Europe’s Propane Refrigeration Expansion
Is the U.S. far behind?

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Looking Through a Different Lens to Solve Problems

By Bill Bosway
Group Vice President
Emerson Climate Technologies

A jet pilot, a surgeon and a contractor walk into a bar … or a commercial kitchen or a supermarket. While this may sound like an interesting set-up for a joke, it’s actually an accurate description of a product ideation session that was recently held at The Helix Innovation Center.

There’s no question that the current regulatory climate has placed renewed emphasis on product development, creating a sense of urgency around this effort unlike anything our industry has seen in recent history. In this dynamic environment, it’s easy to look toward new technologies as the only answer — and rightly so. But it’s as important to solve the industry’s challenges to The Helix — our supermarket, commercial kitchen, residential home and data center — as it is to take new ideas, rapidly prototype them, and test their technical and commercial viability in days, even hours in some cases. Before we launch a solution into the market, we can verify its benefits to the industry, including: equipment performance, servicing requirements, and environmental and economic value.

Our new Helix Innovation Center embodies this outward-looking, customer-first philosophy. Partnerships with a number of top-tier universities and government agencies as well as neighboring resources — such as the University of Dayton and the Wright Brothers Institute — have helped us build a strong foundation for our partner network. We’re also seeing vast potential in online contributors and through industrial communities that share kindled challenges.

The model for this type of ideation is unique to our industry: first define the problem and then deploy as many (or more) opinions from outside our organization as there are on the inside. By utilizing the real-world “playgrounds” at The Helix — our supermarket, commercial kitchen, residential home and data center — we’re able to take new ideas, rapidly prototype them, and test their technical and commercial viability in days, even hours in some cases. Before we launch a solution into the market, we can verify its benefits to the industry, including: equipment performance, servicing requirements, and environmental and economic value.

So what’s the punch-line to the above set-up? We hope you’ll bring your biggest challenges to The Helix and find out for yourself. Emerson.com/TheHelix.

Connect to E360 and Continue the Dialogue

Welcome to our sixth edition of E360 Outlook. In 2014, we set out to create an industry-wide dialogue that would address the four “E’s” impacting commercial refrigeration: energy, environment, equipment and economics.

We call this initiative E360 for two reasons: 1) Because it takes a 360-degree view of these four key concerns, and 2) It invites the participation of the entire channel of OEMs, wholesalers, end users and contractors.

For this initiative to be successful, we sought each of your diverse perspectives to shape and drive the conversation. Thankfully, you have answered the call and engaged in many E360-sponsored events. Here’s a snapshot of your participation to date:

- E360 Forums: nearly 700 attendees have joined our five events across the U.S.
- E360 Webinars: close to 5,500 of you have attended a live Webinar, with another 2,600 viewing these events on YouTube or on-demand at our website.
- E360 Outlook: we’ve distributed roughly 5,000 printed copies of our first five editions; an additional 2,600 were downloaded from our website.

The shifting regulatory landscape in the past two years has made this industry dialogue even more critical as we build consensus on the path forward. We will continue to seek your insights as the conversation continues and E360 evolves. If you’re not able to attend any of our events, we encourage you to connect with us via any of the following methods:

- YouTube channel: www.youtube.com/user/EmersonClimateTech; Here you’ll find video playlists from both our E360 Webinars and Forums.
- LinkedIn group: simply log into your LinkedIn profile, search for E360, and join the group to catch up on recent industry news, information and topics of discussion.
- E360 section of our website: EmersonClimate.com/E360; From this portal you can download or view previous E360 Outlook editions, archived Webinars and Forum session presentations.
- Twitter and Facebook: twitter.com/emersonclimate and www.facebook.com/emersonclimate.technologies; Connect with us here for the latest updates and join the conversations.
- And, as always, feel free to reach us through our E360 email address at e360_climate@emerson.com with questions, ideas and contributions. We all have quite a bit of work to do to prepare for the road ahead. It’s more important than ever that we keep the lines of communication open and collaborate toward our common goals.
Europe’s Propane Refrigeration Proliferation

As R-290 based refrigeration becomes more commonplace in the E.U., is the U.S. far behind?

