

## Supply Chains and War



The impact of the  
Ukraine conflict  
on regional and  
global logistics.

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## Navigating the Next Normal

**T**HE GLOBAL COLD CHAIN HAS NOT ENTERED A PERIOD OF GETTING BACK TO NORMAL AS WE HAD HOPED ... AND INSTEAD THE supply chains are navigating the “next normal.” It will be important to lead the industry in building supply chain resiliency. Cold supply chain assets will continue to struggle with demand within the United States and internationally.

The impact to cold chain transport companies means they will need to anticipate and forecast business needs beyond the current coming year along with building in flexibility within profit and losses that will need to take on the additional cost.

With this stress on the cold chain build times, cold chain transport assets time in service may be extended beyond the current business strategy. This will add additional expense due to increased maintenance and down time.

Here are other issues to consider:

- **Labor shortages** will continue to plague the industry. From drivers and warehouse workers within the United States to bringing cold chain to developing economies – how will we attract and hire less skilled labor but increase efficiency? **Technology** will be the answer.
- **Cost of operations.** Companies will continue to need to compete for labor, outside the four walls expense, and of course the cost of fuel impacts everything.
- **Geo-political engagement.** The Russian war in Ukraine is anticipated to create worldwide food shortages. Understanding supply chain resiliency will require understanding **assets and product locations** in real time to be able to adapt to the dynamic needs of supply chain requirements. Technology will be the answer again.
- **Sustainability** will continue to be a key focus of government and customers. The U.S. Department of Agriculture reports that 40% of the food produced in the United States ends up wasted. If all the wasted food in the world represented a country, food waste would be the third largest carbon producing nation. Food waste has

been identified as a major contributor to carbon emissions. The U.S. Environmental Protection Agency (EPA) has an initiative that campaigns targeting food waste across the supply chain to achieve the national target of a 50% reduction in food waste by 2030.

- **Government regulation** landscape with industry meeting regulatory compliance will continue to be a focus – the new FSMA 204 rule is expected by November 2022. According to the U.S. Food and Drug Administration’s own financial feasibility study, it will cost the supply chain \$1.5 billion during the first year of implementation, with more that 90% of the financial burden falling on shippers and receivers. The EPA is now making a greater push into regulating food entering the supply chain.
- **IRTA Refrigerated Transportation Best Practices Guide** and the **Cold Carrier Certification** will need to be the cornerstone of controlling cost and delivering excellence in cold chain transport. Best practices have proven to improve cold chain efficiency. The use of best practices and technology will be the foundation. And I’d like to pay tribute to two past IRTA Chairs — Todd Lanter and Robert Fay — for their leadership and for laying down the groundwork for bringing about the Best Practices Guide and the Certified Cold Carrier Program.

One of the most important initiatives I could undertake as IRTA chair would be to see IRTA dedicated to growing the membership and influence of the organization both in the United States and globally. Honestly, I think IRTA is one of the best kept secrets in the industry. ☺



**DON DURM**  
IRTA CHAIRMAN

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COLD FACTS magazine is published every other month by the **Global Cold Chain Alliance (GCCA)**, an organization that unites partners to be innovative leaders in the temperature-controlled products industry. The GCCA Core Partners are:

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The **World Food Logistics Organization (WFLO)**, which delivers education and research to the industry and empowers economic development by strengthening the global cold chain.

The **International Refrigerated Transportation Association (IRTA)**, which cultivates, fosters and develops commercial and trade relations between all those engaged in the transportation and logistics of temperature-controlled commodities.

The **Controlled Environment Building Association (CEBA)** represents the design and construction industry specializing in temperature-controlled facilities that prioritize product safety best practices. We are the source for best practices of building and maintaining the thermal envelope.

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# MITIGATING DISRUPTIONS

*USDA releases Agri-Food Supply Chain Assessment.*

**By Lowell Randel**

The United States Department of Agriculture (USDA) issued a report entitled “USDA Agri-Food Supply Chain Assessment: Program and Policy Options for Strengthening Resilience” on February 24, 2022. The report was triggered by President Biden’s Executive Order 14017 on “America’s Supply Chains,” which directed several federal agency actions to secure and strengthen America’s supply chains. One of these directions was for the secretary of agriculture to submit a report to the president that assesses the supply chains for the production of agricultural commodities and food products.

The resulting report outlines the risks and resilience of U.S. agri-food supply chains and identifies potential solutions to address vulnerabilities. This assessment involved extensive input and review by USDA subject matter specialists, consultations with other federal agencies and recommendations obtained through a public comment process. GCCA met with USDA and other administration officials multiple times during the development of the report, as well as submitted formal written comments.

The assessment identifies six priority vulnerabilities facing U.S. agri-food supply chains and offers suggested federal actions. Many of the issues included in the report were highlighted by GCCA in its communications with

USDA. Below is a summary of the six priority areas and selected proposed policy actions of importance to the cold chain.

## **Priority 1: Concentration and Consolidation in Agri-Food Production, Manufacturing and Distribution**

Resilience in agri-food supply chains depends on having access to reliable and diverse sources to meet supply and demand. Weak links in supply chains occur at “choke points” in food production, manufacturing and distribution. Even temporary shutdowns of one or more of these facilities (from fire, electricity disruption, labor shortages, cyberattacks, worker illness, etc.) can threaten significant supply chain disruption.

Selected proposed policy actions include:

- Investing \$4 billion to strengthen critical supply chains in the food system by, for example, prioritizing grants, loans and complementary support to promote regional/local and diverse food processing, aggregation, distribution and other necessary capacity and purchases from domestic firms to the maximum extent possible consistent with the law.
- Backing private lenders through the Food Supply Chain Guaranteed Loan Program, which leverages \$100 million of American Rescue Plan (ARP) Act funding to provide more than \$1 billion for qualified lenders to finance food systems projects, specifically for the start up or expansion of activities in the middle of the food supply chain.
- Prioritizing support for workforce development and safety programs and increasing technical assistance across the broader food production/processing sector.
- Supporting the development of cooperative aggregation and processing facilities, including retrofitting or expanding existing facilities, for locally grown produce meant for institutional markets, food hubs, food banks, schools, etc.
- Building on efforts initiated during the COVID-19 pandemic to ensure food and agriculture sector workers are prioritized for worker health and safety measures such as prioritized access for vaccination and other





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- Investing \$1 billion in diversifying meat and poultry processing capacity, workforce development, research and innovation, and technical assistance.

## Priority 2: Labor Needs

The agri-food supply chain has historically experienced a tight labor market as the ongoing decline in rural population exacerbates difficulties in finding qualified workers. A recent survey by Purdue University and CME reported that 66% of agricultural employers are having difficulty finding workers to fill agricultural jobs.

In addition to shortages of hired workers generally, the COVID-19 pandemic exposed the significant impacts that a public health emergency has on the broader agricultural workforce, the implications for the food supply, and the need to strengthen prevention and treatment of illness among workers engaged in agricultural production, food processing, distribution, transportation and retail.

This vulnerability was seen across workers in every area of the supply chain including farms, production facilities, truckers, railroad crews, river barge crews, distribution facilities/warehouses, grocery stores, school nutrition workers and the restaurant industry.

Selected proposed policy actions include:

- Making available \$1.4 billion in grants through the Pandemic Response and Safety Grant program and the Farm and Food Worker Relief Grant program to support measures, including for PPE, for producers, processors and workers across the agri-food supply chain in response to COVID-19.
- Utilizing research, extension and land-grant university networks and community colleges to train individuals attending these institutions and utilize skills-based apprenticeship opportunities in local communities to build skills in effective farm and land management practices, agribusiness strategies and food safety. Continuing support for USDA's National Institute of Food and Agriculture (NIFA) workforce development programs such as the Agricultural Education and Workforce Development grants.

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“GCCA appreciates USDA efforts to conduct this assessment of the food supply chain. Many of the recommended policy actions correspond to issues raised by GCCA and have the potential to assist cold chain companies in mitigating supply chain disruptions.”

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- Deploying \$100 million in ARP funding to support development of a well-trained workforce, safe workplaces, and good-paying, quality jobs by working closely with partner organizations, including labor unions, with expertise in workforce development and worker health and safety.
- Engaging with Department of Labor (DOL) on how to further leverage existing USDA programs in workforce development and more closely partner on DOL programs such as the Susan Harwood Training Grant program and DOL and DOT registered apprenticeship programs for drivers to support food and agricultural needs.

## Priority 3: Ecological and Climate Risks to Crops

Agriculture and fisheries are highly vulnerable to severe weather events and climate change including droughts, floods, severe storms, heat waves, pests and disease, and disruption of harvest patterns. Shortages of water for irrigation in western states especially threaten vegetable, fruit, and dairy production.

A USDA assessment identifies the following vulnerabilities that need to be addressed:

- Drought and irrigation water scarcity.
- Emergence of new crop and seedborne pests and diseases.
- Ongoing needs related to Good Agricultural Practices (GAPs) for Food Safety.
- Loss of pollinators and pollinator services essential for crop production.
- Need to diversify specialty crops production to adapt to changing conditions.

## Priority 4: Livestock and Poultry Disease Threats

Livestock and poultry are vulnerable to biosecurity and disease threats. An outbreak of a virulent animal disease can spread quickly and cause devastating losses to the industry and disrupt food supply chains. Key vulnerabilities facing animal health include diseases and threats such as: African Swine Fever, Foot and Mouth Disease and Avian Influenza.

Selected proposed policy actions include:

- Strengthening disease monitoring and prevention, regulatory control and response, training and extension of best management practices, and animal health research for priority animal diseases.
- Enhancing a “one health” approach that considers animal, human and environmental contributions to disease surveillance and response in wildlife and domestic animals.
- Strengthening global disease and vector monitoring and conduct vulnerability assessments to identify opportunities to prevent entry of transboundary and emerging diseases to U.S. animal populations.
- Enhancing risk-based surveillance in both wildlife and domestic livestock and poultry populations for early detection of disease and prevention of disease transmission between vulnerable populations.
- Strengthening traceability of meat/meat products to meet export certification with negotiated zoning protocols and animal health language with foreign governments and trade partners.





