

The Rising Cost of Power

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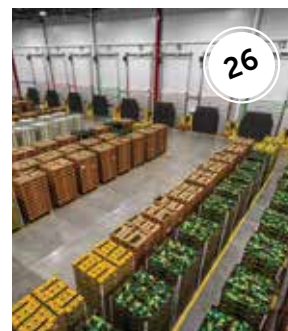
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Newly Named Global Cold Chain Foundation Launches

IT IS MY PLEASURE AND PRIVILEGE TO ADDRESS MY FELLOW GCCA MEMBERS AS THE FIRST ELECTED CHAIRMAN OF THE BOARD OF GOVERNORS OF THE newly named Global Cold Chain Foundation, formerly the WFLO. We are excited to launch this new name as we feel it better aligns the Foundation with GCCA as well as the position it holds in the marketplace. The board of governors undertook a strategic planning initiative to better clarify the mission and focus of the Foundation. A new strategic plan ensures the Foundation will continue to:

1. Deliver intelligence and research that allow members to make informed business decision.
2. Train the next generation of cold chain industry leaders.
3. Support the development of a robust and efficient cold chain globally.

Constant in its popularity and value to members is the WFLO Institute program, now renamed the Cold Chain Institute to better reflect the industry being served by this valuable training and development event.

As the core provider of temperature-controlled warehousing and logistics training, the Institutes have been the capstone in GCCA's education program for almost 60 years. After being unable to hold the 2021 Institute program due to the pandemic, the Institute is back on track with events being held both in 2022 and again in 2023. Attendance at the 2023 East and West Institutes in the United States were the largest in the history of the program. A record number of students attended with 168 more students in 2023 than 2022, and 50 more students graduated in 2023 than in the previous year. These numbers are testament to the importance of education and training in our industry.

Latin America will host its 10th Annual Cold Chain Institute this July in Mexico City, and the Cold Chain Institute Australia will be back in Melbourne this May with a year 1 and 2 curriculum being delivered.

An uptick in cold chain development projects parallels a surge in member interest in participating in these projects that help build and secure the global cold chain for the future. GCCA noted record attendance at its development project webinar in early February.

Engaging in projects that are helping emerging economies and lower-income countries meet the challenges of growing a safe and efficient cold chain can be a recruiting tool as well as one of the best ways company management and executives can quickly learn the intricacies of industry abroad. Read the Cold Chain Development column on page 36, and in every issue of Cold Facts, to learn about key projects with members, aid organizations and international development partners.

In addition to development projects, the Foundation will work with the Global Food-Banking Network (GFN) and Feeding America® to strengthen the relationship between companies handling and storing food and organizations redistributing it to those experiencing food insecurity, significantly reducing food waste. Complimentary membership is open to any and all food banks and food rescue groups globally. See the Cool Person column on page 54 to learn more.

As we look forward to the future and the growth of the industry and Foundation, we are pleased to have a mission, vision and strategic plan. They will elevate our positioning within the industry, government and international communities. With your continued support and innovative GCCF programs and initiatives that bring value to all of us, we can continue to work towards these goals. ☺



GREG LAURIN
CHAIRMAN
GLOBAL COLD CHAIN
FOUNDATION (GCCF)

COLDFACTS

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EPA DEVELOPS PROPOSED RESTRICTIONS

Agency proposes HFC phasedown rule for refrigeration sector.

By Lowell Randel

The U.S. Environmental Protection Agency (EPA), on December 9, 2022, announced a proposed rule under the American Innovation and Manufacturing (AIM) Act to advance the transition to more efficient heating and cooling technologies by restricting the use of hydrofluorocarbons (HFCs) in certain products and equipment.

The AIM Act authorizes the EPA to limit or prohibit the use of HFCs in specific sectors and to phase in these requirements over time as appropriate. The proposed rule addresses numerous stakeholder petitions presented to the EPA and granted in October 2021. The regulation would restrict the use of HFCs used in certain foams, aerosol products, and refrigeration, air conditioning and heat pump equipment beginning in 2025. The EPA has listed entities potentially impacted by the rule including companies that manufacture, import, export, package, sell or otherwise distribute products that use or are intended to use HFCs. These include refrigeration and air-conditioning systems, heat pumps, foams and aerosols.

Under the AIM Act, the EPA is implementing a national HFC phasedown to achieve a 40% reduction below historic levels

starting in 2024 and an 85% reduction by 2036. The U.S. phasedown is also consistent with the schedule in the Kigali Amendment to the Montreal Protocol. This is a global agreement to phasedown HFCs that the United States joined in October 2022.

A global HFC phasedown is estimated to avoid up to 0.5 degrees Celsius of global warming by 2100. The EPA has estimated that this proposed rule would provide greenhouse gas emissions reductions of up to 35 million metric tons of carbon dioxide equivalent (MMTCO₂e) per year.

The EPA estimates that the proposed rule would result in significant GHG emissions reductions benefits while providing savings to American consumers and industry through energy efficiency gains and lower cost alternatives. The proposal would result in cumulative GHG emissions reductions ranging from 134

to 903 MMTCO₂e through 2050.

The agency estimates that the cumulative net benefits of this proposed action are between \$13.1 billion to \$56.3 billion from 2025 through 2050. The GHG emissions reductions from this proposed action would provide between \$5 and \$51 billion in climate benefits. The EPA further estimates that the proposed rule would also save U.S. industry and consumers between \$5 to \$8 billion from 2025 through 2050. This would be as a result of improved energy efficiency in refrigeration, air conditioning and heat pump products and lower cost alternatives.

The EPA is proposing to restrict the use of certain higher-GWP HFCs in aerosols, foams, and refrigeration, air conditioning and heat pump products and equipment. The proposed rule would prohibit manufacture and import of products containing restricted HFCs by January 1, 2025, in most cases. The sale, distribution, and export of products containing restricted HFCs would be prohibited a year later. In most cases, that would be January 1, 2026.

The EPA developed the proposed restrictions after reviewing petitions and holding stakeholder workshops. It also considered an extensive list of factors as specified in the AIM Act, including the availability of substitutes,



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safety and the overall economic and environmental impacts.

The proposed rule includes a list of proposed GWP limits for a variety of sectors and types of refrigeration systems. In many cases, the EPA is proposing to set a 150 GWP limit for systems with a refrigerant charge of greater than 200 pounds and a 300 GWP limit for systems with a charge less than 200 pounds. Below is a table of selected sectors relevant to GCCA members.

In addition to setting GWP limits for new refrigeration systems, the EPA is also proposing to prohibit the use of specific refrigerants in particular applications. The following refrigerants would be prohibited for use in new systems for transport refrigeration in road and marine systems starting on January 1, 2025:

- R-404A, R-507, R-507A, R-428A, R-422C, R-434A, R-421B, R-408A, R-422A, R-407B, R-402A, R-422D, R-421A, R-125/R-290/R-134a/R-600a (55/1/42.5/1.5), R-422B, R-424A, R-402B, GHG-X5, R-417A, R-438A, R-410B

It is important to note that the restrictions proposed by the EPA would be for new refrigeration systems.

Selected Proposed GWP Limit Restrictions on HFCs by Sector and Subsector by January 1, 2025	
Sectors and Subsectors	Proposed GWP Limit
Industrial process refrigeration systems with refrigerant charge capacities of 200 pounds or greater	150
Industrial process refrigeration systems with refrigerant charge capacities less than 200 pounds	300
Industrial process refrigeration, high temperature side of cascade systems	300
Cold storage warehouse systems with refrigerant charge capacities of 200 pounds or greater	150
Cold storage warehouse systems with refrigerant charge capacities less than 200 pounds	300
Cold storage warehouse, high temperature side of cascade system	300
Chillers – industrial process refrigeration	700
Transport refrigeration – Intermodal containers	700

Existing systems using HFC refrigerants would not be required to make a change unless they are going through a major change or retrofit.

GCCA will continue to closely monitor the EPA's activities as it moves forward with the rulemaking, and update members throughout

the process. A final rule is expected by September 2023. ☞

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THE RISING COST OF POWER

Geopolitics slam energy costs and accelerate innovation and renewable alternatives.

In the past year, geopolitics has brought war, and as a result, the cost of power is on the rise around the globe. Serious issues for a cold storage industry that counts energy as its second largest expense after labor.

The impact on the bottom line is further incentivizing innovation. The rising cost of energy is also accelerating the transition to renewable energy sources for Global Cold Chain Association member companies around the world.

Global Disruptions

“We are looking at increased expenses for energy use, transport and storage, which can affect product quality and lead to supply chain disruptions,” says Joris Olbrechts, Director of Jodifrost, based in Europe. “In worst case scenarios, these disruptions can have global implications such as food waste and environmental damage.”

“By its very nature, cold storage logistics is energy intensive,” points out Raul Fores Valles, Regional Vice President, Southern Europe at Lineage Logistics. “I think what’s interesting is how we react as an industry to the longer-term challenge and opportunity created by this major energy disruption.”