By Allen Wicher
Director of Marketing
Emerson Climate Technologies
The use of propane (R-290) as a refrigerant in commercial refrigeration is the subject of much debate in the U.S. Its A3, flammable classification conjures up negative connotations in the minds of operators, technicians and public officials alike — beliefs that when examined closer are largely unfounded. But in Europe, the use of R-290 based equipment is well into its second decade and continues to play a big role. Some leading retailers are even making it a cornerstone of their refrigeration portfolio. How this may influence R-290 perceptions and its subsequent adoption in the U.S. remains to be seen. We can, however, evaluate R-290’s early adoption in Europe and speculate on its path toward commercialization in the U.S.

**Environmental and energy efficiency drive R-290 adoption in the E.U.**

When it comes to adherence to environmentally sound practices, the European Union (E.U.) and its member countries have consistently been ahead of the curve. The E.U.’s F-gas regulations were among the world’s first actions to phase down hydrofluorocarbon (HFC) refrigerants in favor of low global warming potential (GWP) natural alternatives. At the same time, consumer, OEM and retailer preferences for sustainable goods and eco-friendly systems contributed to driving compliance with these regulations. It’s no surprise then that Europe has led the way in the adoption of natural refrigerants in commercial refrigeration — including R-290.

From an environmental perspective, R-290 is among an elite class of viable green alternatives to many of the industry’s most common high-GWP refrigerants. It’s a naturally occurring hydrocarbon (HC) with a GWP of 3 and 0 ozone depletion potential (ODP). R-290 is a highly refined grade of the fossil fuel propane, and although flammable, it is non-toxic in nature.

R-290’s green potential doesn’t stop there. Its excellent thermodynamic properties — such as pressure, low back pressure, volumetric capacity, capacity and coefficient of performance — are very similar to R-22, even outperforming it in certain parameters. In Emerson Climate Technologies’ test labs and published studies alike, R-290 consistently outperforms R-404A in energy efficiencies. For more than 15 years, retailers in Europe have included R-290 based equipment as part of their refrigeration portfolio. Those who sought to meet environmental objectives and establish green market positions began field trials and deployed R-290 chillers before the regulatory actions to limit HFCs were in place. Estimates vary about the degree of R-290 proliferation, but according to a 2014 study on HC refrigerants in Europe, nearly 0.5 million plug-in supermarket cabinets were in the European supermarket arena alone at the end of 2013, with many calling this a conservative estimate. The same study states that more than 2 million bottle coolers and ice cream freezers were in use throughout the European light commercial refrigeration market at the time research was conducted.

In a region where 150 GWP is the aspirational standard for green refrigerants, R-290 allows retailers to comply with both environmental and energy efficiency requirements.

**A charged issue on both sides of the pond**

Adhering to proper R-290 safety protocols is imperative when considering potential applications. In the E.U., the 150g charge limit recommendation set forth by the International Electrotechnical Commission’s (IEC) safety standards for the use of propane is widely accepted. As a result, Europe has seen a proliferation of R-290 to R-290 yields 20%+ better EER efficiency than R-404A

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**R-290: Separating fact from fiction**

**Characteristics:**
- Naturally occurring, hydrocarbon
- GWP = 3, ODP = 0
- Readily available and affordable
- EPA-approved in commercial refrigeration applications
- High efficiency, high-performance, reliable
- Flammable, A3 classification
- Safe to use when proper protocols are followed
- Globally mandated charge limit of 150g

**Commercial refrigeration applications:**
- Reach-in bottle coolers
- Reach-in freezers and refrigerators
- Integrated display cases
- Ice machines (in current EPA SNAP proposal)
- Under countertop
- Beverage dispensers

**Challenges to wider adoption:**
- Classified A3 Flammable Refrigerant
- Not a “drop-in” refrigerant; equipment and components must be designed for R-290
- Globally mandated low-charge limits of 150g restrict application range
- Difficulty getting approved in fire and building codes
- Lack of trained and certified technicians
- Absence of product and safety training

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**R-404A and R-290 EER Comparison**

R-290 yields 20%+ better EER efficiency than R-404A
based equipment in the light commercial refrigeration segment.

