



Meet Me at the Intersection of CO₂ Technology and Humanity

HPX Industrial Refrigeration and KPS Global collaborate with Vermont Food Bank on environmentally sustainable refrigeration solution

In the worlds of commercial and industrial refrigeration, there is always something brewing in the marketplace. And, with all the rules and regulations that already abound, and yet more to come on the near horizon, it should come as no surprise that change is inevitable. So, we recently posed a question to refrigeration technicians at one of our training venues: “What’s new and exciting to you in the world of refrigeration?” One technician’s answer had us initially scratching our heads. He said, “Meet me at the intersection of humanity and technology and I will tell you all about it.” And while that comment may have been short on words, it turned out to be oh-so-long on meaning.

As his story unfolded, it had all the traditional players; the customer, the needs and the supplier proposing solutions to those needs. But this is where the story departed the everyday and dove deep into the world of something very special. You see, all needs are not born equal. And while you’ll find it difficult to achieve solidarity of opinion as to what

makes one set of needs more important than another, there is one measuring stick that stands out from the rest when it comes to making such comparisons — namely, “Just what happens if those needs go unfulfilled?” And when the answer to that question becomes that people will suffer hunger and perhaps even starvation, allowing one of the most basic of human needs, eating food, to go unfulfilled, we can all see the needle on that proverbial “needs meter” bouncing against the top.

Nationally, *Hunger in America 2014* (the largest and most comprehensive insight study into charitable food distribution in the United States) found that more than 46 million people turn every year to agencies and programs of Feeding America, a network of over 200 food banks. The Vermont Foodbank, which opened its doors in 1986, has been a member of that network since 1994. Their mission statement is straightforward — “to gather and share quality food and nurture partnerships so that no one in Vermont will go hungry.”

Deeming this as a “lofty” goal would be an understatement. Nicole Whalen, director of communications and public affairs for Vermont Foodbank, dimensions the challenge for the state of Vermont alone with some eye-popping statistics:

- 1 in every 4 Vermonters, or an estimated 153,000 residents, have a hunger problem requiring them to turn to food shelves and meal service programs.
- This includes 33,900 children and 26,010 seniors.

The bottom-line need is there are hundreds of thousands of everyday Vermont folks — including children, seniors and working families — who are unable to put enough food on their table to avoid going to bed hungry that night. Enter the Vermont Foodbank who acquires and distributes over 12 million pounds of food each year through 215 network partners around the state — food shelves, pantries, senior meal programs and other community meal sites — utilizing a modest staff and over 1,500 volunteers operating out of three Vermont distribution facilities with the headquarters located in Barre, Vermont.

These herculean efforts have been conducted by the Vermont Foodbank amid a number of significant operational challenges, ranging from a major paradigm shift involving the sources and types of donated food to the current impact and constraints of fulfilling their mission in the midst of the Covid-19 pandemic. The “food banking industry” continues to change in significant ways. Not long ago, donated food came in the form of trailer loads of “salvage” involving dry goods from the grocery industry. However, the emergence of “secondary food markets”, with channels like factory outlets, off-price and discount stores, dollar stores, flea markets and online auction houses, provided food retailers with an option for disposal of their surplus where they still would receive some revenue stream in return. As things shifted, Vermont Foodbank saw a decline in donated, nonperishable goods and began purchasing more perishable types of food from diverse sources like farms, individual food retail stores, and small processors to make up the difference.

The Vermont Foodbank (VF) was at a crossroads. Now staring at large quantities of fresh, perishable food that had to be properly managed and maintained with refrigeration, along with an old facility with insufficient space and lacking other key capabilities, and still working to an out-of-date business model incapable of handling the efficiencies mandated by this “new world”, decisions had to be made and actions had to be taken. In the words of Nicole Whalen, “These were unprecedented times that demanded an organization capable of creativity, innovation and inspiration — and we had just the right team for the job!”

Nicole and the VF team realized that they first needed a comprehensive plan to achieve the required degree of change. They formulated a “Capital Campaign” with primary focus on four elements:

1. Refrigeration – providing the capability to properly control temperatures and efficiently manage the large quantities of fresh, perishable foods they were now receiving.

2. Expansion – increase the facility size to accommodate the growth in volume in an efficient manner. Putting this in perspective, fresh produce distribution alone by VF increased from less than 250,000 pounds in 2004 to over 2.2 million pounds in 2019!
3. Renovation – broad-based in scope, ranging from altering physical facilities to organizational structure to their business model with its everyday process for conducting their mission.
4. Expansion of fresh food programs.