Valles says the company is transitioning to renewable energy sources in the long term. “We are also deploying more efficient insulation and other technologies that will allow us to reduce our exposure to extreme energy price fluctuations, like the ones we face now.”

Because of supply and demand issues, energy disruption has become a common occurrence in the cold chain industry, says Kulsoom Khan, Energy Efficiency Manager at Congebec, based in Canada. “As a result, companies have started to invest in alternative fuel technologies to produce back-up power such as solar-battery energy storage system and diesel generators.”

R.J. Neu, President and Regional Partner at RLS Alliance, makes the point that as the cost of energy rises so does the cost of everything else. “In 2022, we saw about a 15% increase in electricity cost in Southern California,” he says. “Today our best option for running our refrigeration equipment is electricity, and we cannot simply turn it off. When energy costs go up, it hits straight at our bottom line, and it is a cost that we have to pass on to our customers.”

“Most power is generated by gas at the moment, and for the foreseeable future,

natural gas will be important, especially in markets where it can be sold at a profit,” notes Mike Lynch, Senior Vice President of Engineering at United States Cold Storage, Inc. “As a result, a lot of natural gas is exported to Europe and Asia putting pressure on domestic prices – that’s the impact of geopolitical events.”

Short-Term Fixes

Olbrechts suggests that to help control energy costs in the short term, cold storage companies can improve insulation, use energy-efficient refrigeration equipment, optimize temperature control systems and implement demand-response programs.

“Cold storage companies need to be operating as efficiently as possible, and every warehouse should conduct an energy audit to find and close the gaps” Lynch offers. “That will have an immediate impact on the bottom line.”

Lynch adds companies should be investing in technology that reduces energy, looking at control systems and seeking efficient roof options – anything to reduce energy costs.

Neu says in the short term, companies can undertake maintenance projects and update the building infrastructure. “Make sure doors are sealed and there are no air leaks, and change to more efficient lighting with motion detectors.”

“Recently, there have been calls by various companies to the government to cap energy costs for the food cold storage industry. This is one way to control energy costs temporarily and for the short term,” notes Khan. “In addition, some companies are also looking into PPAs (power purchase agreements), which are becoming more prominent in North America.”

Long-Term Solutions

“I feel that new innovations in equipment and

building materials is key,” Neu suggests. “In the past, if you needed a building colder, you threw horsepower at it, which consumed more energy. With innovations in science and engineering, we now have more efficient equipment and better control over the horsepower.”

Valles says long-term sustainability efforts take a few different forms at the company. “One is building out our suite of advanced technological solutions, both software and hardware, to improve efficiency within our warehouses, therefore reducing waste and reducing our environmental footprint.”

He adds the second approach is fully automated warehouses that can be built taller, store more in the same footprint and minimize heat entry via the roof – decreasing the demand on the refrigeration system.

“We also see our people as key to reaching our sustainability goals,” Valles explains. “We need talent that’s equipped with the right skills to help us reduce waste and use this cutting-edge technology to the best of its ability.”

“The long-term strategy for energy costs is either procure electricity more efficiently or generate and supply your own,” Lynch says. “Cold chain companies should be making investments in renewable assets, like solar or wind, that will mitigate the risk of rising prices.” Lynch adds that solution is only available to some operators as it requires capital investment and space.

Lynch supports deploying onsite generation through wind or solar microgrids to cap energy costs as a long-term solution. He sees very limited opportunity for PPAs where the warehouse secures power through renewable sources, such as grid scale wind and solar farms, and locks in at a fixed priced for anywhere from seven to 15 years. “These agreements are very regional and very rare but do exist,” Lynch says, “I’d love to see PPAs expanded, but federal regulations will likely be

an obstacle, and I don't see them taking off."

As part of a long-term approach, Lynch believes sustainability should be elevated and emphasized as an issue by GCCA, and a subcommittee should be formed. "I think we need an outreach program to solar companies to bring them to the table," he says. "GCCA can also play a role in helping operators better understand how solar can be used."

In addition to investing in energy-efficient equipment and vehicles, Olbrechts says cold chain companies can also implement sustainable packaging and recycling programs to reduce waste.

Regarding the transportation industry, Khan says electrification of the fleet is coming and will greatly help reduce emissions for the supply chain. To minimize food waste, she adds companies have to invest in initiatives to reduce, reuse and recycle wherever possible, such as signing up for a local food bank donation program.

Sustainable Cool

What do sustainable cooling solutions look like?

"Ideally, the solution is a new build on a piece of land large enough to give you the space to generate your own electricity and store it," Neu sums up.

Khans explains these cooling solutions make use of sustainable and energy-efficient materials ensuring either low or no emissions. "For instance, carbon dioxide-based refrigeration versus ammonia-based refrigeration is an example where the latter is a bit less efficient and potentially harmful for the environment," she says.

In addition to using natural refrigerants, Olbrechts says sustainable cooling utilizes innovative cooling technologies like evaporative cooling or thermal energy storage.

Power Generation

Is it viable for cold storage facilities to become not just power users but power generators and storers? "Yes, if you have the available land around you and in large metropolitan areas, that's not always the case," says Neu.

Valles points out that unlike other industrial facilities that require constant electricity supplies, cold-storage facilities can be cooled when renewable energy is at its peak, and then the cooling turned off when the supply of renewable energy is low, in effect acting as a thermal battery.

"Ideally, the solution is a new build on a piece of land large enough to give you the space to generate your own electricity and store it."

R.J. NEU, RLS Alliance

"By cooling our facilities a few extra degrees when sun and wind energy is high, the cooling systems can be switched off for hours or days as required," he says. "We use advanced temperature control systems connected to weather forecast databases and grid operators to cool our facilities when renewable energy is plentiful and shut down the cooling systems when grids become overloaded."

"What most people don't think about is that not only do we use a lot of energy, but we also store a lot of energy in our freezers," Khan points out. "In addition, if companies start investing in self-generation technologies, it will become possible to eventually start supplying the grid with energy and contribute to stabilizing and making the energy grid more sustainable."

Lynch says advances in battery storage or microgrids are prevalent. He explains it's basically a small power plant located onsite, and a variety of renewable energy sources incorporate battery storage. "To produce and store energy, especially solar, with batteries extends the window of deployment for renewable energy," he says. "You can never store enough energy as you are limited by size and cost can be prohibitive, but the field is maturing and technology is advancing."

Smart Design/Build

"Warehouse design and construction is important because the primary factor in most warehouses that determines how much energy it will consume to freeze products depends on how well the warehouse envelope is sealed, insulated and has the appropriate R-value," Kahn points out. "In addition, room design has an impact on capacity and volume, which also affect how efficiently product is frozen in the warehouse."

Olbrechts notes the significant role design and construction play in optimizing building

orientation, improving insulation and implementing energy-efficient lighting and HVAC systems.

Neu adds design is extremely important in mapping out the workflow of the building to ensure there are less inefficiencies.

"The significance of warehouse design and construction in sustainability is paramount in my opinion," says Lynch. "Design will determine the efficiency of reducing the electrical consumption of the warehouse, but to be more energy efficient, design is going to cost more." Lynch says it may be 30% more expensive to make energy-efficient choices, but the return on investment may be reducing energy consumption by 30%.

Valles points out the company recently opened a new facility in the Port of Rotterdam, which was constructed to the highest sustainability standards. "The energy-saving design of the facility, combined with best-in-class refrigeration technology and the latest systems for inside temperature control make the site up to 45% more energy efficient than a conventional cold storage facility."

Barriers to Efficiency

Olbrechts counts among the barriers to energy efficiency "high capital costs, lack of understanding or awareness of energy-efficient technologies and concerns over safety and regulatory compliance."

To that list, Neu adds aging infrastructure, cost of replacement in metropolitan markets and the availability of land.

For Lynch, federal regulations are the main barrier to energy efficiency and sustainability. "However," Lynch adds, "the lack of financial capital to invest, lack of human capital to make the right investments and understand where the investments should be applied, and lack of awareness or resources to conduct an energy audit can all be barriers



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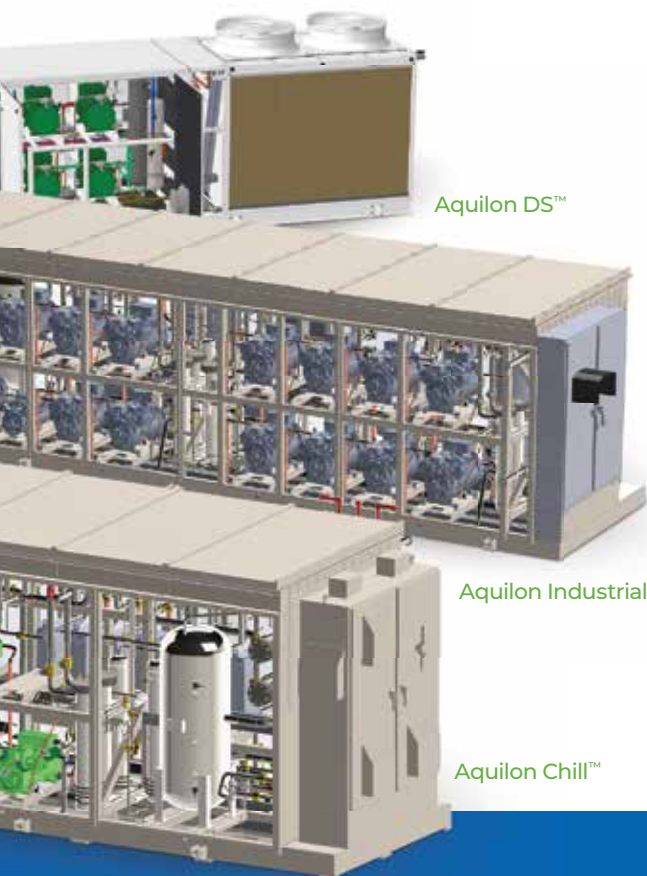
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to contend with.”