This small charge limit also curbs the use of the refrigeration application. Some E.U. retailers have made attempts to extend the charge limits to enable larger applications and further expand their green footprint. But when charges exceed 150g, E.U. retailers are subject to the approval of national, regional and local governance standards and codes for building occupancy and fire safety. Achieving this approval requires a mandatory risk assessment and third party certification of safe operation—a potentially lengthy process that can be costly and difficult for both OEMs and retailers.

It’s also interesting to note that R-290 adoption varies widely among E.U. member countries. The U.K., for example, has a more flexible stance toward R-290, even approving charges up to 500g for retailers committed to green refrigeration practices. Meanwhile, some territories in France and Italy have yet to employ even light commercial systems, dispelling the notion that R-290 based refrigeration equipment is accepted in all corners of the E.U. To date, some countries have begun to introduce national R-290 safety standards, even applications with small charge limits are subject to the authority of state and local governance, as well as fire marshal jurisdiction—and these differ drastically from region to region. As a result, commercial adoption has been limited primarily to the most

Major E.U. grocer deploys large R-290 display cases, keeps low refrigerant charge

Some E.U. retailers have worked closely with their OEMs to develop larger R-290 based refrigeration equipment that still adheres to the 150g charge limit. Although this helps accelerate the commercialization process, it does add to system complexity. One such example of a successful implementation involved a very prominent retailer who sought to deploy a large integrated display case design that could replace their centralized rack system architecture. The retailer tapped a preferred OEM to develop new integrated cases based on three individual 150g, R-290 circuits in the same case. The design requires three separate R-290 compressors, each with its own supporting system components (fans, valves, piping, etc.). The plan is to install 10 cases per store in up to 1,800 stores each year. The retailer also plans on expanding its operations in the U.S. in the near future.

The path toward broader commercialization of R-290 based equipment and wider adoption in the U.S. is largely dependent upon the development of national standards. While there are still many unanswered questions, the U.S. has the benefit of learning from the European model. As the U.E.’s international standards continue to evolve, the industry is appealing for the option to increase the 150g refrigerant charge limit to much higher allowable charges. Should this become enacted, there’s no question it will influence the emerging standards in the U.S., where the possibility of increasing the charge limit to 300g is already being discussed. This would add flexibility to system design and help transition R-290 to larger commercial applications.

Finally, it’s important to remember that there’s no such thing as a perfect refrigerant. For decades R-22 was considered ideal until it was discovered to contribute to holes in the ozone layer. Its replacement was a class of widely used HFCs that were later found to have high global warming potential. And both of these were man-made compounds. Aside from its potential flammability, which can be managed with proper system design and safe protocols, R-290 is very similar—(or better) in performance to its now-prohibited predecessors.

One very important question remains to be answered: will the U.S. refrigeration industry allow the many benefits of R-290 to outweigh its perceived risks? For decades R-22 was considered ideal until it was discovered to contribute to holes in the ozone layer. Its replacement was a class of widely used HFCs that were later found to have high global warming potential. And both of these were man-made compounds. Aside from its potential flammability, which can be managed with proper system design and safe protocols, R-290 is very similar—(or better) in performance to its now-prohibited predecessors.

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SUCCESS STORY

Five Times the Capacity Without Increasing Energy Costs

New York supermarket quintuples refrigeration equipment during store redesign

Imagine running a supermarket with a full array of refrigeration equipment for just 10 weeks every year. That’s the annual challenge faced by Skopps Supermarket, Inc., a family-owned supermarket in the resort area of Fallsburg, New York. Skopps operates seasonally, serving summer vacationers and local residents from June through late August. The store is open 16–18 hours a day when the tourists come to town. For many years Skopps was located in an older wooden building. By 2015, however, it was clear the business needed to expand to keep pace with Fallsburg’s growing population. An all-new 10,000 square foot store was planned.