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### Priority 5: Transportation Bottlenecks

The nation's extensive transportation system is of paramount importance for an efficient, competitive and flexible agri-food system. Transportation enables food to move from our farms to our tables and to ports for export to foreign markets.

It also ensures American producers receive the lowest prices on inputs and the highest prices for their crops while ensuring American consumers pay less for the food on their tables.

Together, the four major transport modes – barges, ocean vessels, trucks and railroads – operate as a seamless network. They both complement and compete with one another to deliver products efficiently and economically within ever-changing domestic and global markets.

This system of inland waterways, ocean ports, containers, highways and bridges, trucking and railroads, has enabled the United States to become the world's largest exporter, as well as one of the largest importers, of food and agricultural products.

Agriculture is the largest user of the freight transportation system in the United States, and the need for transportation services will only continue to increase as agricultural production, exports, incomes, trade and world population continue to grow. Thus, a modern, efficient, reliable, and competitive transportation system is necessary to the continued success of American agriculture.

Selected proposed policy actions include:

- Deploying financial support to strengthen the nation's highway infrastructure.
- Establishing an agricultural freight secure data commons.
- Encouraging and coordinating regional infrastructure planning among states.
- Continuing ongoing collaboration and information sharing with DOT and DOL to address trucking challenges in agriculture. Supporting the Drive-SAFE Act – designed to find ways to let younger people enter the industry as well as reach out to underrepresented demographics, including women and minorities, to open trucking as a career path.
- Implementing regulatory changes to enhance competition within the consolidated industry and improving the rate dispute process.

### Priority 6: Trade Disruptions

U.S. agri-food supply chains are highly integrated into global markets, with a substantial share of agricultural and food products both exported and imported. Trade improves the efficiency and performance of the agri-food sector. It enables commodities, intermediate goods and final consumer products to be sourced from where they can be grown or manufactured at the lowest cost.

Production and manufacturing of many critical agricultural inputs and food products rely on components produced in foreign countries. Dependence on single-source or unreliable foreign sources for critical materials and products is a potential vulnerability to U.S. agri-food supply chains should that source be disrupted. Heavy reliance on one or few foreign market destinations for U.S. agricultural exports creates risk of shocks to producers and supply chains if access to those markets becomes limited.

Transportation bottlenecks arise from truck driver shortages, port congestion, aging or outdated infrastructure and inspection operations. Food and agricultural products that require refrigeration or that have a short shelf life, such as certain meat and poultry products and fresh fruits and vegetables, are especially vulnerable to transportation delays due to refrigeration costs and spoilage.

To support increased resiliency across U.S. agri-food supply chains relative to potential trade disruptions, four core areas were identified (export promotion, sanitary and phytosanitary (SPS) issues, shortages in packaging, transport materials and certain ingredients, and ocean shipping) under which a variety of actions could be implemented.

Selected proposed policy actions include:

- Strengthening and diversifying U.S. exporters across the supply chain, improving access by small exporters from diverse backgrounds to USDA export promotion programs.
- Accelerating the adoption of electronic certification (e-Cert) for phytosanitary and sanitary import and export certificates.
- Convening a public/private taskforce at the national level to provide recommendations and strategies to prevent future occurrences of shortages in pallets, packaging and other shipping containers,

and essential raw ingredients for food processing in collaboration with FDA and exploring increased domestic sourcing for these items.

- Exploring creation of a strategic reserve of shipping containers and pallets. This reserve could help ensure that prioritized goods, such as perishable produce and agricultural inputs, are available when they are needed.
- Continuing work by USDA with the Federal Maritime Commission (FMC) to support use of its full regulatory power authorities to promote free and fair competition through 1) reviewing existing carrier alliances to determine if they decrease service, increase transportation costs, or reduce competition, 2) improving transparency in service contract rates 3) addressing unfair detention and demurrage fees, and 4) using any other appropriate tools to promote fair competition in ocean freight shipping.

GCCA appreciates USDA efforts to conduct this assessment of the food supply chain. Many of the recommended policy actions correspond to issues raised by GCCA and have the potential to assist cold chain companies in mitigating supply chain disruptions.

GCCA will continue to work closely with USDA and the Administration as they move forward with implementing the policy recommendations to strengthen the food supply chain. ☎

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# SUPPLY CHAINS AND WAR

The impact of the Ukraine conflict on regional and global logistics.

**T**he Russian invasion of Ukraine has rattled global supply chains that are still in disarray from the pandemic, putting pressure on cargo capacity and raising concerns about further supply chain disruptions



There have been myriad impacts on logistics and supply chain operations in the form of rapidly increasing oil and gas prices, shippers and carriers implementing contingency plans, prolonged deliveries and a ceasing of port operations in Ukraine.

Western Europe and Russia have imposed reciprocal flight bans bringing travel between the two regions to a halt and impacting air shipments between Asia and Europe, which now must divert around Russian airspace. Shipping ports around the Black Sea have closed, halting cargo vessels and disrupting vital shipping routes that carry much of the world's wheat and other agricultural products.

#### Sanctions and Disruptions

Many Western countries have announced a series of escalating sanctions on Russia over its invasion of Ukraine. In early April, the EU

announced a ban on Russian vessels and Russian operated ships from accessing EU ports. The commission did indicate there would be certain exemptions such as agricultural and food products. The Commission added it will propose a full ban on Russian and Belarusian freight road operators working in the EU. Again, certain exemptions cover agricultural and food products.

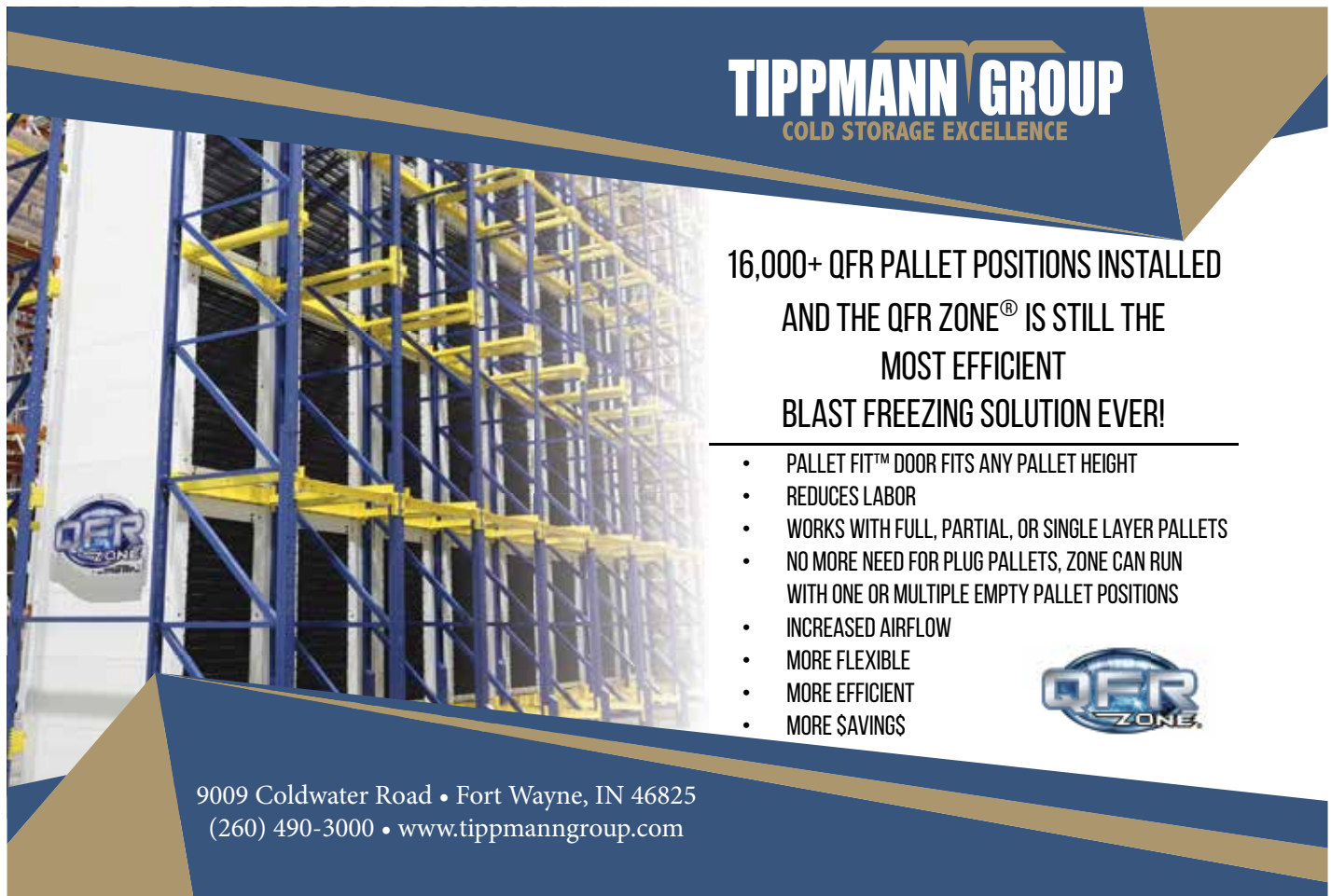
Maersk announced it would temporarily suspend all shipments to and from Russia by ocean, air and rail, with the exception of food and medicine. Ocean Network Express, Hapag-Lloyd and MSC, the world's other major ocean carriers, have announced similar suspensions.

"Our operations in Europe are port-centric and many of our customers had product stuck on Russian vessels once the sanctions against Russian vessels were put in place,"

explains Rudy Sandoval, Vice President of Operations – Europe Region, Americold. "Additionally, product we stored in our warehouse could not be shipped out on time because the vessels were barred from port. The ban has also blocked the Russian port of St. Petersburg, causing a significant reduction in available containers to load." He adds customers have had some shipments diverted to Rotterdam, Netherlands.

Kris Verbruggen is the CEO and Managing Director of Frigo Logistics, a Polish logistics operator mostly focusing on domestic distribution. "We have a small office in Moscow with two Russian employees. For now, we have decided to halt our activities. However, this is only our own decision and not connected to sanctions."