“In my opinion, the biggest barrier to energy efficiency is the company culture itself,” Khan points out. “If all employees become invested in making their operations energy efficient, we will be able to solve the majority of our energy-related issues.”

In addition, Khan believes it is very important to educate and spread awareness about energy efficiency in the cold storage industry. “By doing this, we are creating an energy efficiency culture that will help inspire and shape the future of our industry.”

The Future of Cool

“In the past decade, energy production has been shifting from coal and biomass to other more sustainable and renewable energy sources such as wind and solar,” Khan notes. “In addition, the energy infrastructure is evolving across the world with more investments in solar panels, wind turbines and energy storage battery systems.”

“In the past decade, we have seen equipment efficiency get better,” Neu points out.

“We are now also paying a lot more attention to it, as well as how energy consumption and availability affect our bottom line.”

“We are of course impacted presently by the increases in electricity prices across Europe, but in the long term, we believe the investments we are already making in energy including efficiency-increasing technology, cutting-edge automation and renewables will help us weather future shocks such as this one – while contributing to our net-zero goals,” Valles sums up.

Looking to the future, Olbrechts is excited about the use of magnetic refrigeration and solid-state cooling, which are highly energy-efficient and use no harmful refrigerants. “Both of them are still in the early stages but highly promising.”

Khan thinks carbon dioxide-based refrigeration is eco-friendly and very upcoming in the cold storage industry. “This is one main reason why we chose to build our new facility, north of Montreal, with a CO2 system,” she adds. “In addition, the use of evaporative cooling technologies is another

way to sustainably cool or freeze food products. And hydrogen-based energy storage is not very common but also another green energy initiative.”

The Internet of Things (IoT) is where Lynch sees technology heading in the near future. “We’re starting to see its prevalence in industry, and we’re starting to get data from our refrigeration systems that allows operators to easily see where inefficiencies exist and bring that data onto intuitive platforms.”

Energy sustainability is also about optimizing, says Valles. “There is a real cost to being unsustainable as that means you’re losing out on efficiency gains, and you’re behind on applying the latest innovations.”

ALEXANDRA WALSH is a Senior Publishing Consultant with Association Vision and Editor-in-Chief of COLD FACTS.

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Port of Antwerp Bruges in Belgium. (Photo courtesy of Antwerp Bruges Port Authority.)

ARE THE PORTS IMPROVING?

*Congestion eases, container volumes increase
and port infrastructure scrambles to keep up.*

By Karen E. Thuermer

The past two years have ushered in several dramatic challenges at seaports around the world brought on, most notably, by the impact of the Covid pandemic. China's port closures and work slowdowns contributed significantly to the challenges, as well as escalated consumer demand for cold chain foods. Combined, these factors resulted in overwhelming congestion at ports around the globe.

At the start of 2020, more than 100 ships were going to the U.S. West Coast seaports of Los Angeles and Long Beach. Unable to accommodate so many ships at once, many anchored offshore or extended their shipping times by slow steaming.

"Many ports have been experiencing record import and export levels for frozen foods resulting from changing buying habits during the last few years," comments Brian Beattie,

President North America West, Lineage Logistics. "This has resulted in congestion as there was simply more frozen container volume arriving than existing infrastructure and support services, like container chassis and gensets, could effectively handle. This resulted in high demurrage, per-diem and other fees incurred by importers."

On top of that, vessel schedules have been erratic, which causes missed bookings and

impacts export schedules and timing. This has created problems. As Beattie observes, many protein exporters prefer to ship product from inland locations and have that product shipped out within one to two weeks upon arrival at the port-based facility.

"When we miss a booking, and our facilities are at capacity, it causes the whole system to get backed up," says Beattie. "This creates a situation where Lineage or the protein company must find alternative storage locations near the processing locations, or in alternate diverted locations, and then ship to the port facility when space becomes available."

Good News on the Horizon

The good news is today congestion at seaports is easing. But this also means that shipments that have been tied up due to the lack of ships and containers to transport them, are now being shipped. Suddenly cargo is being discharged, which means all receivers are



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Reefers are moved off ships at the Port of Antwerp Bruges. (Photo courtesy of Antwerp Bruges Port Authority.)

receiving goods in a short period of time. The result, industry observers say, is most warehouses in the United States and Europe are full. Compounding the problem is the fact that for 2023, a record 2.5 million 20-foot equivalent units (TEUs) of new containership deliveries is scheduled.

"In many of the major ports, we are starting to see massive new ships that accommodate significant increases in containers per ship," says Beattie.

Meanwhile, Beattie notes there has not been parallel expansion of port infrastructure to be able to handle this high volume of containers. "The chassis, gensets, carriers, carrier flow and warehousing network were built over many years to accommodate a reasonable flow matched with the appropriate equipment, which also inherently affects port operations," he says.

Rich Burke, President and COO of Konoike-Pacific California, Inc., says that the separation of the terminals from the steamship lines at the ports of Los Angeles and Long Beach has created inefficiencies in the drayage of containers. "We are now moving more empty containers to off-dock properties, and that has made drayage less efficient," he says.

Konoike-Pacific California, Inc. (KPAC) is located approximately four miles from the two ports, which serve as the primary gateways for Pacific Rim imports and exports. The company operates within the "overweight corridor" in Southern California, where shipment of overweight containers is allowed. KPAC has sidetracks for both Union Pacific Railroad and Burlington Northern Santa Fe Railway.

"Steamship line delays of early return dates for containers have improved but volume to the U.S. West Coast has also been reduced possibly due to the unsigned labor agreement

and the weaker economy in the United States," Burke says.

He notes, however, refrigerated containers now seem more available and at a better price than earlier in 2022.

Meanwhile, to advance cold chain operations, KPAC has added additional plug-in stations to be able to load and unload more containers and have them ready to receive and deliver to the terminals in the Port of Los Angeles and Long Beach.

"We have more than 150 plug-in stations, which allows us an additional 5,000 pallets of short-term storage under temperature control," Burke says.

In 2023, the company is also adding another 72,000 square feet of new freezer and cooler space and creating 16,000 new pallet positions at its KPAC - Wilmington location. "This will help with the future volume and bring port-related storage back into the Los

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Reefers are checked at the Port of Antwerp Bruges. (Photo courtesy of Antwerp Bruges Port Authority.)



Angeles and Long Beach overweight corridor,” he says.

Besides the challenges, Burke notes that environmental concerns and concerns from neighborhood committees and political action groups are also pressuring operations.

He points out how California Air Quality Board’s decision to eliminate any trucks older than 2009 to be allowed in or out of the terminals in 2023 has put additional pressure on the carriers to move more volume with less trucks.

“Reducing truck traffic, limiting hours and having certain routes to and from the terminals seem to be some solutions to consider,” Burke says.

KPAC has realized some successes amongst these challenges. “We have acquired 10 trucks to pick up and deliver overweight containers with our own equipment instead of relying exclusively on third-party contracted carriers,” Burke says. “This opportunity occurred due to the changes brought on by AB5 and California

“Reducing truck traffic, limiting hours and having certain routes to and from the terminals seem to be some solutions to consider.”

RICH BURKE, Konoike-Pacific California, Inc

Air Quality Board in 2023. Our hope is that we can improve on efficiencies by controlling the volume and smooth out labor hours by bringing in overweight imported containers to unload on lighter volume days like.”

Although KPAC has not been operating in this manner for long, so far, Burke says, the results have been encouraging.

Meanwhile, Burke sees investment in newer equipment limiting competition in the future. “The cost of land around the harbor will make

investments in the local area cost prohibited,” he adds.

Cold Chain Advancements

Much is being done to advance the cold chain. For one, suppliers, distributors, 3PLs and retailers in the cold supply chain are implementing a wide variety of energy reduction technologies that, Beattie says, are achieving dramatic decreases in consumption.

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Port of Antwerp's Long History of Cold Chain Success

The Port of Antwerp in Bruges, Belgium, exemplifies the long and successful history with cold chain activities that seaports have enjoyed. This major European port, which merged with the Port of Zeebrugge in April 2022, has been handling the movement of such commodities for centuries. In fact, in 1877 the Port of Antwerp received the first refrigerated steamship carrying frozen meat from Argentina to Europe.