Location and tradition made reliability critical

As the design of the new store evolved, refrigeration and AC challenges were a key consideration for contractor Steve Eschenberg of Eschenberg Temperature Control. Reliability was a major concern because the supermarket carries high-quality refrigerated meats, poultry and seafood. Any system failure could create the potential for significant financial loss. Because Skopps is in a rural area, concerns about the local power grid meant the system would have to work safely with a backup generator to prevent downtime during hot weather. Skopps’ owner couldn’t afford to risk equipment loss or damage because of power failure.

The store’s location — 60 miles from the nearest supply house — was another factor that called for dependable equipment. The system also had to be quiet enough to comply with local noise restrictions, because the new store was located close to a vacation home community. And since Skopps is closed nearly nine months of the year, equipment placement was an important factor in deterring theft and vandalism.

Finally, the new location would have approximately five times the refrigeration equipment as the old store. The store owner had a strong desire for the new equipment to be as efficient as possible to keep operating costs under control.

A fast-track job

Eschenberg Temperature Control didn’t have a lot of time to get the refrigeration and AC up and running in the new building. Steve Eschenberg had his first meeting with the store owner in late February of 2015. The new store had to be ready to open by late June.

Eschenberg quickly determined that Skopps couldn’t risk a centralized system. “If we used a central plant, a single fault could impact the whole system,” he said. “We needed to make it modular to limit losses if there was a breakdown.” Space limitations in the new steel building also meant there was no place for a machine room.

Ultimately, Eschenberg worked with Emerson Climate Technologies and Meier Supply Company to design a multiple condensing unit system that met the refrigeration challenge. The system was designed around 18 Copeland Scroll™ X-Line Series Outdoor Condensing Units mounted high on the supermarket’s exterior wall closest to the majority of the refrigeration devices. A pair of 15-ton Copeland Scroll roof units provided the building’s AC needs.

Eighteen wall-mounted, X-Line outdoor condensing units provide quiet, efficient refrigeration for the entire supermarket.

“The XJs were perfect because they’re quiet, efficient, have a lot of interchangeability with a good stock of service parts, and most important, they’re reliable.”

— Steve Eschenberg, Eschenberg Temperature Control
Reliability was a major concern because the supermarket carries high-quality refrigerated meats, poultry and seafood.

“The new store is four times the size of the old and holds five times the refrigeration equipment. Yet the new equipment’s energy efficiency resulted in no increase in energy costs.”

— Joel Lowy, Skopps Supermarket

“This was the only way to go,” Eschenberg said. “The XJs were perfect because they’re quiet, efficient, have a lot of interchangeability with a good stock of service parts, and most important, they’re reliable.”

Despite Skopps’ distance from the nearest supply center, Eschenberg was confident because the system’s interchangeability would allow him to manage most issues with his own supply of spare parts and fuses. “Basically, anything but the compressor is interchangeable,” he said.

The rapid turnaround time made the job tricky, because multiple crews had to work simultaneously during the assembly and installation. Fortunately, the system’s layout allowed for short wiring and piping runs. Eschenberg was able to mount the units on the building’s exterior in mid-May and began wiring and piping in early June, finishing in time for the new supermarket’s opening in late June.

Substantial energy savings makes a happy customer

In its first season of operation, the new system provided consistent and reliable refrigeration and control for the supermarket’s meat and fish cutting rooms, deli, a 34-door freezer, 16 grab-and-go cases, plus produce, dairy, meat, seafood and coolers. The new store is four times the size of the old and holds five times the refrigeration equipment. Yet according to the store owner, the new equipment’s energy efficiency resulted in no increase in energy costs. Power now accounts for a smaller percentage of his expenses than at the old store.