Although Lineage does not have operations in either Ukraine or Russia, Harld Peters,




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President, Lineage Europe, says the company does have teams in Poland and across Europe that have been impacted. “We are supporting our team members through continued payment of salaries for those directly affected and emergency relief funds. We are also supporting team members who are volunteering and hosting refugees from Ukraine.”

### Food Prices

Peters points out rising food prices and global food security are two of the biggest challenges the global community faces. “As we’ve seen in the European Union, governments around the world are taking steps to address food affordability issues and to make our agriculture and food supply chains more resilient and sustainable,” says Peters. “While it is too early to tell the medium-long-term impacts of the conflict in Ukraine, we are committed to working with governments, partners and suppliers globally to optimize food supply chains, and to building more sustainable food chains to help address rising costs and increase food security.”

Frank Huckschlag, Executive Vice President Global Operations, NewCold, says their customers are already having problems getting some raw materials because of the situation in Ukraine. “Looking at the coming harvest, for sure there will be a bigger global impact.”

Sandoval says Americold is very concerned. “We’re already seeing the impact on food prices, power and labor.”

### Energy Costs

Huckschlag points out as consequence of the sanctions against Russia, energy costs are increasing dramatically, which is one of the main cost drivers of their business.

“Clearly, the effect of the war on our costs is very large,” notes Verbruggen. “On the other hand, as a logistics operator, we are in contact with our clients and explain to them the underlying reality. Most often, the objective indicators are accepted by the clients, and they generally accept the increased prices as well.”

Peters says Lineage is mitigating the impact of these rising costs by doubling down on its investment in sustainable energy initiatives like solar arrays, wind turbines and flywheeling.

“We are also investing in infrastructure such as reefer plugs, which allows a reefer to dock and unload without running the diesel engine,” explains Peters. “And we are also looking to the future and how we can do the same with diesel trucks.”

### Labor Impact

Sandoval says labor remains challenging. “We have had a couple of associates return to Ukraine to fight in the conflict. We have a site in Poland, so our associates in that country continue to volunteer their time and services to assist Ukrainian refugees as they enter Poland.”

Verbruggen says the company has approximately 100 workers from Ukraine. “A handful of them returned to Ukraine to join the army. This was temporarily disturbing but did not structurally impact the operations.”

“A lot of truck drivers and part-time colleagues working in the warehouse in our facility in Poland come from Ukraine so we already feel a lack of resources that could be worse towards the summer,” says Huckschlag. He added the company also has Ukrainian colleagues, for example, in its head office. “We try to support them in the best way we can by talking with them a lot about the situation of their families in Ukraine.”

### Capacity and Rates

Spot market rates have spiked significantly due to the conflict, notes Sandoval.

“Occupancy has increased due to vessels not porting and emptying out inventories (loss of turns),” says Sandoval. “Once vessels begin to arrive, inventory levels will decrease, and turns will increase as previously expected.”

“For now, the effect of inflation is great, with more frequent and larger price increases,” says Verbruggen.

Huckschlag says the impact on pricing is not known at the moment. “But looking at the situation in the United Kingdom last year, our experience tells us that it could easily be plus 30%.”

### Aid and Comfort

Verbruggen reports Frigo Logistics has organized free transportation for non-governmental organizations that are shipping products to refugees and to Ukraine. The company also organized a fundraiser among its employees with the company doubling the donated amount.

“In addition, we give financial and psychological support to our Ukrainian workers and support in different ways local initiatives in Poland in the communities where we are active,” Verbruggen says. “A number of our workers are also privately volunteering to host Ukrainian families in their house.”

Huckschlag says NewCold is supporting shipments of food to Poland and Ukraine through its own transport organization.

On a local level in Poland, Americold associates are donating clothing, food and other supplies and volunteering at shelters that are regularly receiving refugees from Ukraine, says Sandoval.

“Our Polish site also donated money to a local shelter to assist with refugees. And, in the European region, we donated €30,000 to the International Red Cross to assist with aid efforts,” Sandoval notes. “We’ve partnered with Feed the Children (our primary non-profit partner in the United States) to direct monetary donations to one of their partner organizations in Poland that is providing food baskets to refugees.”

Sandoval points out many Americold associates in the United States, particularly in the Northeast corridor where there are larger Ukrainian populations, have also asked how they can help.

Unequivocally, Lineage Logistics stands with the people of Ukraine, and we are committed to providing support in every way we can, says Peters.

“Through the Lineage Foundation for Good, we have donated immediate direct aid to two relief organizations in the region – Polish Humanitarian Action and the Global Foodbanking Network – to support food banks in Ukraine, Poland, Hungary, Moldova, Slovakia and Romania,” adds Peters. “Our team members and many of our partners were also very keen to show their support. In response, our co-founder, Adam Forste, in partnership with the Lineage Foundation for Good, ran a dollar-for-dollar matching campaign for all our team members, vendors and customers.”

Peters says in addition, many Lineage locations and teams have organized food, medical and hygiene supply drives of their own to help those affected by the crisis, and they are collaborating to ensure those materials reach the people affected. ☺

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# BUILT BY THE BEST

## CASE STUDIES

By Keith Loria

### *Primus Builders Provides Case Farms With Expanded Poultry Facility*

Case Farms, a fully integrated poultry farming and processing group with more than 35 years of history, was looking to expand its operations to meet the Midwest's growing demand for responsibly-raised poultry. Among its ideas was to expand an existing processing facility in Winesburg, Ohio, United States.

Primus Builders had worked with the poultry manufacturer on a similar project and the success of that project, and the relationship Primus enjoyed with Case Farms since, positioned its team as the design-build automate provider of choice for the Ohio project.

"The customer wanted to expand their production capabilities, freeze product onsite rather than paying to ship to an off-site facility, expand their onsite storage and minimize staffing requirements," says Ryan Jennings, Solutions Project Manager for Primus. "They wanted to triple their production capacity, keep the minimum staff hired and bring in product from about an hour away."

Once selected for the job, Primus' team started by requesting data from the customer to understand the production rates and be able to scale for what they were looking to accomplish in the future.

The most pressing component of this project was its schedule. Case Farms had already grown the hatchery for the chickens to be processed at the Winesburg facility, so it was imperative the building be ready to receive them.

"In addition, the client requested that the processing area be ready four weeks ahead of the originally scheduled completion date,"



Case Farms' expanded poultry processing center in Winesburg, Ohio, built by Primus Builders, Inc. (Photo courtesy of Primus Builders, Inc.)

Jennings says. "Communication was key to achieving these schedule goals. The Primus team met weekly with Case Farms to inform their ownership of the project's progress."

#### **A Proper Time Line**

As Primus had completed a similar project for Case Farms, the entire project team, including stakeholders from design, automation and construction divisions, sat down with Case Farms and discussed lessons learned to improve the approach to the Ohio project.

Since the existing facility on the project site was an active chicken processing plant, Case Farms was clear in its expectations

prior to construction – there should be zero interruptions to ongoing activities. This was something Primus had to work around from the get-go.

"We scheduled and aligned our plan with Case Farms' production schedule, then paid careful attention to things such as utility tie-ins and food safety measures to ensure not one minute of production time was lost," Jennings says.

To accomplish that, three phases of construction were planned for the project.

"We started placing the first footings for phase one on May 4, 2020, and had all three phases completed, and the full expanded



production capabilities completed, by April 21, 2021,” Jennings notes.

The first two phases took place simultaneously. Phase one included a new engine room; a 36,000-square-foot chicken processing facility area with interstitial space; an access corridor, and processing utility areas.

Phase two consisted of a 138,000-square-foot cold storage warehouse; a -33° automated carton freezing solution; a palletizing area; wet cooler dock; -10° storage freezer; loading dock and additional support spaces and supporting office space.

“The facility was located in a rural area with limited access to additional staff,” Jennings says. “This led us to embrace automation in the facility to help them utilize the staff they already had while still increasing the production rates.”

### Innovative Design Features

Case Farms was utilizing a blast freezing cell called a VRT (variable retention time) freezer that would handle product at case level and freeze it quicker than what is done traditionally at pallet level. This required additional automation so that product is last touched by a human when the lid is placed on it until it is picked up by a forklift frozen and stretch wrapped for an order.

“Two palletizing robot cells were installed and are able to handle 1,000 to 1,200 cases per hour and palletize over 35 pallets per hour,” Jennings explains. “This increased the safety of the workers by not having to handle the heavy cases and reduced the need to hire additional workers to move the cases. This also required less building footprint, which allowed our customer to utilize their property better.”

Case Farms also desired more floor space to accommodate equipment in the palletizing area. To achieve this, Primus installed a double layer conveyor belt that literally sandwiches each case of product, resulting in cases moving up the incline faster. The steeper angle allowed for more floor space and ultimately more production equipment.

One challenge was that the end user had to accommodate many different types of orders that changed the case size of the product and the actual case itself.

“We had to configure and tool the palletizing and de-palletizing robot cells to be dynamic enough to handle the case changes without requiring any adjustments to the robots themselves and not slow down production,” Jennings says.

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“Our training on the new automation equipment and hand over to the customer went very well and did not cause any delays to the production rate. We were able to create more technical and higher paying jobs for the area by utilizing technology while increasing the customer’s overall return on investment.”

**RYAN JENNINGS,**  
*Primus Builders, Inc.*

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### Overcoming Challenges

Another challenge was the expansion required utility power beyond what was available in the small town of Winesburg. For instance, the facility required 1.5 million gallons of water a day to operate properly but the existing water tower on the Case Farms site could provide only 200,000 gallons.

To ensure access to enough water, Primus built two wells, installed four pumps and erected two 300-gallon tanks.

“We also re-engineered the booster pumps to ensure there was enough water pressure,” Jennings says. “Electricity was equally challenging. Primus worked with a power co-op to pull electricity from two substations to ensure enough electricity to the project before Winesburg built a new substation dedicated to the building.”

The site itself was also a challenge. Being situated on a former strip mine, mine spoils were discovered during site work, and needed to be dug out of the ground. Then the ground was rehabilitated to ensure it was safe for construction.

“The site’s elevation change was also challenging when it came time to design the retaining wall,” Jennings points out. “The design team redesigned the wall five times to get Case Farms the best value. The final design featured three types of retaining wall – poured-in-place concrete, beam and lagging, and modular block.”