"It was a huge milestone," says Ingrid Vanstreels, Business Development Manager, International Relations & Networks – Shippers & Forwarders at the Antwerp Bruges Port Authority. "This period should be remembered as the start of the food trade around the world."

Particularly noteworthy, 1877 was the first year shippers were able to keep perishables at a certain temperature, thereby prolonging shelf life while in transit. Soon after, the industry began adapting those practices and cooling machinery was invented.

Most of those machines were combinations of ammonia and CO² compressors. "Passenger ships were equipped with those machines, so that fruit could be transported under deck," Vanstreels points out.

In 1910, passenger ships arrived in Antwerp, among other ports, and bananas were unloaded by hand labor and cranes. "Soon afterwards, all other aspects of the chain started developing like cold stores and transport," she notes.

That year, the United Fruit Company became one of the biggest companies transporting bananas from Latin America. With their fleet of refrigerated vessels, their ships were nicknamed the banana fleet – a name, says Vanstreels, that is still often used to describe the refrigerated vessels.

The 1970s ushered in the era of containerization, which forever changed seaports and cold chain development. "For one, the reefer containers with integrated cooling units allowed even more transport of cold chain volumes," she says.

Since then, ports – certainly those in Europe, have undergone major developments on multiple levels. Today container vessels are becoming bigger and container terminals need to follow with the necessary infrastructure and space. Automatization is being implemented and port authorities are being challenged to meet industry demand.

"We are positive about cold chain growth," Vanstreels remarks. During the last 10 years, volumes of all cargoes have been growing.

Antwerp Bruges Port Authority has executed a study with the major cold chain players on its port platform. "This was the basis for us to be able to draw the 'cold chain port of the future,'" she says. "I can say that the future will require more warehouse space, smart solutions, automatization and more workforce and expertise."

Vanstreels notes the Port of Antwerp-Bruges operates with a very close cold chain community via a working group called the Perishables Expertise Group. The group consists of a mix of terminal operators, cold store operators and forwarders. "We discuss growth, opportunities, challenges and promotion," she says. "Even if we bring competitors around the same table, as a group we all feel it's important to promote your port and look toward growth together."

Vanstreels also points to the Authority's working relationship with Julie Hanson, Director of GCCA Europe, with whom she

brainstorms on education and finds out what stakeholders need.

Members of the Antwerp Bruges Port Authority also hold regular discussions with airports, such as Brussels Airport, which has resulted in collaboration and a digital project.

"Brussels Airport is the initiator of the PMA app – perishables management app," she says. Developed by Nalian, the app was created to digitize the planning of a Federal Agency for the Safety of the Food Chain (FASFC) inspection and share real live information to the stakeholders involved for that specific cargo.

"The benefit is you get information much quicker, and you are able to track activities and documents," Vanstreels says. "Brussels Airport shared its knowledge with us and we are now developing the maritime version of the app. The pilot is running now so we hope to share more news later."

While Vanstreels is positive about the growth of the cold chain business, she notes the entire cold chain is under pressure from the energy crisis, trade embargoes, and other geopolitical and industry events.

"Not only do we need to invest in infrastructure and other improvements, investing in people is important too," she says. "The more you know about the business, the more you are capable of reacting to disruptions."

an innovative solution called flywheeling that rethinks the way temperature-controlled warehouses consume energy,” says Beattie.

Flywheeling is when a facility super-cools the frozen food and the room to a much lower temperature than normal during low priced hours and then cycles off, or greatly reduces, active refrigeration operation during the higher priced periods of the day.

“Through flywheeling, we changed our electricity from a flat consumption to one that absorbs excess production from renewable sources opportunistically,” Beattie explains. “When the electricity grid lacks supply, we can eliminate our consumption, reducing reliance on fossil fuels, without affecting our customers’ product. In the first three years of its implementation, flywheeling lowered our energy usage by 34% – an annual savings of 33 million kilowatt hours.”

Automation capabilities continue to expand rapidly, with new developments in robotics and autonomous vehicles coming out almost every month. “For us, this means building new automated facilities with smaller footprints and greater density, which translates to lower energy consumption, better efficiency, and greater environmental sustainability,” Beattie says.

Going Forward

Analysts are predicting a much-improved environment for seaports as far as congestion is concerned. Meanwhile companies are addressing growth opportunities by building new facilities and adding to or retrofitting existing ones.

“For the chassis and genset shortages, companies are adding equipment to provide more chassis for overweight containers and chassis with built in gensets,” Beattie says.

Some ports like Houston and Long Beach are also adding pool chassis to assist in the congestion and grounded containers.

“The challenge moving forward will be to make sure there is enough equipment and that the port is expanding fast enough to handle the growth of the cold chain in the market,” Beattie concludes. ☞

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Reefers at the Port of Antwerp Bruges. (Photo courtesy of Antwerp Bruges Port Authority.)



The Konoike-Pacific California, Inc. facility is located approximately four miles from the Ports of Los Angeles and Long Beach on the California coast. (Photo courtesy of KPAC.)

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CASE STUDY

By Keith Loria

The Kings of Avocado

Innovative design proves fruitful for Mission Produce.

Mission Produce, a leader in the worldwide avocado business, saw an opportunity to capitalize on the continued popularity of avocados. It intended to do this by leveraging the United States' busiest inland port connected to Mexico.

The company was looking for someone to design and build its first-ever hybrid facility in Laredo, Texas. The facility would be required to process a record number of avocados and incorporate additional product lines with different temperature requirements.

What's more, the facility would need to meet the demands of multiple customers, provide productive logistics and be easily expanded in the future.

Finding the right partner for this project was paramount. A M King Founder and President Brian King met with Mission executives at the company's California headquarters. The executives expressed their confidence that A M King would be able to successfully carry out their vision. A M King was commissioned to provide property consulting, design and construction services for this project.

"The company knew that opening a large-scale food facility at the southern border of Texas would support the nearly \$1 billion of avocado imports and \$4.2 billion of produce imports crossing the Port of Laredo as of 2020," says Carl Morse, A M King's business unit leader. "A combination packing house and distribution center would allow the company to ripen, pack, bag, ship and store avocados and mangos under one roof. It would



The shipping, receiving and staging bay provides unobstructed maneuvering space for high capacity, direct access to dock doors for loading and unloading fresh avocados and mangos. (Photo courtesy of A M King.)

also provide third-party logistics services for others in the industry."

The Road to Success

The completed 274,000-square-foot facility sits on 33 acres. And while one of the most innovative facilities in North America, there were many challenges that A M King faced along the way.

For instance, in the spring of 2019, during the internal analysis of a previously identified greenfield site, the A M King team discovered issues making that site unusable.

"With the project now at risk of being postponed or abandoned, we were forced to seek

another site," Morse says. "Working with both Mission and local landowners, we identified a new site situated on 33 acres of desert land located one mile from the Mexican border."

While property analysis and negotiations were ongoing, A M King's internal design team was collaborating with Mission to design the facility. Mission's requirements, along with its desire to incorporate innovation and efficiency, led to a unique and complex design process relative to most environmentally controlled food facilities.

"In addition, this undeveloped tract of land, while destined to be a new business park, posed multiple challenges," Morse notes. "The



Mission Produce's Laredo facility is situated on 33 acres in a new industrial park located adjacent to the Rio Grande River and U.S.-Mexico border. (Photo courtesy of A M King.)

site would require annexation by the City of Laredo, which involved a detailed process of development and approvals. There was no existing infrastructure, including roadways, electrical service or utilities such as water or sewer, serving the site."

It was apparent to all that developing this site for a 274,000-square-foot facility – as well as future expansion – would require significant effort and planning if construction were to begin in spring 2020.

"Our team managed an accelerated process wherein we were able to gain the approvals and infrastructure necessary to begin construction on this site in accordance with our desired start date," Morse says.

Being one of the largest providers of avocados in the United States, Mission had a unique completion deadline: its goal was to ship product by Cinco de Mayo 2021.

"To accomplish this, we had to overcome significant design and construction challenges and deliver the project within 12 months," Morse points out.

Innovative Design

A M King was tasked with designing and building a facility that could ripen and distribute more avocados than any other facility in North America. With that in mind, development of the facility began with securing a site that allowed Mission to expand its capabilities in the future.

"The building's design permits the dry storage warehouse to convert to additional

coolers and cooler docks," Morse explains. "The office layout allows for expansion, and the refrigeration system is prepped to support future growth. This level of forethought enables the company to make any of these changes without disrupting existing product flow and output."

Additionally, the design maintains the product in the cold chain, supporting shelf-life extension until it reaches the end user. A M King's internal design team worked with Mission to design layout and process flows, develop precise, flexible environmental specifications for superior product integrity, and integrate custom processing and packaging equipment into a facility plan that would optimize efficiencies and allow for the anticipated future capacities.

A M King designed Mission Produce's first-ever hybrid facility to process both avocados and additional product lines with different temperature requirements.