There have been no noise complaints from the neighbors, either. In fact, the units can’t even be heard when customers leave the supermarket. And because the units are mounted high off the ground, there were no vandalism issues during the store’s first winter of 2015–2016. The whole cycle will begin again for the 2016 season when startup and adjustments take place in May.

INDUSTRY EVENTS

NRA Show 2016
McCormick Place
Chicago, IL
May 21–24
show.restaurant.org/Home

ATMOsphere America 2016
The Westin Michigan Ave.
Chicago, IL
June 16–17
atmo.org/events.details.php?eventid=44

FMI Connect 2016
McCormick Place
Chicago, IL — June 20–23
fmiconnect.net

2016 ASHRAE Annual Conference
America’s Center Convention Complex and Marriott
St. Louis, MO — June 25–29
ashraem.confex.com/ashraem/16ctep.csp

FMI Energy and Store Development Conference
Sheraton New Orleans
New Orleans, LA — Sept. 11–14
http://www.fmi.org/forms/meeting/Microsoft/E3602016

HRAI Annual Meeting and Conference
Hyatt Regency
Calgary, Alberta, Canada
Aug. 24–26
hr.ai.ca/events.html

FMI Energy and Store Development Conference
Sheraton New Orleans
New Orleans, LA — Sept. 11–14
http://www.fmi.org/forms/meeting/Microsoft/E3602016

CONFORTECH 2016
Pennsylvania Convention Center
Philadelphia, PA — Sept. 20–22
comfortechshow.com/ct16
Public/Enter.aspx

World Energy Engineering Congress
Washington Convention Center
Washington, DC — Sept. 21–23
energycongress.com
Safety codes for flammable refrigerants are under revision;  
**HFC phase-down continues**

Evolving safety standards for A2L and A3 refrigerants

Flammable refrigerant alternatives are becoming increasingly viable as global environmental regulations push the HVAC/R industry toward low-GWP refrigerants. Naturally occurring hydrocarbons (HC) such as propane (R-290) and a new class of hydrofluoroolefins (HFO) refrigerant blends are among the most likely flammable refrigerants to be considered as replacements. Since these low-GWP options have varying degrees of flammability, they’re subject to requisite standards to ensure safe operating and handling protocols.

In the current industry landscape, there are a number of organizations that have developed codes and standards to manage the safe use of flammable refrigerants. Since the majority of today’s safety standards were developed prior to the increased emphasis on green refrigerant alternatives, many are now currently under revision to include A2L and A3 refrigerants with the intent to evaluate their potential use with modern equipment, applications and system architectures.

When dealing with flammable refrigerants, the following criteria are evaluated to ensure safe use:

- The lower flammable limit of the refrigerant
- Amount of charge in equipment
- Risk of refrigerant leak
- Area where a leaked refrigerant could occur
- Presence of ignition sources

While we can’t predict the extent of the code changes, we can report on the most relevant safety standards currently under revision:

**ASHRAE Standard 34**

In the U.S., ASHRAE Standard 34 defines the flammability and toxicity classification of refrigerants, with the letters A and B designating lower and higher toxicity, and the numbers 1, 2 and 3 denoting the level of flammability from none, lower and higher flammability, respectively. For example, R-290 is classified as A3, meaning it has lower toxicity and higher flammability. This standard was recently updated to include the flammability subclass of 2L for refrigerants that burn slower than those designated as Class 2. Newer HFO blends, such as R-1234yf, fall into this A2L classification.

**ASHRAE Standard 15**

ASHRAE Standard 15 is the U.S. safety standard for refrigeration system design, construction, installation and operation. It adopts the classifications set forth in ASHRAE 34, and is under revision in part due to the inclusion of the A2L classification. The current standard also prohibits the use of A3 and B3 refrigerants except where approved by the authority having jurisdiction (AHJ). Once Standard 15 is revised, ASHRAE will propose revising the building model codes in the U.S.