The VF Capital Campaign took full advantage of the opportunity of working together with several large organizations, all collaborating together with the singular purpose of meeting the VF critical mission.

Initially, KPS Global®, an industry-leading manufacturer of walk-in coolers and freezers, worked together with the ReArch Company, a Vermont-based innovative real estate development, construction, and property management firm, to design an outdoor walk-in cooler and freezer to accommodate the challenges brought about by the shift in foodbank donations to more perishable items. The decision to build the ~14k sq. ft. combination walk-in cooler and freezer outdoors was driven by space constraints in the existing building. KPS Global not only manufactured the panels but also engineered the roof and steel of the building.

With the physical facility design in hand, attention now turned to the need for refrigeration — what technology existed out there that could best meet their need to serve humanity? The idea of using CO₂ as a refrigerant surfaced to the top of the discussion as the most attractive option to VF, driven in large part by its environmentally friendly nature and the corresponding sustainability benefits it offered. Jason Maring, VF's COO, was able to draw on his prior experience working for a local, prominent, community-owned food cooperative, who employed a Hillphoenix Advansor CO₂ Booster System for all their refrigeration needs. As Jason recalls, "I had knowledge of some refrigeration companies from my time at the local food co-op. Hillphoenix was the popular brand with the solid performance track record, so I encouraged the architect and builder to reach out to them."

And so, Hillphoenix, a leading manufacturer of display cases, specialty products, commercial and industrial refrigeration systems, power systems and comprehensive services was brought in to join the collaborative effort. Collectively, the project team conducted a site visit to the local co-op to get a better understanding of the Hillphoenix CO₂ system in operation and how it would serve as the optimal solution for providing the needed refrigeration to the new outdoor VF facility. From a financial standpoint, the first cost difference between traditional HFC refrigerant systems and CO₂ can be significant challenge to overcome. However, this cost difference is mitigated quite effectively by the robust return-on-investment (ROI), driven by a variety of factors, that CO₂ offers beyond the system installation. After analysis of all the incentives and energy savings on utilities they would receive, the foodbank estimated the payback would be approximately 3 years while the net result would be a reduction of an estimated 170 tons of CO₂ emissions annually.

Leveraging the collective power of their collaborative project team, the Vermont Foodbank overcame the initial "first cost" hurdle with the financial assistance of "Efficiency Vermont", an organization dedicated to helping the state transition to a more affordable and cleaner future by working with partners throughout Vermont to save customers money, strengthen the state's economy, and lower carbon emissions.

Jason Maring recalls the VF team bringing closure to their decision-making process. "Our goal was to be as environmentally sustainable as possible while still meeting all the functional and budgetary requirements we had. CO₂ offered us reduced system energy cost, invaluable environmental sustainability and responsibility, along with a refrigerant that was non-volatile, inexpensive and devoid of any harmful effects to our planet," he stated. "With the performance and efficiency savings we witnessed at the local co-op, along with the financial help we received from Efficiency Vermont and the associated favorable environmental benefits of using CO₂, we were sold on CO₂ refrigeration as the technology we needed to achieve our mission," he concluded.

And so, the intersection of technology and humanity was consummated with the installation and commissioning of the new KPS Global walk-in cooler and freezer with its companion Hillphoenix Advansor CO₂ Booster System for refrigeration by VF in 2019. Nicole Whalen has many positive things to say about their experience to date with the new refrigerated facility, but among them, she likes to encapsulate it all by succinctly putting it in the perspective of the Vermont Foodbank mission — “We have drastically improved our ability to provide Vermonters in need with more fresh food, more efficiently!” she proclaims. Nicole is careful to point out and emphasize that their Capital Campaign is a “work-in-progress” in its initial throes, having made its first few significant steps now, yet having a long way to go. But her enthusiasm for the future of VF is evident as she points out, “Our new refrigerated facility has revolutionized our operation and positioned us well to tackle our future needs. It didn’t take us long to realize that we cannot do our important work without it!”

And important work it is indeed. The advent of the Covid-19 virus has created a food security crisis the likes of which we have never seen in our lifetime. Nicole and her team feel up to the task. “These are new waters we are forced to navigate,” she said. “But our creative, innovative, and inspiring organizational response will meet the challenge. To that end, the addition of our new KPS Global walk-in cooler and freezer facility, powered by the Hillphoenix Advansor CO₂ refrigeration system has been invaluable!”

So, if you’re ever wondering how refrigeration can have a direct and profound impact on the basic needs of humanity — Meet me at the intersection of technology and humanity — Boy, have I got a story to tell you!