"Initially, avocados would be the company's primary product line. However, our team developed a plan for the facility to have the capacity to accommodate the temperature range necessary for the recent addition of mangos, as well as potential future additions of other commodities, such as bananas, pineapples and berries, among other produce," Morse says. "To meet Mission's client requirements for varying levels of ripeness for each type of fruit, our team collaborated with a specialized vendor to design and build a custom, flexible refrigeration system that has

the ability to maintain thousands of pallets of product in a wide range of temperatures within 1° F of accuracy."

Sustainability Measures

A M King's design-build approach allowed Mission to evaluate what sustainability items it wanted to incorporate through preliminary design and cost-valuation exercises.

"We were able to provide hard data to evaluate front-end cost versus long-term operational savings," Morse says. "These early efforts also played a role in how the overall site and building were designed and constructed with a master plan for growth. Items we evaluated included solar panels, renewable energy backup power systems and alternate/hybrid refrigeration systems."

While solar panels were not installed, A M King did provide infrastructure for backup power systems and expandable refrigeration systems.

Also, welfare areas, shipping offices and primary office spaces feature a high degree of natural light to reduce dependency on lighting systems and provide a more pleasing work area. While LEED Certification was not required for the facility, the company incorporated multiple LEED-recommended sustainability elements into the project.

Other Challenges

In addition to the inherent challenges of building a complex facility, A M King's project management team seamlessly navigated pan-

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The front entry of the main office features high-performance glass. The lower level uses masonry to mitigate high temperatures during the day, low temperatures at night and reflects the natural color pallet of the surrounding landscape. (Photo courtesy of A M King.)

demic-related shutdowns, travel restrictions and protocols; cross-country time differences; supply chain disruptions; permitting impacts; language barriers, and limited skilled labor in the Laredo market.

One of the biggest challenges, however, occurred during steel erection. Mission reevaluated the building's production potential and determined the need for larger processing equipment.

"Unfortunately, that equipment would not fit in the designated space as designed," Morse says. "We collaborated with Mission executives, local jurisdiction and equipment manufacturers and vendors to develop a solution. We were able to rearrange the equipment layouts within the existing structural steel design, upgrade necessary service utilities to operate the increased equipment loads, and relocate floor drain systems without compromising future ripening and processing operations."

Strong Collaboration

From start to finish, the design-build approach fostered a tremendous amount of collaboration from all sides. The owner team included executives from Mission's research and development, engineering and operations departments, which became the key group that A M King worked with throughout the entire project.

"In executing this project, A M King's leadership, credentialed by the Design-Build Institute of America, and experienced staff collaborated with Mission's leadership from concept to completion," Morse says. "We

prequalified and selected design-build trade contractors with relevant project experience. Our in-house design and construction teams, together with team members brought in for critical coordination, worked side-by-side at our headquarters to expedite the transfer of information to Mission's ownership team. This streamlined decision-making and increased communications efficiency."

Mission allowed A M King to interface and work directly with local authorities as well as vendors contracted by Mission. For example, A M King President Brian King negotiated with local government agencies on Mission's behalf during the site selection process.

"During design, we met with all departments for pre-permit review," Morse says.

"During construction, we collaborated with Mission's preferred vendors. The fact that Mission, based on the West Coast, hired a Carolinas-based design-builder to develop a Texas project, speaks to the mutual trust established at the outset. This solid relationship and early key stakeholder engagement led to this project's overwhelming success."

Increased Production

Thanks to a focused management process, the design and construction teams overcame each of these challenges and delivered North America's largest avocado-focused facility in accordance with the original project budget. And they did it 45 days ahead of schedule.

The Laredo facility increased Mission's



The temperature-controlled ripening rooms were custom designed and built to maximize efficiency of Mission's operations. Growth was top of mind during the design of the facility, allowing for additional Ripening Rooms to be added without disruption to existing processes. (Photo courtesy of A M King.)

North America capacity by more than 40%. And since its opening, Mission has ramped up usage of the facility with the addition of mangos to the product portfolio. It is also servicing additional 3PL and other dry container storage partners.

At the facility's grand opening in September 2021, with Laredo Mayor Pete Saenz and Texas Governor Greg Abbott in attendance, Mission Produce CEO Steve Barnard recognized the accomplishment. "I would like to thank the A M King team. A M King was so professional. The project was on budget and on time. We appreciate the work you did." 📧

KEITH LORIA is an award-winning journalist who has been writing for major newspapers and magazines for close to 20 years, on topics as diverse as sports, business and technology.

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The packaging area is efficiently located next to custom temperature-controlled ripening rooms. (Photo courtesy of A M King.)

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GCCA is excited to announce the 2023 Cold Chain Policy Forum will be held in person from June 19-21 at The Watergate Hotel, Washington, D.C.

The Policy Forum is envisioned as the premier policy event for businesses engaged in temperature-controlled logistics. As with previous Policy Forum events, it will feature education sessions and keynote presentations focused on rules, regulations and legislation that directly impact the industry. It also provides the opportunity for engagement with key federal agency officials, congressional meetings and more.

This year's Policy Forum will be held at the infamous Watergate Hotel, forever attached to scandal and infamy. On June 17,

1972, E. Howard Hunt and G. Gordon Liddy stationed themselves in room 214 where they used a radio to stay in contact with burglars stealing documents at the Democratic National Committee in the Watergate Complex, adjacent to the hotel. Once the suspicious activity was discovered by a security guard, the police were called, the famous cover-up ensued. Eventually, it led to the 1974 resignation of U.S. President Richard Nixon just before impeachment proceedings were due to begin.

Today the hotel is an urban resort that

sets itself apart from other Washington D.C. hotels. At the Watergate, modern design blends with an iconic landmark to redefine luxury. A place where travel and business are occasions worth celebrating, attention to detail is the standard, and intrigue can be found just beyond every curve. Attendees of the Policy Forum will have the opportunity to tour the Scandal Suite (i.e., room 214) during their time at the event.

The Government Affairs, Safety and Refrigeration and Energy Committees as well as GCCA committees focused on association governance (Executive Committees, Finance Committee, Insurance Committee, etc.) will hold their meetings in conjunction with this year's Policy Forum. Additional details on where other GCCA committees will be meeting will be published shortly.





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Building on the momentum created around advocacy in 2021 by expanding its activities in the United States and globally, GCCA established the Advocacy Fund. The Fund enables new investments in resources to help GCCA promote and protect the industry with policy makers. GCCA rolled out new member services including the Washington Weekly newsletter, Canadian Monthly newsletter, monthly Advocacy Webinars and a grassroots mechanism connecting members with their elected officials in the United States, Canada and Australia. The GCCA Advocacy Fund helps expand the association's advocacy efforts in Washington, D.C. and around the globe.

Since initiating the Advocacy Fund, GCCA has been able to raise the profile of the cold chain industry. GCCA has further advanced key policy priorities in Canada, through our partnership with Tactix, and in Brazil, by hiring a Government Affairs Consultant. Expanded government efforts are developing in Europe and Latin America as GCCA looks to dramatically expanded advocacy services. They include hiring new team members, building new partnerships and coalitions and developing new advocacy-focused resources around the world.

As we enter a new year with new policy opportunities and threats, ensuring your voice is heard by government officials is more important than ever. To be recognized as an Advocacy Fund Contributor in 2023, please contact Lowell Randel (lrandel@gcca.org) with your contribution.

We hope that you will join us on June 19-21 in Washington, DC. For more information and to register for the Policy Forum, please visit gcca.org. 





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COLD CHAIN DEVELOPMENT

NEWS ABOUT GCCF INTERNATIONAL PROJECTS

This column features news about key projects of the Global Cold Chain Foundation (GCCF), formerly the World Food Logistics Organization and its work with members, aid organizations and international development partners to help emerging economies and lower-income countries meet the challenges that arise when growing a safe and efficient global cold chain.

ACTIVE PROJECTS

Bangladesh Trade Facilitation (BTF) Project, 2020–2025

Partnered with Venture37 and LixCap

Through the project, the GCCF will partner with the regional American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) to implement training of Bangladesh engineers with GCCA Engineering Expert Harshal Surange. Additional virtual cold chain trainings and in-person events will be completed later in 2023.

Cambodia Market Systems Program, 2022–2023

Partnered with LixCap and

Khmer Cold Chain Company (KCCC)

GCCF is advising on the construction and startup of the Khmer Cold Chain Company facility at the LM17 port on the Mekong River in Phnom Penh, Cambodia. The team is identifying training to support startup operations of the new facility as well as advising on the IT systems and SOPs.

Dominican Republic TraSa Project, 2021–2025

Partnered with International Executive Service Corps (IESC)

In January, GCCF technical expert Juan Carlos Hencker traveled to the Dominican Republic to visit project beneficiaries' facilities. Hencker consulted on best technologies for establishing refrigerated facilities and recommended refrigeration equipment in accordance with each company's business. He also completed a two-hour seminar on best practices for the design, operation and maintenance of cold rooms used to store or rapid cool perishable crops.



Juan Carlos Hencker providing training and consultations in the Dominican Republic.