### The Finished Project

The Primus team and those they worked with on the job had a lot of big personalities but also a lot of experience. Jennings notes everyone was always on the same page about delivering a fully functional and profitable facility to the customer – and one that not only Primus would be proud of but the customer as well.

“Delivering the project on schedule, and not causing a single lost day of production for the customer was a big achievement for the team,” Jennings says. “Our training on the new automation equipment and hand over to the customer went very well and did not cause any delays to the production rate. We were able to create more technical and higher paying jobs for the area by utilizing technology while increasing the customer’s overall return on investment.”

The completed facility not only increased Case Farms’ own production capabilities. It was also built to handle product from a separate facility that allowed the end-user to bring more capabilities in-house. Jennings says, “It saved them from having to rely on off-site storage and freezing facilities and brought that process in-house for two facilities in one location.”

The project added 144 jobs and a \$5.3 million payroll to the local economy and Case Farms was thrilled with the finished outcome.

# Ti Cold Builds State-of-the-Art Facility for Nor-Am Cold Storage

When Nor-Am Cold Storage was looking to add a new cold storage facility in Dodge City, Kansas, United States, to its portfolio, it called on Ti Cold (going by Tippmann Innovation at the time) for the job.

Ti Cold started planning the facility with the company owners a few years before construction began. Several site and design ideas were developed that included solutions to a variety of pivots and barriers.

In October 2020, Ti Cold completed the 148,000-square-foot state-of-the-art meat processing and distribution facility for the company. The new facility is home to more than 17,000 pallet positions of storage space as well as the QFM In-Rack Freezing System.

## From the Start

Ti Cold started the job in November 2019 – just a month before the pandemic began.

Building in 2020 brought new difficulty to an already complex project as COVID-19 brought new restrictions that affected everything from travel to social distancing.

Ti Cold and Nor-Am utilized video conferencing platforms to keep in constant communication with each other. The onsite representatives for both companies needed to comply with COVID-19 guidelines that included restricting movements both onsite and offsite, masking policies and social distancing requirements while managing the production of a complex, multiuse building.

“Due to significant engineering and planning, we were able to purchase the materials prior to starting the construction,” says Rob Adams, a Partner at Ti Cold. “It was a very difficult time on the job site with all the COVID restrictions; however, the Ti Cold project manager team along with contractors and subcontractors were able to work efficiently and strategically to get it done.”

Project managers delivered detailed weekly reports to company owners that included progress photos so the owners could ask questions or make changes throughout every stage of the construction process. A live camera also displayed daily updates on Ti Cold’s website at [ticold.com](http://ticold.com).

## Innovative Design

The complexities continued as the project developed.



The new Nor-Am Cold Storage facility in Dodge City, Kansas, built by Ti Cold. (Photo courtesy of Ti Cold.)

“Nor-Am’s new facility houses the most innovative BRC-certified pet food processing facility in the country,” Adams says. “Completing this section of the building required multinational coordination working with a large pet food company and procuring the state-of-the-art DSI plate freezing equipment.”

Not surprisingly, the coordination of the freezing equipment was quite challenging during the pandemic, but the professionals at DSI worked hand-in-hand with the Ti Cold and Nor-Am logistics teams.

“The processing room and freezer are connected by a conveyor that seamlessly moves product from the processing area directly into the freezer,” Adams says. “Stainless-steel slope and slot floor drains cover the processing room floor, eliminating an additional step in the clean-up process while the mezzanine above holds air compressors and other equipment, allowing for maximum storage and processing space.”

The completed freezer holds more than 17,000 pallet positions and 450 positions of Tippmann Engineering’s QuickFreeze In-Rack Freezing System (QFM). Adams describes it as, “the most efficient way to freeze product as it pulls warm air away from the middle of the pallet instead of blasting cold air at the product.”

The technology in QFM allows for all product to freeze evenly and consistently while reducing energy costs.

## Sustainability Measures

The Nor-Am Cold Storage facility in Dodge City is situated across the street from the National Beef Plant and near several food processing facilities. The location is no accident.

“The transportation of the many different beef products that these plants produce, and Nor-Am stores has been streamlined by the location of Nor-Am’s new building,” Adams says. “This also cuts down on transportation emissions, the need for long-term cold storage transportation and ensures the freshest product. This relationship has also created an almost zero-waste processing system.”

The facility also contains the highest quality equipment, including six plate freezers that allow for accelerated freezing of large quantities of product.

Ti Cold took no shortcuts when it came to designing an energy efficient facility. From its high-quality refrigeration room to energy saving lighting systems, the entire facility was built with sustainability in mind.

“Not only were the refrigeration room and freezing/processing equipment built for energy efficiency and cost savings, but other design details inside and outside of the facility were crafted to ensure economic, environmental and social sustainability,” Adams says.

That includes energy efficient touchless fixtures, motion sensor lighting and more.

The facility also holds the prestigious BRC Certification. Holders of this certification must have an effective food safety management system and excellent facility maintenance standards. The certification gives Nor-Am access to a market available only to companies holding this status.

## Acclaimed Accomplishments

To meet the demanding requirements of temperature, pressurization, air purity, humidity and condensation control, the processing and production space received state-of-the-art systems, including interstitial space, allowing for a cleaner production room. The installa-



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“Not only were the refrigeration room and freezing/processing equipment built for energy efficiency and cost savings, but other design details inside and outside of the facility were crafted to ensure economic, environmental and social sustainability.”

**ROB ADAMS, *Ti Cold***

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tion of a waist heat floor heating system in the process space reduced floor condensation and wetness and improved operational safety. And the addition of the new QuickFreeze system (QFM) provides a much greater automation capability.

Since decision-makers with Nor-Am were unable to travel to the job site as often as they planned due to COVID restrictions, Ti Cold put together an onsite project manage-

ment team. It had the ability to anticipate the company's needs, bringing solutions to the virtual table.

“Building a new section within an already working cold storage facility puts a constraint on working space,” Adams says. “Social distancing requirements created an additional need for space, and the Ti Cold project managers worked with Nor-Am onsite management to create a schedule and

building flow that allowed both construction and work in the public warehouse to continue under these conditions. We are really proud that throughout the pandemic and conditions of the job, our teams were able to stay on schedule and budget.”

In fact, Greg and Janna Brandt, CEO and CFO at Nor-Am, had the following to say about Ti Cold's project management capabilities. “Ti Cold worked with us to set up the project the way we wanted to on the financial side as well as on the building side. When things popped up, they were always ready to be innovative with us and with our best interests in mind. With COVID hitting the project, Ti Cold ensured there were no additional delays and went the extra mile to keep everyone safe on the job site.” ☎

**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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## *First South African Cold Chain Conference*

**By Lizelle van der Berg**

**T**he Global Cold Chain Alliance will host its first ever South African Cold Chain Conference on August 4, 2022, in Cape Town, South Africa. The South African Cold Chain Conference is South Africa's 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 will provide leadership experience, knowledge, and exclusive networking with decision makers from across South Africa and beyond, in a relaxed yet professional atmosphere.

Throughout the conference, attendees will hear from thought leaders and industry experts and get a better understanding of industry trends, perspectives, and best practices. Delivered in various formats – keynote presentations and educational sessions, the program will offer interactive participation.

Making connections with fellow delegates is an important aspect of any conference experience. That is why this event has ample opportunity to connect/re-connect with professionals who share your goals and your challenges.

### **Plenary Sessions & Learning Opportunities**

With the support of the GCCA South Africa Advisory Council and the GCCA South Africa Risk Management Committee, GCCA is building a program that aims to be transformative, innovative, and practical.

The conference's keynote speakers are leaders in their industries, whether that is logistics, automation, economics, or talent management. Their stories will inspire attendees to think outside the box and widen their perspectives.

### **Program**

Attendees at the conference will be provided a high-level overview of current trends and challenges experienced by the industry in various parts of the world, including a look at Africa.

There will be a number of government affairs sessions offered as well as technical sessions with the latest innovations in cold storage and refrigerated transport.

### **Networking**

The conference offers participants numerous networking opportunities to make new connections and strengthen existing relationships. Networking functions include an Early Arriver's Dinner planned for Wednesday, August 3, and a Closing Reception on Thursday, August 4.

Throughout the event, attendees will also have multiple opportunities to network with peers during breaks.

### **Sponsoring**

The GCCA South Africa Cold Chain Conference is a supplier's best venue for reaching temperature-controlled warehousing and logistics executives in the South African market. Increase your company's brand visibility and promote your brand at the event through the sponsorship program. Each opportunity has been customized to spotlight your company throughout the entire event.

### **Location**

The conference will be held at the Century City Conferencing Centre in Cape Town. For more information on the conference visit [www.gcca.org/events](http://www.gcca.org/events).



## SEMINAR ON FIRE RISK INSURANCE

Obtaining insurance has become challenging for refrigerated facilities in South Africa and globally. This is especially true for facilities that lack what is seen as acceptable fire protection. To address these challenges, the Global Cold Chain Alliance hosted a full day, in-person Fire Risk Insurance Seminar in Johannesburg, South Africa, on 10 March 2022.

The seminar brought together 64 temperature-controlled warehousing and logistics executives from all over South Africa for discussions on innovations and trends and to network. This event was initiated by the GCCA SA Risk Management Committee at a committee meeting in September 2021.

### Risk Management Committee Challenge

Gerhard Coetzee, the Financial Director of Sequence Logistics and Vice Chairman of the GCCA Risk Management Committee, gave an overview of the challenges experienced by the industry. These included the percentage increases in insurance rates over recent years and the fact that acquiring insurance is an even bigger challenge for some of the players in the industry.

Coetzee explained the industry remains unsure if it is making the best possible investment decisions in terms of fire risk and ensuring that facilities are safeguarded with the best possible prevention and firefighting solutions available. And, that those solutions are in line with what is required from insurers.

### Oxygen Reduction Systems

Allan Cunninghame from Nitro-Gen Africa gave a detailed overview of oxygen reduction systems as an alternative to sprinkler or foam fire suppression installations as an approved fire prevention system for cold and freezer rooms.