**International standards**

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<td>The International Electrotechnical Commission (IEC) is in the process of revising its codes that affect heating and cooling equipment, commercial refrigeration appliances, and ice and ice cream machines, including: IEC 60335-2-89 and IEC 60335-2-24. It’s widely anticipated that the standards around charge limits – for both A3 and A2L refrigerants – will be included in the IEC’s revisions.</td>
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As is the case with the US adoption of an existing IEC standard, the international standards are often the benchmark from which global safety standards are implemented. The U.S. is no exception to this rule, although usually with a degree of deviation from the IEC standards. It’s also as important to keep in mind that until national safety standards are both adopted and accepted in the U.S., A2L and A3 applications may be subject to AHJ.

While exact timing on regulatory matters is difficult to predict, we expect some movement in these areas through 2017 due to the urgency of HC and HFO adoption.

**New SNAP proposal**

The EPA recently issued another SNAP proposal regarding the listing status of certain high-GWP refrigerants deemed as “unacceptable” in specific applications. Although the new proposal is relatively smaller in scope, there are a few potential impacts to be aware of, including:

- Listing of R-290 as an acceptable alternative in commercial ice makers, water coolers and very low-temperature refrigeration equipment
- Exempting R-290 from the Clean Air Act’s section 608 venting prohibition
- R-404A will be unacceptable in soft-freeze, frozen carbonated beverage and slush machines as of Jan. 1, 2021
- R-404A will be unacceptable in cold storage warehouse by Jan. 1, 2023

Per usual, the EPA will accept public comments to the proposal for 45 days after publication of the rule in the Federal Register.

Reference

Emerson Climate Technologies recently hosted the University of Dayton’s E-week Innovation Challenge at Emerson’s new Helix Innovation Center. The entrepreneurial student club EMpower and engineering-based KEEN organization also co-sponsored the challenge. The theme of this year’s event was The Supermarket of the Future, and students were asked to brainstorm innovative concepts that addressed the many challenges and opportunities facing grocers today, such as energy usage, convenience, customer experience and even aesthetics.

At the kick-off reception, students gathered at The Helix to learn more about the parameters of the competition. Participants were given the option to work independently or in small groups, although the event facilitators encouraged collaboration to raise the team’s collective IQ. Teams then had one week to come up with a concept and create a presentation that would be delivered separately to the six judges at the adjudication competition.

At stake was prize money for the top three teams in the amounts of $1,500, $1,000 and $500, respectively. Participants were judged on their ability to demonstrate the technical and financial feasibility of deploying their concept by 2050. In addition, teams were instructed to keep KEEN’s three C’s in mind: curiosity, connections and creating value. Finally, participants were reminded to not forget the all-important “wow factor” when conceptualizing and presenting their ideas.

Dr. Rajan Rajendran, vice president of system innovation center and sustainability, explained at the opening reception that this event not only showcased the ingenuity of UD’s engineering students, but also highlighted the partnership between Emerson and UD at The Helix.

“One of the dreams we had when conceptualizing this unique facility was to be able to host educational events just like this,” Rajendran said.

Before leaving the opening reception, students were presented with an exercise to get their “brain stirring” in motion. Each team was given 15 minutes to build the tallest free-standing structure possible using 20 sticks of spaghetti, one yard of tape, one yard of string and one marshmallow (which also had to be placed on the top of the structure). As expected, the exercise yielded diverse designs as teams scrambled to achieve this objective.

The winning concepts

Exactly one week after the opening reception, the students returned to The Helix with their poster boards to pitch their concepts to the judges. It was immediately apparent from the first presentations that the teams had not only clearly understood the challenge but also had significant insights to contribute.

Among the six judges on the panel that night was Don Newlon, vice president and general manager of refrigeration marketing at Emerson Climate Technologies. Newlon was impressed by how the teams synthesized the task at hand with their diverse individual perspectives.