Egypt Rural Agribusiness Strengthening (ERAS) Project, 2019–2024

Partnered with Abt Associates Inc.

Dr. Elhadi Yahia, a member of the GCCF Scientific Advisory Council, plans to return to Egypt in the spring of 2023 to provide training and technical assistance on best practices for postharvest handling for mangoes. This will be his third visit to the project, and the second time to work on mangoes.

Georgia Agriculture Project, 2018–2023

Partnered with Cultivating New Frontiers in Agriculture

The GCCF successfully completed a regional cold chain event in Tbilisi in November 2022. Talks are currently underway with the United States Agency for International Development project in Azerbaijan to replicate the event in Baka in June 2023. In addition, the GCCF is continuing to support and provide advice to the newly formed Georgian Cold Storage Logistics Association. 



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Never before has our industry faced such uncertainty and vulnerability from America's policy makers, both in the White House and in both chambers of Congress. The Administration and Congress represent challenges and opportunities that we will need to face as an industry, together.

The Administration and Congress are considering a wide range of policies that could impact the cold chain in 2023. Key issues:



FARM BILL

- Congress is working to reauthorize the Farm Bill in 2023.
- GCCA will be actively engaging with Congress to advance cold chain industry initiatives and priorities.



CLIMATE CHANGE

- Pursuing aggressive policies to address climate change, through both executive action and legislation
- Implementation of the AIM Act to phase down HFCs



TAXES

- Increasing the corporate tax rate, phasing out deductions for pass-through entities
- Raising the top marginal income-tax rate



LABOR

- Strengthening worker organizing, collective bargaining and unions through executive action and legislation such as the PRO Act
- NLRB advancing labor initiatives, like 'micro-unit' organizations and joint employer policies



BURDENSOME REGULATIONS

- Revising EPA's Risk Management Program (RMP) regulation and making additional requirements
- Changes to OSHA's Process Safety Management regulation
- Implementation of FDA's Food Traceability Rule

THERE IS SOMETHING YOU CAN DO.

To learn more about how you can contribute contact Lowell Randel (lrandel@gcca.org) or visit advocacy.gcca.org.
Visit ADVOCACY.GCCA.ORG for more information.



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In April 2022, the GCCA and the United Kingdom's Cold Chain Federation announced a partnership agreement signalling a renewed commitment to building knowledge, networking opportunities and insights across borders.

Here, Cold Chain Federation Chief Executive Shane Brennan continues his new series for COLD FACTS exploring hot topics for our industry in the United Kingdom and beyond.



It's All About the Talent – Today and Tomorrow

When we think about the cold chain world, it is easy for the mind to wander to visions of new warehouses, exciting vehicle innovations or the software solutions of the future. But when I talk to senior cold chain leaders in the United Kingdom, across Europe and the wider world, the first thing that usually comes up is the importance of people. At the root of all the success stories I can think of, is a team of people that have delivered outcomes with passion, energy and commitment.

We can invest billions in buildings, research and technology but it will never work without the right operatives, drivers, engineers, sales teams and business support functions.

At times in the past three years, we have seen this from both extremes. From the selfless commitment of the key cold chain workers that turned up at their job through the uncertain early days of the COVID pandemic, to the crunch periods of labor shortages, especially among truck drivers and warehouse operatives, when the lockdowns came to an end.

The crisis periods taught us and our customers that people matter, and that people have choices about where they work and who they work for. In the United Kingdom, the Cold Chain Federation is focused on playing our part in making the positive case for talent and skills development across cold chain.

This is particularly important because the United Kingdom's annual National Apprenticeship Week recently wrapped up in February 2023. Apprenticeships are an important feature of workplaces in many markets across the world, but they are particularly evocative in the United Kingdom. The idea of bringing career starters, or career changers, into the business and giving

them structured training and learning on the job, under the supervision of skilled experience mentors, is one that we all believe is intuitively right.

In practice, the bureaucracy and patchy availability of education opportunities mean that apprenticeships are not suitable for every business or individual. The Cold Chain Federation is committed to supporting the roll out of formal apprenticeship programs wherever we can. But the point is as much about mindset as it is exact structures.

With an ageing population, strong restrictions on immigration and increasing choices for young people over job and career options, the cold chain industry can't sit back and hope that the labor we need will be available whenever we need it. We have to make the case for the cold chain as a career and create career paths that are varied, rewarding and infused with a clear sense of mission and purpose. The apprenticeship mindset works. It values the more experienced workers, often extending the time they are willing to continue working. It communicates a sense of how workers are valued. It won't work for everyone, but it doesn't have to. The job is to mine for gems.

The changes needed will take time, but positive steps are being taken, both within individual businesses and by the industry as a whole. The Cold Chain Federation is working with other federations and associations across the storage and distribution industries as partners in the Generation Logistics project launched last year. This project is a collaborative, practical response designed to help our industry meet the challenges of an ageing workforce, outdated perceptions of career opportunities

within logistics and strong recruitment competition from other sectors.

The Generation Logistics project is designed to show the next generation of logistics talent all about the varied and pioneering opportunities of a sector that embraces innovation and cutting-edge technology every day. The Generation Logistics website not only displays thousands of live vacancies but also hosts a library of resources to encourage people to consider a career in logistics. It's a good demonstration of how different groups within the wider logistics industry can work together for the benefit of all operators, today and into the future.

The U.K. government was broadly supportive of logistics operators as we coped with a shortage of people in 2021. But as time goes by, old prejudices and misunderstandings can resurface. We fight against the perception that warehouse and driving work is a low order job, and that logistics employers are to blame for the retention challenges they face.

That is why it is important that we show government the progress we are making as an industry. When the Cold Chain Federation takes operators from across the United Kingdom to meet with politicians and government officials in the House of Commons at our Parliamentary Reception in May, high on the agenda will be discussions around the challenges and opportunities related to the people of our industry, today and tomorrow. 📍



The Global Cold Chain Foundation (GCCF) Scientific Advisory Council is an eminent group of food scientists, logistics, and packaging experts from around the world. The council provides cutting-edge research and advice to members of the Global Cold Chain Alliance and its Core Partners.



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Fish Products Expert
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Dr. Patrick Brecht

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The Ohio State University, Food
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Universidad Autónoma de
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R. L. (Bob) Henrickson, Oklahoma State University, Meat Products Expert

Joseph Sebranek, Iowa State University, Meat Products Expert

Daryl B. Lund, University of Wisconsin, Food Science Expert

Joseph Slavin, Jos. Slavin & Associates, Fish Products Expert

W. F. (Will) Stoecker, University of Illinois, Refrigeration Engineering Expert

**Have a burning cold chain question?
Submit an inquiry to the Scientific Advisory Council
at www.gcca.org/inquiry**

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COOL SOLUTIONS

SCIENTIFIC ANSWERS TO COLD CHAIN CHALLENGES


This section highlights a cold chain question and answer submitted through the GCCA Inquiry Service to the team of experts on the GCCF Scientific Advisory Council (SAC), the roster of SAC members and abstracts on cool solutions written by SAC members. Submit your cold chain questions to the Scientific Advisory Council at www.gcca.org/inquiry.

Q: We received a request from a customer to transport frozen Miracle Berry pulp. The pulp will be shipped to Europe and made into an over-the-counter capsule. The customer is uncertain about the upper and lower limit of the pulp and only knows that it should be transported at -18°C . Can we get the thoughts of the Commodity Storage Manual authors and Scientific Advisory Council on what the range should be?

A: Limits on high and/or low temperatures for storage of frozen foods are not generally defined. Low temperatures are limited by energy demand and costs of maintaining storage temperatures at much lower than -18°C . There are a few frozen foods that justify lower temperatures for quality and shelf-life. Higher temperature limits are associated with microbial safety, and Dr. Schaffner suggests temperatures above -5°C should be avoided to remove concerns about activity by a limited number of food-borne pathogens.

The SAC recommends -18°C as the set point and -13°C as the upper temperature limit; no lower temperature limit is necessary.

Answer provided by Cool-Climate Fruit & Produce Expert Dr. Jeffrey Brecht, University of Florida; Food Process Engineering Expert Dr. Dennis Heldman, The Ohio State University; and Refrigerated Transportation Expert Dr. Patrick Brecht, PEB Commodities.

Submit your burning cold chain questions to the Scientific Advisory Council at www.gcca.org/inquiry or at inquiry@gcca.org 

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COOL SOLUTIONS: ABSTRACT

SCIENTIFIC ANSWERS TO COLD CHAIN CHALLENGES



Dr. Paul Dawson
Clemson University, Poultry Products Expert

Food service endpoints such as consumer homes and restaurants, are significant sources of food waste. Interventions to prevent loss of meats, seafood and produce are needed for economic and environmental sustainability. Cold storage

can aid in preventing food waste by maintaining quality and safety of perishable foods.

Exposure to storage conditions such as thawing or refreezing can cause meat quality to decline. This is especially true for consumer home storage where the long-term cold storage options, consumer refrigerators, have less control than their commercial counterparts.