Oxygen-controlled environments are noncombustible areas and provide a proactive approach to fire prevention rather than a reactive approach. A human being only breathes about 17% oxygen, which is the same level these freezer rooms are kept at, making them completely safe for staff to work in.

A case study was presented on the oxygen reduction system that was installed at the Euroberry distribution center in Somerset West, South Africa.

### Insurance Market Trends

Pieter Kruger from Marsh explained that the biggest problem with insurance claims is business interruption claims, and the market has changed drastically.

Contributing to the change is a consistent inability to achieve underwriting profits, a material decline in investment income, a reduction in available risk capital, historical underpricing, and a confluence of industry events, both man-made and naturally occurring.

COVID-19 claims have become more common in insurance, which has also changed the industry drastically. It has resulted in larger companies increasing the use of data and analytics to ensure their risk financing decisions are informed, data driven and sustainable. Many players are either reassessing the strategic use and value of self-insurance or considering the formation of a specialist self-insurance model at the center of their risk financing strategy.

Kruger noted that markets are pressurized by reinsurers to impose blanket Grid Failure Exclusions for South Africa. To improve your insurance renewal process, you should start



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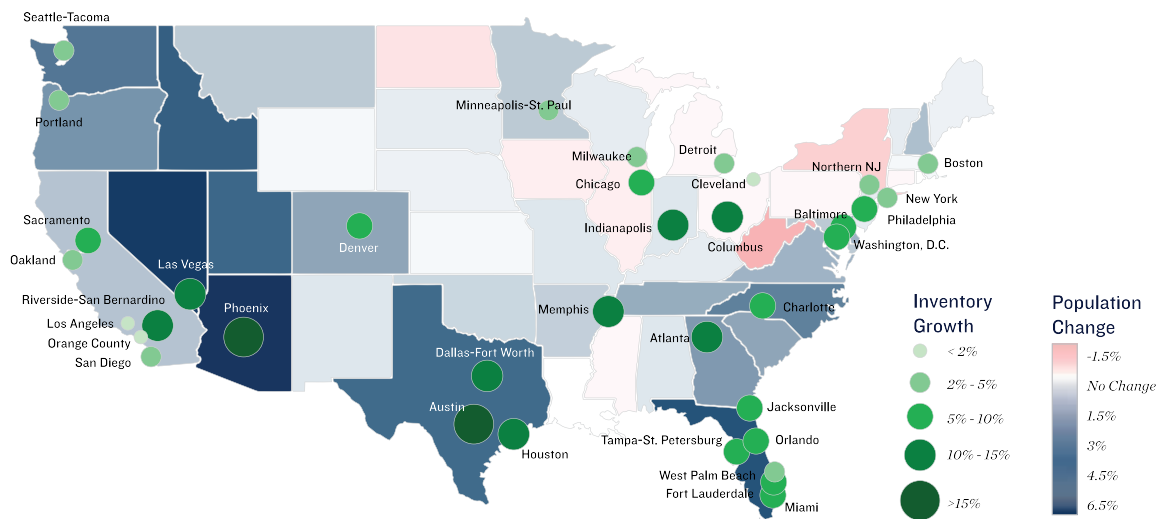
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Phoenix	17.2%	4.4%	5.5%	-230	\$8.95	20.3%
Houston	11.8%	4.0%	6.4%	-10	\$7.85	16.6%
Las Vegas	11.6%	5.1%	2.5%	-300	\$10.50	22.0%
Indianapolis	11.5%	2.8%	4.0%	-30	\$5.80	24.5%

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early and stick to an agreed timetable, identify your risk tolerance, understand the market, avoid gaps in information, expect questions, highlight lessons learnt, sell your risk, use your relationships and cast the net wider. And, you should have a plan B.

### Reducing the Risk

Karel Roodt from The Fire Engineer described the key fire engineering segments and how to comply to South African National Building Regulations. He then took the audience through a case study of a fire risk assessment that was undertaken at a bulk apple and pear supplier just outside of Grabouw in the Western Cape.

### Foam Sprinklers

Hannes Pretorius of Paragon Systems Design explained a wet sprinkler system that combines water and a foaming agent for large scale fire extinguishment that can put out extensive fires in seconds with incredible efficiency. The water and foam mix will not freeze in a pipe grid. The foam blankets the surface smothering the fire. It suppresses the release of flammable vapours and creates a barrier between the fuel and the fire.

Pretorius further explained that the foam lowers the surface tension of water and allows it to penetrate deep seated fires. Due to the high expansion ratios, less water storage and deliver capacity is required. There is less damage to electrical and electronic equipment and waste and contamination control is easier and safer. Frozen foams can be removed by mechanical means as opposed to frozen water, and mobile racking will still be able to move.

### Smoke Detection

Lian van der Merwe of Exodus Group gave an overview of the latest innovations in smoke detection technology specifically designed for extreme temperature environments that will soon be launched.

This breakthrough technology will revolutionize the way forward in controlled-temperature conditions to aid in fire detection. Van der Merwe further explained the practical applications, installation criteria and financial benefits.

### Insulated Panels

Tammy Grove of Kingspan explained that not all insulation is the same and that the building fabric used is a crucial part of a holistic fire safe design. The general term



Tammy Grove with Kingspan (left) and Lizelle van der Berg, Director, GCCA South Africa.

“foam insulation” is used but is misleading. The different materials used all have their own specific characteristics and should not be generalized as foam insulation.

Grove pointed out that stringent insurance industry requirements have led to the development of specific insurer-driven large-scale fire tests to assess the reaction to fire performance of insulated panels with different cores.

### Panel Discussion

The Fire Risk Insurance Seminar concluded with a panel discussion moderated by Alasdair Martin of Vector Logistics. The audience was offered the opportunity to ask questions, which they enthusiastically made use of. Panellists included specialists from Bryte Insurance, Marsh, Old Mutual, Paragon Systems Design, IFESA and Lockton in the United States.

The panel discussion gave the audience a good overview of how insurers are impacted by what happens overseas and why there are so few lead insurers in South Africa. Another point of discussion included the fear that local insurers might stop covering cold storage facilities completely as has happened in Australia. Other topics included early detection systems vs sprinkler systems, the main cause of fires in cold storage building internationally and regulations in South Africa. 🌐

**LIZELLE VAN DER BERG** is Director – GCCA South Africa.

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## UPCOMING GCCA EVENTS

(as of May 2022)

**9 May, 2022**

**GCCA South Africa: Ammonia Short Course**  
Virtual

**25 May, 2022**

**GCCA Cold Chain Connection**  
Dominican Republic

**2–5 June, 2022**

**WFLO Institute West**  
Tempe, Arizona, United States

**12–15 June, 2022**

**WFLO Institute East**  
Atlanta, Georgia, United States

**14–16 June, 2022**

**GCCA Curso Básico - Operações para Armazéns Frigoríficos**  
Virtual

**11–13 July, 2022**

**WFLO Institute Latinoamérica 2022**  
Mexico City, Mexico

**15 July, 2022**

**GCCA Cold Chain Connection**  
Newport, United Kingdom

\*All events are subject to change due to COVID-19. Visit [www.gcca.org/events](http://www.gcca.org/events) for updates.



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# WHAT IS CULTIVATED MEAT?

*And what kind of supply chain does it require?*

By Reza Ovissipour and Michael Jahncke

As the world population increases to 10 billion by 2050, total food and meat production must rise by 70% and 100%, respectively, to satisfy global demand. The U.S. food production system faces several issues in meeting this demand. Increasing water scarcity in major production regions and increasing vulnerability to disruptions from natural disasters due to climate change are just some of the growing issues that prompt the need for new technologies in meat production.

In addition, a critical challenge in food supply chains is food loss issues that present significant sustainability and security challenges, with 60% of meat becoming processing waste (1.4 billion tons for livestock; 800 million tons for seafood). New sources of sustainable and nutritional protein would help address these concerns.

Cultivated meat production is emerging as a feasible solution to address immediate societal problems by developing new sustainable agri-food systems to feed a rapidly growing global population. This industry will provide nutritious and safe foods for consumer options while reducing environmental impact and resource usage (78-96% fewer greenhouse gas emissions, 99% less land use and 82-96% less water use).

## **What is Cellular Agriculture and Cultivated Meat?**

Cellular agriculture is producing agricultural products using cell culture and tissue engineering techniques instead of using whole plants or animals.

Cultivated meat, also known as cultured, in vitro, lab-grown, clean, and cell-based meat, is genuine animal skeletal muscle and adipose tissue that can replicate the sensory and nutritional profile of conventionally produced meat and seafood since it has the same cell types arranged in the same three-dimensional structure.

Cultivated meat burger was unveiled by Dr. Mark Post on live television in 2013. In 2015, four cultivated meat startup companies were funded, and the industry has since grown rapidly to more than 70 companies worldwide.

Combining cell biology, tissue engineering, cell culture, fermentation, bioprocessing, data processing and chemical engineering supported the cultivated meat industry. Currently, there are hundreds of companies and research laboratories working with several non-governmental organizations to support the field.

The first federal grant (\$3.2 million) was awarded by UC Davis from the National Science Foundation. It was followed by the first United States Department of Agriculture (USDA) grant awarded by Tufts University (\$10 million) to develop the first National Institute of Cellular Agriculture in collaboration with Virginia Tech, UC Davis, MIT, Virginia State University and the University of Massachusetts Boston.

## **Cultivated vs. Conventional Meat Supply Chain**

At this moment, there is no specific cultivated meat supply chain. The cultivated meat industry depends on cell lines, cell banks, media (containing growth factors, amino acids, peptides, proteins, vitamins, minerals and trace elements), plant-based materials (i.e., scaffold), packaging, cold storage, shipment and existing distribution channels. However, the conventional meat supply chain, which depends on feeds, farms, processing plants and distribution channels, could also be used for cultivated meat (Figure 1).



