and the value of refrigerant management activities for ratepayers

What are the gaps to success?

GENERAL AWARENESS

DATA: Need to create more dataset around refrigerant management initiatives to help support utilities' consideration of specific measures

FUNDING: Need support of demonstration projects, pilots, market potential studies, develop TRM characterizations etc.



Closing thoughts....

- **There are energy savings to be had!** Just because you don't have a decarbonization goal or GHG performance metric, doesn't mean you can't support refrigerant management activities.
- **Focusing on "manage existing HFC stock" with goal to "train and ready" workforce for new natural refrigerant adoption.** Utilities need to make long-term plans for deep decarbonization and achieve climate goals. As valuable as new innovative technology (that use natural refrigerants) will be, market adoption takes time.
- **The value proposition for customers and contractors goes far beyond energy cost savings:** O&M savings are significant, ESG/CSR impact are huge, Workforce Development opportunities are multiple!
- **Digital Tools and Installer Training example:** Long Island Power Authority provides a contractor incentive to buy good tools – getting the latest digital tools into technician's hands can make them more effective and profitable, auto documents test results via phone app and makes refrigerant handling more precise with less leaked to atmosphere – multiple positive impacts for a modest investment.



Thank you

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In the fabulous Hudson Valley, New York