Most shelf-life studies for meat have focused on refrigerated temperatures above 0°C or frozen temperatures in the range of -18°C. The goal of the study was to determine the effects of short-term cold storage temperatures on the quality of beef sirloin and chicken breast fillets, using temperatures in the range where meat begins to freeze and slightly colder (-2°C, -5°C, or -18°C).

Our results found that at the colder temperatures over seven days, drip (protein) loss increased, and sensory scores showed lower quality as storage time increased. However,

storage at -2°C resulted in less drip loss and superior sensory scores for both chicken and sirloin beef, compared to meat stored at -5°C and -18°C for seven days. The -2°C stored beef also retained redness better than beef stored at the two lower temperatures. In addition, the cooking loss (degree meat shrinks during cooking) for meat cooked in a traditional oven was significantly lower for the chicken and beef stored at -2°C compared to the meat stored at 5°C or -18°C. Lastly, the total aerobic bacteria growth did not exceed 1 log/g for beef or 2 log/g for chicken during the seven-day storage period when held at any of the storage temperatures.

In conclusion, short-term storage at -2°C was superior to lower frozen temperatures to retain quality without risk of microbiological spoilage. Thus, short term storage at -2°C could reduce energy usage while also reducing food waste.

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GCCA events bring together thought leaders and subject matter experts to not only discuss but solve issues facing the temperature controlled supply chain. All GCCA, GCCF and CEBA events are open to members and non-members. Become a member to save on event registration fees.

Interested in sponsoring an event? Email James Rogers at jrogers@gcca.org

MARCH

26TH GCCA EUROPEAN COLD CHAIN CONFERENCE & EXPO

20-22 MARCH 2023

Barcelona, Spain | InterContinental Barcelona

Here, delegates gain a better understanding of market trends, industry challenges, business solutions, and technological innovations. The conference also provides ample networking opportunities, enabling attendees to meet and connect with professionals from throughout Europe and around the world.

Audience: Executives and managers from temperature-controlled, third-party logistics companies.



26TH EUROPEAN
COLD CHAIN CONFERENCE
20-22 MARCH 2023
BARCELONA, SPAIN

MAY

WFLO INSTITUTE AUSTRALIA

2-4 MAY 2023

Melbourne, Australia

This event, designed for employees with clear management potential and executives new to the industry, features more than 40 classes in warehouse management and transportation management taught by leading experts in the industry.

Large Company Audience: Warehouse managers, operations managers, warehouse supervisors, shift leads, workers with high potential for management, customer service managers, business development managers, transportation managers, executives new to the industry.

Small to Medium Company Audience: Warehouse managers, operations managers, workers with high potential for management.



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JUNE

GCCA COLD CHAIN POLICY FORUM

19-21 JUNE 2023

Washington, DC | The Watergate Hotel

The GCCA Global Policy Forum is the premier policy event for businesses engaged in temperature-controlled logistics. Featuring education sessions and keynote presentations focused on rules and regulations that impact the cold chain, the Global Policy Forum is a must attend policy event for multiple regions across the world.

Large Company Audience: Executives with compliance and regulatory responsibility, members of safety and government affairs committees.

Small to Medium Company Audience: Owners, CEOs, executives with compliance and regulatory responsibility, members of safety and government affairs committees.



GCCA COLD CHAIN POLICY FORUM
WASHINGTON, DC
JUNE 19-21, 2023

JULY

WFLO INSTITUTE LATIN AMERICA

17-19 JULY 2023

Mexico City, Mexico | Hilton Mexico City Reforma

This event, designed for employees with clear management potential and executives new to the industry, features extensive classes in warehouse management and transportation management taught by leading experts in the industry.

Large Company Audience: Warehouse managers, operations managers, warehouse supervisors, shift leads, workers with high potential for management, customer service managers, business development managers, transportation managers, executives new to the industry.

Small to Medium Company Audience: Warehouse managers, operations managers, workers with high potential for management.



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AUGUST

GCCA SOUTH AFRICAN COLD CHAIN CONFERENCE

2-4 AUGUST 2023

Cape Town, South Africa

This event is South Africa's one and only venue bringing together cold store operators, controlled-environment builders, equipment suppliers and service providers to discuss opportunities and innovations of this essential sector. The conference provides leadership experience, knowledge, and exclusive networking with decision makers from across South Africa and beyond, in a relaxed yet professional atmosphere.

Audience: Executives and managers from temperature-controlled, third-party logistics companies.



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SEPTEMBER

132ND GCCA CONVENTION

24–27 SEPTEMBER 2023

Scottsdale, AZ | The Westin Kierland Resort & Spa

This annual gathering for IARW and WFLO features education, networking and business development opportunities for third-party logistics companies and warehouse operators.

Large Company Audience: Owners, CEOs, presidents, executive leadership teams.

Small to Medium Company Audience: Owners, presidents, senior executives.



OCTOBER

GCCA BRAZILIAN COLD CHAIN CONGRESS

19 OCTOBER 2023

Sao Paulo, Brazil

This educational event focuses exclusively on the temperature-controlled logistics industry and features opportunities and solutions for business development.

Audience: High-level executives in temperature-controlled warehousing or logistics.



NOVEMBER

43RD CEBA CONFERENCE & EXPO

11-14 NOVEMBER 2023

Palm Springs, CA | Omni Rancho Las Palmas

This annual meeting of CEBA members offers education, business development opportunities and networking for company executives managing the building of new cold storage facilities and cold storage builders.

Large Company Audience: Chief engineers, regional facility managers, regional facility maintenance leads, construction engineer managers.

Small to Medium Company Audience: Owners/CEOs who are building or expanding facilities, chief engineers.



GCCA LATIN AMERICAN COLD CHAIN CONGRESS

TBD NOVEMBER 2023

Mexico City, Mexico

This meeting enables GCCA members and leaders in the temperature controlled industry to interact, learn about industry trends and expand their knowledge. The Congress also serves as a discussion forum for issues of interest to multi-regional cold chain industry leaders.

Audience: Senior executives in temperature-controlled warehousing or logistics.



JANUARY

59TH WFLO INSTITUTE EAST

4-6 FEBRUARY 2024

Atlanta, Georgia, United States | Georgia Tech Hotel & Conference Center

This event, designed for employees with clear management potential and executives new to the industry, features more than 40 classes in warehouse management and transportation management taught by leading experts in the industry.

Large Company Audience: Warehouse managers, operations managers, warehouse supervisors, shift leads, workers with high potential for management, customer service managers, business development managers, transportation managers, executives new to the industry.

Small to Medium Company Audience: Warehouse managers, operations managers, workers with high potential for management.



FEBRUARY

59TH WFLO INSTITUTE WEST

27-29 FEBRUARY 2024

Tempe, Arizona, United States | Tempe Mission Palms Hotel at Arizona State University

This event, designed for employees with clear management potential and executives new to the industry, features more than 40 classes in warehouse management and transportation management taught by leading experts in the industry.

Large Company Audience: Warehouse managers, operations managers, warehouse supervisors, shift leads, workers with high potential for management, customer service managers, business development managers, transportation managers, executives new to the industry.

Small to Medium Company Audience: Warehouse managers, operations managers, workers with high potential for management.



MEMBER NEWS

NEWS FROM MEMBERS OF GCCA CORE PARTNERS

A M KING and grocery retailer ALDI celebrated the grand opening of ALDI's newest regional headquarters and distribution center on January 31, 2023. A M King provided property consulting and designed and built the 564,000-square-foot structure, which includes cold storage, dry storage and packing space. The facility, located in Loxley, Alabama, United States, also features 45,779 square feet of perishable inbound/outbound dock with 38 dock positions; 82,304 square feet of dry inbound/outbound dock with 49 dock positions and features distinctive design elements geared towards maximizing operational and environmental efficiency.



CRYSTAL COLD, formerly known as Crystal Distribution Services of Waterloo, Iowa, United States, is nearing completion of a new \$21 million state-of-the-art food refrigerated warehouse expansion. The facility expansion will add an additional 100,000-square feet of food grade refrigerated space and includes a 25,000-square-foot processing room along with new freezer, cooler, defrost and office/welfare space.



EMERGENT COLD LATIN AMERICA announced the acquisition of Multifrigo, a leading operator in Santiago, Chile. Emergent Cold LatAm also announced plans to expand Multifrigo's main automated facility in El Olivo to 35,000 pallet positions to triple its current size, creating additional capacity and service offerings.



FLEXCOLD announced plans to open its second cold storage facility in the United States, which will be built in Charleston, South Carolina, where the company's headquarters are located. The new facility will be located within 30 minutes of the Port of Charleston. Operationally, the facility will support critical import and export business, specifically seafood, blast freezing, USDA and FDA inspections, as well as a range of other services. The planned facility will offer more than 30,000 pallet positions of cold storage space.

INNOMINDS' cold chain monitoring platform, iNNTACT, has been named a Microsoft #BuildFor2030 Hackathon 2022 Winner for the Open Category. The innovation is part of the company's efforts to support the UN Sustainable Development Goals.