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## Cultivated and Conventional Meat Supply Chains

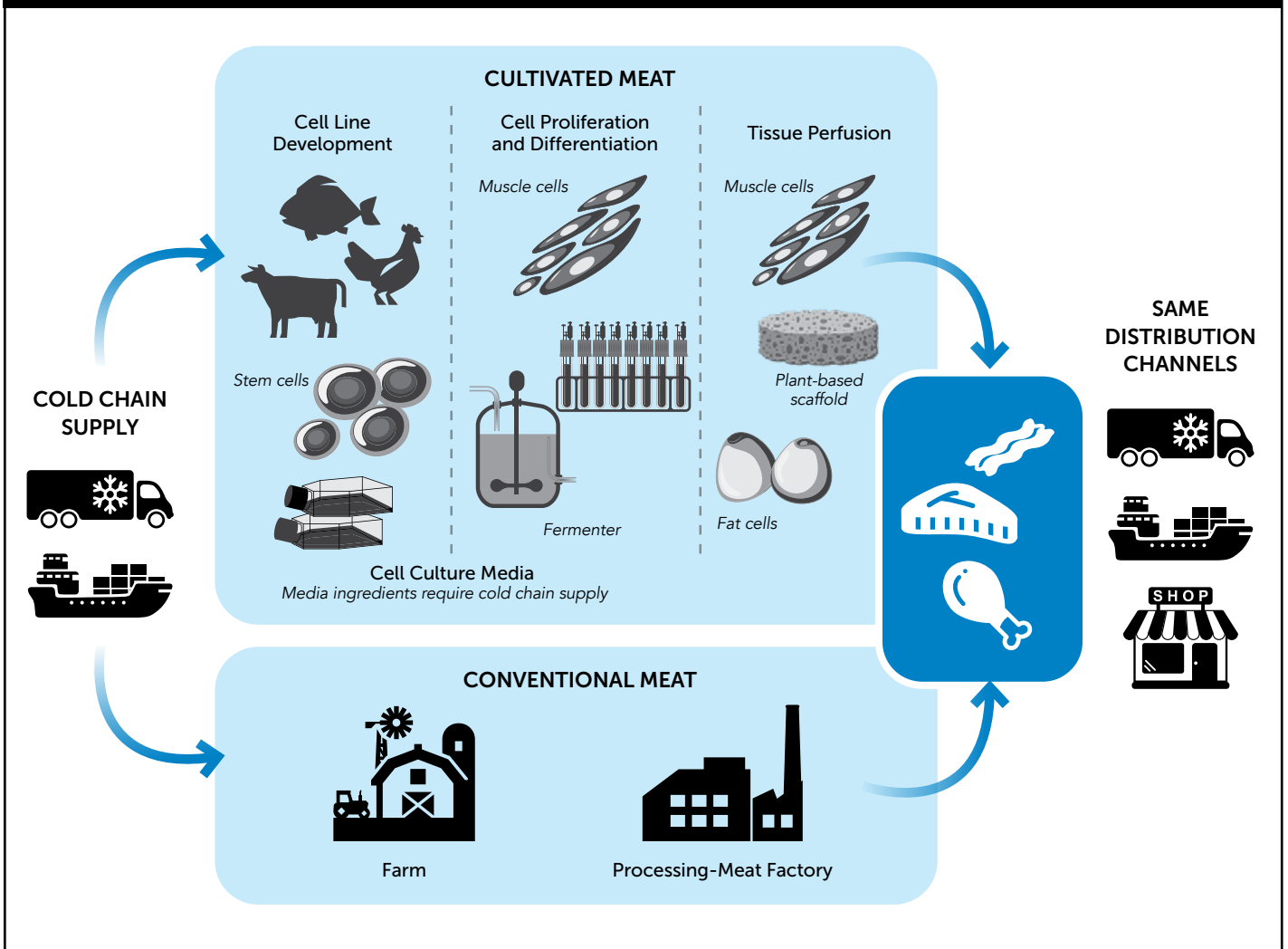


Figure 1. Cultivated and Conventional Meat Supply Chains

Media ingredients and final products, similar to conventional meat products, must be transported and stored under cold conditions to maintain the quality and safety of the final products. Many media ingredients are heat sensitive and should be transported and stored properly. Considering the cultivated meat industry is rapidly growing – it is believed that cultivated meat will make up around 25% of the global meat market by 2040 – its supply chain must grow at the same pace.

Cultivated meat production cost is higher than conventional meat products. Thus, to reduce the cost of production, the quality and yield of the final product must be increased by providing high-quality ingredients, optimizing the production systems and applying proper storage conditions such as a cold chain.

### Regulation

While the cultivated meat industry is growing rapidly worldwide, regulations are slowly developing. Cell-based meats fall under the Novel Food Regulation in Europe. However, in the United States, it is not clear whether the USDA or the Food and Drug Administration (FDA) has jurisdiction.

In 2018, FDA and USDA agreed to create a joint regulatory approach. In 2019, they established a joint agreement indicating which agency regulates food produced using cell culture. At this moment, many cultivated meat companies in the United States prepare their food safety plan and standards based on both FDA and USDA, and in many cases, they received support from consultants.

Singapore Food Agency has approved Eat Just's cell-cultured chicken as the first country that approved cultivated meat.

### Acknowledgment

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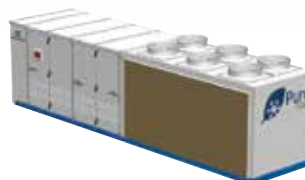
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## Transcritical CO<sub>2</sub> Industrial Chillers

- 50 to 500 tons at -40F to 40F outlet fluid



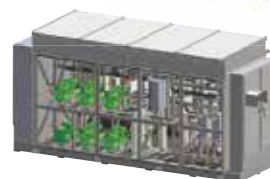
## Transcritical CO<sub>2</sub> Condensing Units

- 10 to 85 Tons at -40 to +40F SST



## Transcritical CO<sub>2</sub> Industrial Racks

- 50 to 400 Tons at +40 to -50F SST or +50F to -40F fluid temperature



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**M&M CARNOT**

# COLD CHAIN DEVELOPMENT

## NEWS ABOUT WFLO INTERNATIONAL PROJECTS

This column features news about key projects of the World Food Logistics Organization (WFLO), a GCCA Core Partner, 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.

### NEW PROJECTS

#### **Ghana Cold Chain Network, 2022 – 2023**

*Partnered with LixCap, Sory @ Law, West African Coastal and Marine Engineering Services (WACAMS), and Maverick Research and Consultant*

This feasibility study, funded by the U.S. Trade and Development Agency, will define the opportunity to establish a temperature-controlled logistics facilities network throughout the country of Ghana. The study will also include a detailed market assessment of existing cold chain services. WFLO will undertake the study with the consortium of local and international experts, which will facilitate cold chain infrastructure for GCCA member FreezeLink. This is WFLO's third international project award of 2022.

#### **Cambodia Market Systems Program, 2022 – 2023**

*Partnered with LixCap and Khmer Cold Chain Company (KCCC)*

WFLO will advise the construction and start up of the Khmer Cold Chain Company facility at the LM17 port on the Mekong River in Phnom Penh, Cambodia. This is the follow on to the successful feasibility study and Owner's Engineer add on, also supported by WFLO. In March, Madison Jaco, Manager of International Projects, attended the groundbreaking ceremony for the facility construction.

### ACTIVE PROJECTS

#### **Benin Projet d'Appui à la Compétitivité des Filières agricoles et à la Diversification des exportations (PACOFIDE), 2022**

*Partnered with LixCap*

WFLO was requested by the government of Benin to develop preliminary designs for the project. The client PACOFIDE will soon launch a tender process for the conditioning facility in the Grand Nokoué wholesale market. This tender process directly follows the successful cold chain rapid response and strategy developed by the consortium.



*From left to right, Shiselle Povedano (LixCap), Saad El Jai (LixCap), Nabeel Khan (Venture37), Mehadi Hasan (ISATL), Harshal Surange (WFLO), Kamrul Hassan (Venture37) and Manuel Cabrera-Kabana (WFLO) during a visit to ISPHAHANI Summit Alliance Terminals Ltd (SATL) in Chattogram, Bangladesh.*

#### **Burundi Projet de Développement Local pour l'Emploi (PDLE), 2022**

*Partnered with LixCap*

The WFLO-LixCap team is focused on delivering a concept design for state-funded cold chain facilities and design and tender documentation for the facilities. CEBA member CT-Technologies is continuing its work to deliver the facility on time.

#### **Bangladesh Trade Facilitation (BTF) Project, 2020 – 2025**

*Partnered with Venture37 and LixCap*

In March, a team of WFLO and LixCap consultants traveled to Dhaka, Bangladesh. They attended meetings with potential investors in cold storage facilities and consulted with government officials to facilitate investment in new warehouses for frozen and refrigerated goods at air and seaports in Bangladesh. The outcome of the meetings has helped identify locations for investment and developed a network of contacts within the country's cold chain industry.

#### **Dominican Republic TraSa Project, 2021 – 2025**

*Partnered with International Executive Service Corps (IESC)*

With major support from GCCA members in the region, WFLO is reviewing the Perishables Manual recently completed by the Dominican Ministry of Agriculture. WFLO is specifically providing comments and suggestions to the legal and regulatory, cold storage, and commodity storage elements of the manual. Additionally, the review of Inspection Protocol of Perishable Products has been initiated. WFLO is also planning two regional study tours for port inspectors and customs officials later in 2022 and cold chain training for the local cargo and retail associations.

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

*Partnered with Abt Associates Inc.*

The Feed the Future Egypt Rural Agribusiness Strengthening (ERAS) is improving the competitiveness of horticulture producers and related downstream businesses and food pro-



cessors by developing their abilities to respond to domestic and international buyer demand. WFLO will provide short-term technical assistance on postharvest handling practices for key crops. Dr. Elhadi Yahia, expert on postharvest technology of perishable foods for the WFLO Scientific Advisory Council, traveled to Egypt in April 2022 to provide support and training on mangoes.

**Georgia Agriculture Project, 2018 – 2023**

*Partnered with Cultivating New Frontiers in Agriculture*

WFLO is developing various remote trainings for the Republic of Georgia. The training modules have grown from 10 to 13 and cover deep dives into harvesting; grading, sorting, and packing; packaging for fruit and vegetables; ethylene management; shelf life and temperature; cold storage; lights, floors, doors, and corridors; design build focus points; ultra-low oxygen; business model case studies; marketing channels; and public private partnerships. Training will be provided by members of the Scientific Advisory Council, GCCA members and GCCA technical experts. The virtual training will roll out in the second quarter of 2022. WFLO is also supporting the development of a newly established local cold chain association in Georgia.

