

JUNE 2022

SPECIAL REPORT

CHEMICAL LOGISTICS:
CRITICAL CHALLENGES
DRIVE CREATIVITY

inbound logistics

a THOMAS company

THE MAGAZINE FOR DEMAND-DRIVEN ENTERPRISES

LNG • BIODIESEL • HYDROGEN • EV

FUELING A SUSTAINABLE SUPPLY CHAIN

- ESG INITIATIVES
- 75 GREEN SUPPLY CHAIN PARTNERS



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InfoSNACKS

BITE SIZED SUPPLY CHAIN/LOGISTICS INFORMATION

ONLINE SHOPPING LIST

47% of all Americans buy their groceries online at least sometimes

15% shop mostly or exclusively online

75% of online consumers spend more than \$50 per week

77% of online shoppers buy at big box retailers like Costco, Walmart, or Kroger

WONDER WOMEN

- In 2022, **women compose 39% of the total supply chain workforce**, down from 41% in 2021.
- Compared to the previous year, **representation of women in supply chain improved at the senior-most level**, with women composing 19% of C-level positions, up from 15% in 2021.
- Supply chain leaders should not become complacent, however—**43% say the pandemic has had a net negative impact in the retention and progression of women** in supply chain organizations over the past year.
- Lack of advancement opportunities and pay equity remain issues—**59% of respondents have no action plan to close the pay equity gap**.

— 2022 Women in Supply Chain survey, Gartner

WHAT THE HACK?

123456

The most common password used by CEOs (1.1 million+ times)

password

Second most common password (used 700,000+ times)

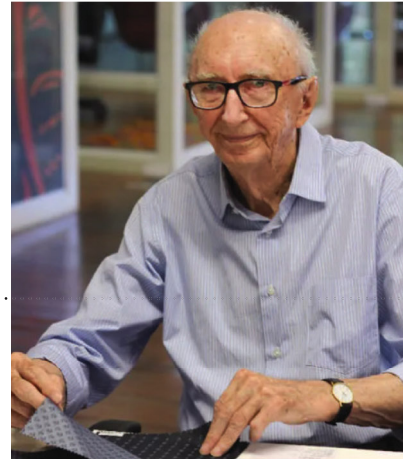
1q2w3e, 12345, 1111, qwerty

Other most common passwords

Michael, Jordan, Tiffany, Charlie

The most widely chosen names executives use in passwords

—NordPass analysis of cyber incidents



NOW THAT'S CAREER LONGEVITY

In 1938, when he was **15 years old**, Walter Orthmann started work as a shipping assistant at a textile company in Santa Catarina, Brazil called Industrias Renaux S.A. (now ReneauxView).

Eighty four years later, at 100 years old, he still works there and holds the official Guinness World Record for the longest career at the same company.

HOLD MY BEERGAME

The Beergame App is an e-learning game that hosts engaging business simulations online to teach and simplify supply chain concepts. This web application was inspired by the Beer Distribution Game, developed by Jay Forrester, an MIT professor, in 1961.

The player gets a role in a specific industry—manufacturer, distributor, wholesaler, or retailer. The game's goal is to satisfy requests at each stage of the supply chain to meet the overall demand of end consumers.

Participating in the games' directives provides insight into important supply chain concepts such as cost, orders, and demand and helps players understand the impact of multiple supply boundaries, the effects of customer behavior, and the bullwhip effect.

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Chemical shippers and their partners keep critical shipments moving safely and efficiently—refining their strategies and getting creative despite considerable challenges. Here's how leading providers formulate solutions for chemical shipments.

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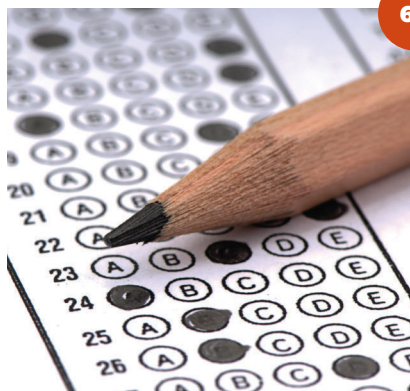


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SUPPLY CHAIN HELPS MEET ESG GOALS

Interest in environment, social responsibility, and governance (ESG) is growing, and companies are increasingly turning to their supply chains to help meet their ESG goals. Their supply chain partners nurture these sustainability initiatives with innovative tools and services.