KARIS COLD has begun a 277,785-square-foot industrial cold storage facility in Rock Hill, South Carolina, United States. Encompassing warehouse and build-to-suit office space across 40 acres, the facility is equipped with convertible freezers, 50-foot clear heights, 28 dock doors with two drive-in doors and 47 trailer parking stalls. The facility is expected to open in the first quarter of 2024.



MAERSK signed an agreement with Refad Real Estate to operate a new cold storage facility at King Abdulaziz Port in Dammam, Saudi Arabia. Maersk will open the doors to the facility in March 2023. The 13,300-square-meter cold storage facility will be designed to handle 168,000 pallet positions annually at Saudi Arabia's second-largest port for refrigerated containers. The cold storage facility will primarily store frozen commodities such as poultry, meat, vegetables, confectionary and processed food. The facility will also house chilled cargo such as dairy products and seasonal fruits.



VERTICAL COLD STORAGE will develop a cold storage facility in Kansas City, Kansas, United States, to support a new food processing center to be opened by West Liberty Foods, a leading protein processor. 🌱



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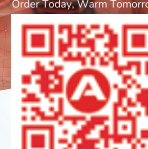

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ASSOCIATION NEWS

NEWS ABOUT GCCA CORE PARTNERS

The **GCCA** Cold Chain Index – 2022 Third Quarter Update is now available. In order to improve the economic information available to industry participants, GCCA commissioned a Cold Chain Index (CCI), reported since the end of 2018. The CCI tracks the growth rates of costs associated with cold storage using predominantly official sources of economic data. The CCI can be customized to the region, state and metro where a warehouse facility operates. The CCI includes five classes of expenses: labor, electric power, supplies, repairs, and rent. The cost shares typical of a North American refrigerated warehouse.



GCCA has updated Terms & Conditions that are now available to members. These standard legal forms are accessible to GCCA Warehouse Members to download and adapt for use in their own companies. These forms were developed by GCCA's Warehouse Legal Partners. The forms represent voluntary language that you may use and modify as you wish as you negotiate with your customer. Unless your company is quoting a prospective customer and unless you will have a mutually signed storage agreement, it is prudent to advise customers that the goods will be stored pursuant to your standard form warehouse receipt and enclose a voided copy.



CEBA launched the “Women in CEBA” initiative to recognize women in the controlled environment building industry. The purpose of this initiative is to celebrate, encourage and promote talent and success of women in the controlled environment building industry.

Do you know a woman in the controlled environment building industry who you believe performs exceptional work and deserves special recognition? Women in controlled environment building, from design to building turnover to client, and their achievements will be highlighted on social media. Nominate your colleague for a chance to be spotlighted as #WomenInCEBA. Submit nominations, a short explanation and a photo to learning@gcca.org.



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ASSOCIATION NEWS

NEWS ABOUT GCCA CORE PARTNERS

GCCA is excited to share the 2022 GCCA Annual Report, which highlights all that the association and its members accomplished last year. Throughout 2022, GCCA continued to connect the cold chain industry across the world as well as provide valuable member resources and tackle key industry issues by advocating on behalf of the cold chain in front of government agencies in numerous countries worldwide.



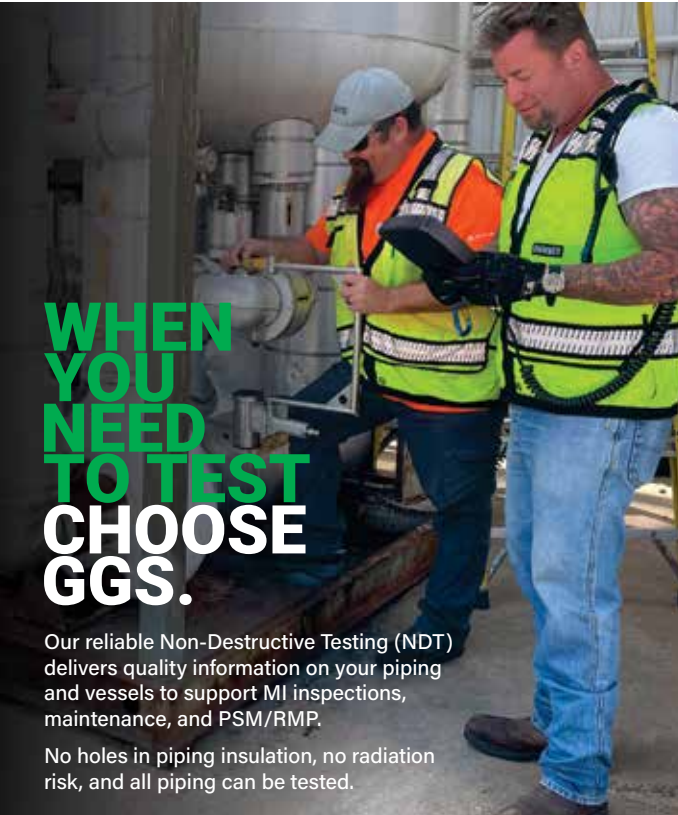
The **GCCA** Don Schlimme Future Leader Award recognizes outstanding young professionals in the North American cold storage industry. The award is named in honor of Donald V. Schlimme, Ph.D, who passed away

in 2012 and was a longtime member of the Scientific Advisory Council (1983-2012) and a GCCF Staff Advisor for many of those years. The Don Schlimme Future Leader Award recognizes outstanding young professionals who show potential for future career advancement but have not yet risen to top-level leadership positions within their company.

This year the competition will be held during the GCCA Cold Chain Policy Forum being held in Washington, DC from June 19th to 21st. Interested young professionals who meet the eligibility criteria should independently submit an application today through the GCCA website.



After a three-year hiatus due to COVID, **GCCF** is returning to Melbourne Australia (2-4 May 2023) to host the Cold Chain Institute Australia. This three-year industry training program is for professionals engaged in temperature-controlled logistics. The curriculum takes students through cold chain management, customer service, employee safety, food safety, warehouse operations, transportation operations and professional development. The program is taught by leading experts in the industry. Registration is now open. ☎



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KATIE PEARMINE

Katie Pearmine is Associate Director of Global Food Systems Partnerships at the Global Foodbanking Network. GCCA has partnered with The Global FoodBanking Network (GFN) and Feeding America® to amplify recent new initiatives to provide opportunities for food banks to connect with, and glean valuable knowledge from, experts in the perishable logistics industry.

CF: What is food banking and how does it alleviate the problem?

KP: Put simply, food banks recover food and distribute it to people facing hunger. They offer a “triple-win” strategy to address some of the world’s most pressing issues: food insecurity, food loss and waste, and climate change.

Food banks partner with companies across the supply chain to recover food that would have otherwise been discarded. They then distribute recovered food to people experiencing hunger through community organizations like schools, community kitchens, shelters and food pantries.

The amount of food recovered by food banks is significant. Our research found that GFN member food banks recovered almost 515,000 metric tons of food – enough to fill nearly 172 Olympic swimming pools. And through this recovery, they prevented over 1.6 billion kilograms of greenhouse gases from entering the atmosphere, equivalent to reducing emissions from more than 365,000 passenger vehicles.



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Food banks are crucial to mitigating climate change and supporting sustainable food systems. But they also support resilient communities, provide emergency relief and assistance, enhance nutrition, and advance other United Nations Sustainable Development Goals (SDGs).

Food banks are key players in ensuring access to safe, nutritious, and sufficient food.

CF: What is the mission of the Global FoodBanking Network (GFN)?

KP: Our mission is to nourish the world’s hungry through uniting and advancing food banks. In partnership with local food bank leaders, GFN offers technical assistance, resources and grants, and strategic partnerships to help food banks operate more efficiently and scale their impact. Whether helping local leaders start food banks in their community, supporting the growth of early-stage food banks, or strengthening food banks that have been in existence for decades, GFN is working toward a world where everyone can access food. We also convene food bank professionals to share their knowledge across borders and cultures.

Last year, GFN supported member food banks in nearly 50 countries, and distributed 692 million kilograms of food to 39 million people facing hunger worldwide.

CF: Why did GFN become a GCCA partner?

KP: GCCA is not only an industry leader in cold chain and food innovation but is also committed to philanthropy and building sustainable food systems. Developing and maintaining cold chain capacity is critical to food banks throughout the world. GFN is thrilled to partner with GCCA to strengthen food bank capacity while also supporting partnerships between food recovery organizations and companies handling and storing food.

CF: Where do you think GCCA members can provide the best support to GFN food banks?

KP: Cold chain technology is critical to ensure food safety and reduce unnecessary food waste. For food banks, this is especially important as they recover perishable food from a variety of sources across the supply chain and need to store this food safely and efficiently before distribution. While GFN has provided member food banks with funds to increase their cold chain capacity, GCCA members can amplify this work by providing members with tailored technical assistance based on the food bank’s infrastructure and capacity needs.

Ultimately, our efforts together will help more people gain access to fresh, nutritious, high-quality food worldwide. And we’re delighted to partner with GCCA on this critical work. 🌱



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