**North African Cold Chain Skills Gap Analysis and Trainings, 2021 – 2022**

*Partnered with USA Poultry and Egg Export Council (USAPEEC)*

WFLO is planning relevant training and resources for the region to enhance cold chain logistics across all levels of the supply chain. With implementing partner USAPEEC, WFLO will offer these resources later this year to various 3PL providers in the region with the support of GCCA technical experts and members of the association.

**Southeast Asia Emerging Markets Program (EMP), 2019 – 2022**

Following the completion of a comprehensive baseline assessment of the cold chain situation in Vietnam and Cambodia, GCCA technical experts Kent Sisson and Manuel Cabrera Kabana traveled with GCCA staff member Madison Jaco to Thailand to perform a rapid assessment of the industry. The collected data



Madison Jaco, Kent Sisson and Manuel Cabrera-Kabana traveled to Bangkok, Thailand, in March to assess the country's cold chain system. The team visited Food Gallery where they were joined by representatives from AT Success Marketing and the U.S. Department of Agriculture Foreign Agricultural Service.

will be used to identify potential educational opportunities for stakeholders in the region, such as one-on-one consultations, virtual and

in-person trainings, Cold Chain Connections, and/or a study tour to the Philippines. 🌐

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## GCCA STANDS WITH YOU. THE TIME TO ACT IS NOW.

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 current Administration and Congress present new challenges and opportunities that we will need to face as an industry, together.**

The Biden Administration and Democratic controlled Congress could implement burdensome regulations and increase oversight over our industry in a number of ways. This includes:



### OSHA COVID-19 STANDARDS

- Enacting a national emergency temporary standard for industry
- Sets the stage for permanent regulation on infectious disease control in the workplace



### CLIMATE CHANGE

- Pursuing aggressive policies to address climate change, through both executive action and legislation
- Rejoining the Paris Climate Agreement, eliminating greenhouse gas emissions, and implementing the Green New Deal



### TAXES

- Rolling back the Trump tax cuts
- Increasing the corporate tax rate from 21% to 28%, phasing out deductions for pass-through entities
- Raising the top marginal income-tax rate from 37% to 39.6%
- Less money in the pockets of businesses means less jobs available for hardworking employees



### LABOR

- Strengthening worker organizing, collective bargaining and unions through executive action and legislation such as the PRO Act
- Labor initiatives, like 'micro-unit' organizations and joint employer policies could quickly be reinstated



### ADDITIONAL REGULATIONS

- Revisiting EPA's Risk Management Program (RMP) regulation and making additional requirements
- Changes to Process Safety Management

A Democrat controlled White House and Congress will only mean more rules, regulations and burdensome policies.

## THERE IS SOMETHING YOU CAN DO.

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

# 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 WFLO 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](http://www.gcca.org/inquiry).

To get instant advice from a private, online community of over 4,000 cold chain professionals, simply post your inquiry in the GCCA Online Community. All GCCA Members and their employees can access the GCCA Online Community at [community.gcca.org/home](http://community.gcca.org/home).

**Q:** A potential customer is asking if we can help them freeze and store several pallets for a few months. The product is a protein flour product for synthetic meat in 30-gallon drums. My team is concerned with the unfamiliarity of the product and wonders if it will jeopardize other customers' products with the introduction of chemicals. At this time, it isn't a huge amount of storage, but as we have seen this market grow, it could become a better account to have. Could you review the SDS sheets and offer a recommendation?

**A:** It appears that this is a protein powder made by microorganisms using carbon dioxide from the air for use in manufacturing artificial meat products. They have already achieved the initial regulatory feasibility assessment and are in the process of obtaining GRAS – Generally Recognized as Safe – approval from the U.S. Food and Drug Administration.

It should be fine to store in the warehouse. All indications suggest that this is a safe product. However, the major HACCP issues are to establish controls to prevent cross-contamination and control for potential allergen issues.

*Answer provided by Dr. Michael Jahncke, Chairman of the Scientific Advisory Council. 📧*

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The WFLO 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.



**Dr. Michael Jahncke**

Virginia Tech University,  
Fish Products Expert  
**SAC CHAIRMAN**



**Dr. Brian Fugate**

University of Arkansas, Supply  
Chain Management Expert



**Dr. Jeffrey Brecht**

University of Florida, Cool-  
Climate Fruit & Produce Expert



**Dr. Cody Gifford**

University of Wyoming, Meat  
Products Expert



**Dr. Patrick Brecht**

PEB Commodities, Refrigerated  
Transportation Expert



**Dr. Dennis Heldman**

The Ohio State University, Food  
Process Engineering Expert



**Dr. Paul Dawson**

Clemson University, Poultry  
Products Expert



**Dr. Faris Karim**

Kansas State University,  
Ammonia Contamination & Food  
Toxicology Expert



**Dr. Donald Fenton**

Kansas State University,  
Refrigeration Engineering  
Expert



**Dr. Barbara Rasco, BSE,  
Ph.D., JD**

University of Wyoming,  
Food Safety & Food Safety  
Regulations Expert



**Dr. S. Paul Singh**

Michigan State University,  
Packaging & Labeling Expert



**Dr. Kees Jan Roodbergen**

University of Groningen,  
Logistics & Operations  
Management Expert



**Dr. Donald Schaffner**

Rutgers, The State University of  
New Jersey, Microbiology Expert



**Dr. Victoria Salin**

Texas A&M University, Agriculture  
Economics Expert



**Dr. Charles White**

Mississippi State University, Dairy  
Products Expert



**Dr. Subramaniam Sathivel**

Louisiana State University,  
Frozen Food Quality Expert



**Dr. Elhadi Yahia**

Universidad Autónoma de  
Querétaro, Mexico, Postharvest  
Technology of Perishable Foods  
Expert

### **SAC Emeritus**

**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](http://www.gcca.org/inquiry)**

# COOL SOLUTIONS: ABSTRACT

## SCIENTIFIC ANSWERS TO COLD CHAIN CHALLENGES



**DR. FARIS KARIM**  
Kansas State University,  
Ammonia Contamination & Food  
Toxicology Expert

Food safety is as important to human health as food quality to consumers. For that, the relationship between food safety and food quality must be established. This would benefit not only the food industry but also facilitate decisions concerning food-

related issues such as food contamination in insurance/customer claims.

Temperature plays an important factor in both the quality and the safety of food products; low temperature keeps food products safe and prolongs the quality.

Ammonia is the refrigerant of choice for many food production facilities and refrigerated warehouses due to its high efficiency in providing cooling and freezing with low production cost and relatively low environmental impact. However, the toxicity of ammonia is a major concern. Ammonia leaks in production facilities and refrigerated storage warehouses most likely occur due to the corrosive nature of ammonia.

Regulations and publications in relation

to food contaminated during ammonia refrigerant leaks provide limited information, which means products are often held for an indeterminate period or condemned. Scientific literature and regulatory agencies including the FDA offer little guidance on disposing of products exposed to ammonia or what levels of ammonia in contaminated food products are considered safe for human consumption.

Evaluating frozen food products contaminated by ammonia is important information for the food industry and refrigerated storage warehouse facilities. More research is needed to establish guidance on how to handle contaminated food products when exposed to ammonia.



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**DR. BARBARA RASCO**  
University of Wyoming,  
Food Safety & Food Safety  
Regulations Expert

Use of blockchain technologies across the cold chain continues to grow from roughly \$5 billion in 2021 to a projection of more than \$60 billion in 2026. Driving adoption is the use of blockchain solutions that provide digital identities for traceability and

supply chain transparency, data integration, banking and cybersecurity, payments and smart contracts.

A blockchain provides security for the data along with the authenticity and traceability of each transaction making it difficult to tamper with any aspect of the transaction ledger. Both Proof of Stake and Proof of Work provide consensus mechanisms for authenticating transactions without the need for a third party.

The FDA's current focus on tech-enabled technologies through its New Era for Smarter Food Safety emphasizes that traceability will be a regulatory driver resulting in increased adoption of digital technologies for regulatory compliance. Affordable digital technology

connecting buyers with validated and verified sellers is now available. The result is the adoption of sourcing that meets social and environmental market needs in addition to improved operational efficiency and potentially lower financial risk.

Many companies are developing blockchains to quickly identify product impacted by a recall, streamlining and potentially simplifying compliance with food safety and other regulatory programs. Complex sets of data, such as genomic sequences, operational data or proprietary technical specifications can be tied to a blockchain while not necessarily being a part of it. Confidential information is protected as part of permissioned/hybrid-based systems.



## HIGH-BAY WAREHOUSE FOR DEEP FREEZE INTRALOGISTICS AT ITS BEST

In Burley, Idaho, NewCold celebrated the grand opening of one of the largest frozen storage facilities of its kind. This impressive project includes a high bay warehouse with 90,000 pallet positions supplied by SSI SCHAEFER.

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and grow your organization to improve the cold chain industry.

We can't wait to see you.

JUNE

### 58<sup>TH</sup> WFLO INSTITUTE WEST

2-5 JUNE 2022

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.



### 58<sup>TH</sup> WFLO INSTITUTE EAST

12-15 JUNE 2022

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.



JULY

### WFLO INSTITUTE LATIN AMERICA

11-13 JULY 2022

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.



AUGUST

### GCCA SOUTH AFRICAN COLD CHAIN CONFERENCE

3-4 AUGUST 2022

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.



AUGUST

### GCCA GLOBAL POLICY FORUM

9-11 AUGUST 2022

Virtual

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 GLOBAL POLICY FORUM  
AUGUST 9-11, 2022

OCTOBER

### 131<sup>ST</sup> IARW-WFLO CONVENTION

8-12 OCTOBER 2022

San Diego, California, United States | Omni La Costa 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.



IARW-WFLO Convention  
8-12 October 2022  
San Diego, California

### GCCA BRAZILIAN COLD CHAIN CONGRESS

21 OCTOBER 2022

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.