“It was impressive to see how well the group as a whole responded to the challenge, and how their unique millennial mindset produced solutions geared toward...
Given the changing HVAC&R landscape, a new approach to innovation that involves all links in the refrigerated equipment value chain is required. During our recent E360 Webinar, we highlighted the inclusive, collaborative approach that is driving the development of future technologies:

- The current focus of Emerson Climate Technologies’ innovation efforts
- The fundamentals of the innovation process
- The importance of rapid prototyping and testing in real-world conditions
- Why collaboration is needed to solve today’s big problems
- The Helix’s supermarket refrigeration and foodservice modules
- How The Helix’s environmental control room can simulate virtually any ambient condition

Don Neeloo, Emerson’s VP/GM of refrigeration marketing and Eddy Rijns, University of Dayton’s dean of the School of Engineering present prize money to the challenge winner, Nicolas Carducci.

Participating E-week Teams

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Currently, the supermarket refrigeration and foodservice modules for a streamlined shopping experience. The app displays nutritional information and expiration dates for the ingredients needed to make specific recipes, and then determines which items need to be purchased at the supermarket. The shopper then uses this app to order the missing ingredients and pick up the order at their preferred store location. The All in One app allows end users to keep track of caloric intake by entering the number of servings consumed in a particular recipe, and even provides push notifications for food expiration warnings.

Second place ($1,000): Manjunath Ayyappadur, Christopher Wagner

Carbon Emissions: The first runner-up team pitched an innovative app that gives environmentally conscious shoppers a way to calculate the carbon footprint produced by their eating habits. By assigning a carbon equivalent value to each grocery item in the supermarket, consumers have the option to choose items that minimize their carbon footprint.

Third place ($500): Noelle Jacobs, Michael Keller, Sarah Stratil

STC Supermarket: This eco-friendly concept centers on a three-pronged approach that combines solar-equipped parking lots, self-scanning grocery carts and community food trucks to drive sustainable, technologically advanced and community-oriented supermarkets.

In addition to the three winners, six teams earned an honorable mention distinction. All in all, the event proved that the spirit of innovation is alive and well in our collegiate class. We can all rest assured that the future of the supermarket industry is in good hands.
**Bridging the Refrigeration Gap**

**Industry needs to address the shortage of commercial refrigeration technicians**

For more than a decade, the lack of qualified technicians in HVACR has been a growing problem in the U.S. While this issue is often attributed to the larger HVACR trade, refrigeration is where the biggest challenge exists. In fact, if you’re a mechanically inclined entrant seeking technical training in the U.S., you may be hard-pressed to find a vocational school or technical college nearby that specializes in refrigeration.

Recent industry statistics help reveal the extent of the technician shortage. An ACHR News article estimated that more than 27,000 skilled technicians are projected to retire annually. Meanwhile, according to the United States Department of Labor, Bureau of Labor Statistics, only 15,000 trained HVACR technicians are entering the workforce annually, and the industry is expected to grow 21 percent through 2022. The most conservative estimates indicate the current technician shortage to be roughly 20,000, with that number expected to increase dramatically in the near future.

In annual contractor roundtables hosted by Emerson Climate Technologies, the lack of qualified refrigeration technicians is consistently cited as the number one challenge contracting business owners face. Although different HVAC initiatives have attempted to address the issue through the years, the situation for refrigeration has not improved. On the positive side, we’re beginning to better understand the roots of the problem and where to focus our efforts.

**What is the refrigeration gap?**

The refrigeration gap may be defined as follows: a shortage of qualified refrigeration technicians available to service increasingly diverse and complex refrigeration systems and applications, compounded by limited access to training programs offered throughout the nation’s career vocational schools and technical colleges. Adding to this challenge is an industry dealing with continually evolving regulations and emerging technologies. While most of the nation’s technical schools offer accreditation in the AC trade — complete with hands-on training with the industry’s most commonly used equipment — very few of these schools are equipped to support the breadth of equipment and system architectures required to educate refrigeration technicians.

Refrigeration technicians must be equipped to deal with a much broader range of refrigerants and application temperatures, as well as myriad system architectures.