BRAZILIAN  
COLD CHAIN CONGRESS

NOVEMBER

### 42<sup>ND</sup> CEBA CONFERENCE & EXPO

7-10 NOVEMBER 2022

Amelia Island, Florida United States | Omni Amelia Island Resort

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.



42<sup>ND</sup> CEBA  
CONFERENCE & EXPO  
AMELIA ISLAND, FL  
NOVEMBER 7-10, 2022

### GCCA LATIN AMERICAN COLD CHAIN CONGRESS

16-17 NOVEMBER 2022

Bogota, Colombia

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.



LATIN  
AMERICAN  
COLD CHAIN CONGRESS

**Find out more at [www.gcca.org/events](http://www.gcca.org/events)**

Many events are in flux due to COVID-19 and are subject to change.

All of our virtual events and Regional Cold Connections will be posted online as they are scheduled. Please check [gcca.org](http://gcca.org) for updates.



# ASSOCIATION NEWS

## NEWS ABOUT GCCA CORE PARTNERS

**IARW** released the association's annual Global Top 25 List of its largest temperature-controlled warehousing and logistics members. Accompanying the Global Top 25 is the GCCA North American Top 25 Warehouse Member List and a list of the largest operators in Latin America, the Caribbean and Europe. The lists are determined by total capacity of temperature-controlled space in GCCA membership.

Warehouse members currently own or operate 6.64 billion cubic feet (188 million cubic meters). A total capacity of 982 million cubic feet was added to the Global Top 25 since the publication of the 2020 lists, due in most part to frequent mergers and acquisitions activity. This does not suggest the general industry grew at this pace.



The 42<sup>nd</sup> **CEBA** Conference & Expo will be held November 7-11, 2022, at the Omni Amelia Island Resort in Florida, United States. The annual CEBA Conference & Expo is the only event in the world dedicated to best practices in controlled environment facility construction, design and maintenance. The event draws over 200 controlled environment facility construction, logistics, and supply chain operations professionals from around the world to gain valuable insight for improving their business. The conference

and expo features presentations by industry thought leaders, exceptional networking activities, and an expo with cutting-edge products and technology. More details will be available on the website in early May.



Tamara Palefsky, of United States Cold Storage was awarded **GCCA's** 2021 Global NextGen Award in March. The Global NextGen Award recognizes outstanding young professionals in the world's cold chain industry. Candidates for the 2021 GCCA Global NextGen Award were nominated by national refrigerated warehousing organizations to compete virtually for the global award. In addition to Palefsky, who as the 2021 GCCA Don Schlimme Future Leader Award Recipient represented North America, finalists included:

- Mandisa Pakamisa, CCS Logistics (South Africa) | 2021 GCCA Africa Future Leader Award Recipient
- Liam Neilly, Lineage Logistics (Australia) | 2021 RWTA Frank Vale Award Recipient
- Murilo Migliorucci, SuperFrio Logistic Frigorificada (Brazil) | 2021 GCCA Brazil Future Leader Award Recipient
- Alejandro Delgado, Americold Logistics LLC (Spain) | 2021 GCCA Europe Future Leader Award Recipient
- Mauricio Chiossoni, Polo Logistico

de Frio (Uruguay) | 2021 GCCA Latin America Future Leader Award Recipient



Corrin Hill, Transport Manager, Lineage Logistics, United Kingdom, was announced as the **GCCA's** 2022 European Future Leader Award Recipient during its 25th European Cold Chain Conference, held in Rotterdam, Netherlands, March 23-25. This year's conference attracted close to 200 cold chain professionals from Europe, the United Kingdom, the United States and Australia. The award recipient was announced by GCCA President and CEO Matthew R. Ott, who also presented on the association's expanding global footprint and addressed the industry's growing need for an advocacy presence across regions.

Finalists were judged and evaluated on their knowledge level of the industry, track record of excellence, communication skills and leadership skills by a panel of industry leaders. In addition, each candidate delivered a short presentation during the conference. Hill competed for the award with Roope Suotunen, Supply Chain Solutions Manager, Americold Logistics LLC, Netherlands.

Hill will represent Europe and go on to compete against young leaders from different regions later in the year for the GCCA Global NextGen Award. 🌐

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# MEMBER NEWS

## NEWS FROM MEMBERS OF GCCA CORE PARTNERS

**A.P. MOLLER – MAERSK** will provide integrated logistics through its new air freight company, Maersk Air Cargo. Maersk has selected Denmark's second largest airport, Billund, as its air freight hub.



**COLD SOLUTIONS** is opening a new 1,000,000 square foot cold storage facility with meat boxing services and 70,000 pallet positions in Kansas City, Missouri.



**LINEAGE LOGISTICS** has acquired **MTC LOGISTICS**, a cold-chain provider with strategic locations on or near the ports of Baltimore, Maryland, Wilmington, Delaware and

Mobile, Alabama. Through the acquisition of these four facilities, Lineage will add nearly 38 million cubic feet of capacity and over 113,000 pallet positions in the United States.



**LINEAGE LOGISTICS** will acquire **VERSACOLD LOGISTICS SERVICES**, a cold chain solution provider in Canada, that runs 24 temperature-controlled facilities comprising 114 million cubic feet of storage and 361,000 pallet positions. VersaCold also has an integrated, asset-based inbound and outbound temperature-controlled transportation solution that operates out of nine terminals across the country.



**M & M CARNOT**, a leader in industrial and commercial refrigeration equipment and controls, has acquired Logix®, an industrial controls manufacturer.



**STELLAR**, an integrated firm focused on design, engineering, construction, and mechanical services, received a 2021 National Safety Excellence Award from Associated Builders and Contractors (ABC). The company was recognized with a Pinnacle award, the highest of three categories.



**VERTICAL COLD STORAGE**, has entered the Dallas, Texas market with the purchase of Lone Star Cold Storage of Richardson, Texas. ☎



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# NEW MEMBERS

## NEW MEMBER COMPANIES OF GCCA CORE PARTNERS



Controlled Environment  
Building Association

### CEBA MEMBERS

#### AECOM

Columbus, Ohio, United States

#### Honeywell

Madrid, Spain

#### Rite-Hite

Milwaukee, Wisconsin, United States



### IARW-WFLO WAREHOUSE MEMBERS

#### Blue Sea Products, LLC

Perth Amboy, New Jersey, United States

#### Cleveland Cold Storage

Cleveland, Ohio, United States

#### Continental Cold Storage

Bellevue, Washington, United States

#### Hall Street Storage LLC

Brooklyn, New York, United States

#### Maritime Cold Storage Ltd.

Portage, New Brunswick, Canada

#### VX Cold Chain Logistics

Shanghai, China



### IARW ASSOCIATE MEMBERS

#### Beebryte

Lyon, France

#### Exodus Group

Cape Town, WC, South Africa

#### Honeywell

Madrid, Spain

#### Metro One Loss Prevention

#### Services Group

Staten Island, New York, United States

#### Plus Delta Consulting LLC

#### (CHIEFEXECcoach)

Los Angeles, California, United States

#### Rite-Hite

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#### Maritime Cold Storage Ltd.

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#### VX Cold Chain Logistics

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# COOL PERSON

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## KULSOOM KHAN

Kulsoom Khan is Energy Efficiency Manager at Congebec. She also oversees the company's recently launched, workforce-based Energy Ambassadors Program. It is an outcome of Congebec's participation in GCCA's Energy Excellence Recognition Program (EERP) and is intended to leverage the company's efforts in energy efficiency and energy savings by building a culture of energy excellence internally.

**CF:** What regulatory demand does the EERP allow you to promote?

**KK:** The Canadian government requires companies like ours to meet specific regulations to help reduce our energy consumption and work to achieve greener and more sustainable practices. The EERP allows us to leverage actions within our walls to meet sustainability mandates in reducing our energy consumption with the help of our Energy Ambassadors.

Moreover, we work on our carbon footprint directly with our employees and indirectly with our customers and transportation.

Specifically, the EERP allows us to analyze our warehouses very closely to highlight energy saving opportunities to focus on in the future.



I think that better and more sustainable sources of green energy such as hydrogen and nuclear fusion will be big in our future."

**CF:** Do you see the EERP relating to the company's environment, sustainability and governance goals?

**KK:** Definitely. I believe the EERP is a pillar of Congebec's Energy Efficiency Strategy that allows us to develop and maintain our energy culture, but also provides our employees with opportunities to get involved in the company's sustainability efforts. The EERP led us to create the Energy Ambassador Program to help Congebec achieve its energy efficiency goals and work on its sustainability goals.

**CF:** How do you see EERP affecting facility operations in the short term and the long term?

**KK:** Short term: The EERP is already proving to increase our employee engagement in each facility. We are spreading awareness and educating our people about energy efficiency. We will soon notice that our energy consumption will trend downwards in a positive way.

Long term: Our operational efficiency will be hugely impacted by the EERP in each facility as we develop and implement more projects that focus on energy efficiency.

**CF:** You grew up in Pakistan and later moved with your family to Canada where you studied engineering. Is there anything about your background or studies that began your interest in energy management?

**KK:** Growing up, I developed a passion to conserve resources and avoid misusing them to waste as little energy as possible for the well-being of my community. Very early on, I understood that resources such as water, electricity and gas are shared and limited.

When I arrived in Canada, I was amazed to see the availability of these resources and felt very privileged. I started to study engineering and developed a more serious interest in energy management and sustainability. I took courses on energy efficiency and completed a minor in sustainable energy. I became confident that it was my duty to be of service to our planet and create a better environment for our future, even in countries like Canada where resources are abundant. I later completed my Certified Energy Manager (CEM) certification, which built my knowledge and confidence to pursue my career in energy management.

**CF:** What do you think will be the next big advancement in energy sustainability in the cold storage industry?

**KK:** I think that better and more sustainable sources of green energy such as hydrogen and nuclear fusion will be big in our future. There are major breakthroughs happening now that we keep our eyes on to see how they will impact our industry.

Artificial intelligence will also play an important role in the coming years as our energy saving technologies continue to improve and help us control, as well as monitor, our energy consumption, especially for cold storage facilities. ☯



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