**E360 Forum panel discussion**

The technician shortage was the focus of a spirited panel discussion at our most recent E360 Forum in Atlanta. Panelist Dan Steffen, vice president of AAA Refrigeration; talked about the misperception surrounding what is essentially an extremely viable career opportunity.

“At trade shows, I talk with many peers who don’t want their kids going into this profession,” Steffen said. “The truth is this is a great industry for smart people, and until they find another way to preserve food, this is a recession-proof industry. It’s an opportunity not just for a job, but for a career. We need to change perceptions from within,” he added.

Jim Alexander, chief technical officer at Epic Services, said that one way to attract a new generation of talent into the industry is by better engaging with them on social media. “The industry does not have nearly enough exposure to youths entering the job market. We need to do a better job getting our message out and meet them where they live on social media,” he said.

Ross Fazio, service director of Fazio Mechanical Services, shared that this career opportunity was never presented to him in high school. “When I told my friends I was a refrigeration contractor, they thought I fixed refrigerators. High schools need to do a better job of educating the trades instead of just college,” he said.

Vet2Tech co-founder George Nicholson, whose group connects U.S. military veterans with jobs in the HVACR, commercial food equipment and residential appliance repair industries, said vets coming back into the workforce want more than just a job. “They know they will start as a tech, but they want a career path. We need to show them where they can go with this career and give them a road map for how to get there,” he said.

**Building an industry-wide coalition**

While the panel discussion didn’t produce a solution to the growing problem, the panelists all agreed that it will take the concerted effort of the entire HVACR industry to turn the tide. Everyone has skin in the game, from contractors, OEMs, distributors, industry organizations and trade publications.

To be successful, we will need to leverage the collective strength of the entire industry and develop strategies to attract, recruit and retain new technicians to the HVACR industry.

Starting points for executing on this strategy could include:
• Bringing together industry stakeholders to holistically evaluate and address the problem, and determine a plan of action
• Expanding certification opportunities geared specifically toward commercial refrigeration
• Leverage new media to recruit the next generation of entrants into the refrigeration business
• Demonstrate a clear path for career advancement and longevity

We know that the commercial refrigeration trade offers tremendous potential to a new generation of job entrants. But, we need to figure out how to get this message out to the public. It will require the participation of all industry stakeholders to brainstorm new ideas and bring them together in a master plan.

Emerson Climate Technologies is committed to becoming a champion of this effort. Stay tuned for more information in subsequent E360 events and publications.
BUILDING CONTROLLER

To quickly respond to issues that may impact:
- HVAC discharge and space temperatures
- Energy usage

Indicators, including:
- Collecting data on important performance
  optimization and control over key store
  experiences for patrons. It means keeping
  close watch over every store system and
  ensuring proper food refrigeration and
  sacrificing their commitment to convenience
  more like foodservice providers.

While this data enables store managers
- Setting of alarm thresholds to alert
- Interface design keeps the majority of
- All store equipment visible on one
- Refrigeration setpoints and lighting
- Detailed floor plans allow the manager
- Performance meter identifies equipment
- Detailed floor plans allow the manager
- Detailed system questions to alert
- Detailed system questions to alert

To enable enterprise-level visibility, site
management and advanced support services, the
ecoSYS platform offers optional extended capabilities. Site Supervisor
- Connects to refrigeration
- Connects to building control devices
- Connects to condensers
- Connects to circuits

Site Supervisor provides control and logging of nearly every aspect of a facility’s refrigeration and building systems.
Thank you for reading this edition of E360 Outlook! At Emerson, we believe the challenges faced by the refrigeration industry cannot be solved in a vacuum. Only through collaboration and a commitment to innovation will we discover answers to the difficult questions before us.

We hope the information provided here will spark conversations and open all of our eyes to new perspectives. But for that to happen, we all need to contribute. And that starts with you. Feel free to contact us with your feedback, questions and insights. We look forward to hearing from you.

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