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GROCERY SHORTAGES: THE WORM IN THE APPLE

A smorgasbord of factors are leading to grocery shortages, but retailers can take a bite out of the challenge through advance planning, visibility, and a focus on supplier relationships.

ABOUT THE COVER

Electrify America and NFI Industries collaborate on the largest heavy-duty electric truck charging infrastructure project in the United States. Slated for completion by December 2023, the project provides 34 ultra-fast DC chargers to support 60 electric freight trucks that NFI will utilize to serve the Ports of Los Angeles and Long Beach. (Photo courtesy of NFI.)





Air oddities like this skycrane allow supply chains to reach unprecedented heights

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What pandemic-era adjustment will have the greatest impact on the supply chain?

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10 LEADERSHIP

Once a would-be literature professor, Thad Bedard, the president of APL Logistics, is constantly imagining how to make a great company even better. With a collaborative approach and an openness to change, he thrives on challenge and opportunity.

CHECKING IN

Chick-fil-A Strikes Oil



Keith Biondo, Publisher

Have you ever gotten a whiff of french fries as you pass an 18-wheeler on the highway? While it may have been a flashback to your last visit to Chick-fil-A, it was more likely the biodiesel fuel that could have come from upcycled frying oil collected from 2,802 Chick-fil-A locations across the United States.

The fast food chicken chain is participating in a program with Darling Ingredients, a global company that reduces food waste by collecting and repurposing

animal-based co-products and other natural materials. For customer Chick-fil-A, Darling turns waste cooking oil into green energy for truckers.

"We are committed to being responsible stewards of the resources at our restaurants and support the future of renewable transportation fuel—diesel in this case," says Rodney Bullard, vice president, corporate social responsibility for Chick-fil-A.

In New York, for example, the average price for diesel is currently \$6.45. In another time and place (two short years ago) diesel cost \$2.69 per gallon.

That massive price rise trickles up and down the supply and demand chain, increasing prices at every touch. Biodiesel will play an important role in offsetting the energy squelch designed to "wean America off fossil fuels."

Here's how the program works. Darling Ingredients arranges for the regular collection of Chick-fil-A's waste cooking oil. Darling's partnership with Valero Energy, called Diamond Green Diesel, creates an integrated supply chain that combines Darling's supply of waste ingredients with Valero's refining, production, logistics, and marketing through Valero's retail fuel stations. The partnership currently produces and sells 290 million gallons of green diesel per year. Expansion plans are expected to increase Diamond Green Diesel's total production to about 1.2 billion gallons of green diesel annually by 2023.

Currently, 44.6 billion gallons of diesel fuel are sold in the United States each year, according to the U.S. Energy Information Administration. Assuming diesel use stays about the same, biodiesel would account for 2.6% of total consumption by 2023.

Let's run some math about the economic impact of the human-caused increase in diesel fuel: 44 billion x \$6.45 per gallon = \$284 billion, give or take a few billion. And 44 billion gallons x \$2.69 per gallon two years ago = \$118 billion. The two-year difference is more than \$165 billion in added fuel costs.

Green diesel will not only add to the supply sustainably, but it also may help to tamp down more fuel cost increases during the next two years.

Chick-fil-A and partners Darling Ingredients and Valero Energy are clearly winning on their environmental, social, and corporate governance leadership. And my favorite item, the Spicy Chicken sandwich, still costs less than a gallon of diesel.

Keith Biondo

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Inbound Logistics supports sustainable best practices. Our mission is rooted in helping companies match demand to supply, eliminating waste from the supply chain. This magazine is printed on paper sourced from fast growth renewable timber.

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GOOD QUESTION

Readers Weigh In

What pandemic-era adjustment will have the greatest supply chain impact?



The acceleration of digital twins.

The ability to digitally model a company's manufacturing and distribution network will allow it to quickly assess the impact of large and small disruptions and take appropriate actions.

—Allen Jacques

Industry Thought Leader, Kinaxis

PRODUCT VISIBILITY

TECHNOLOGIES that organizations can utilize to monitor the flow and consumption of their products at every step of the supply chain. Product visibility programs and artificial intelligence can provide realistic data-driven projections to help minimize the peaks and dips of product shortages.

—Eric Vasquez

Owner and Founder
Veterans Logistics Group

THE MOVE AWAY FROM JUST-IN-TIME (JIT) OPERATIONS, which for decades enabled organizations to run on a nearly made-to-order process. Manufacturers are now implementing a just-in-case (JIC) model in which supplies are stockpiled “just in case”

Digging Into Data



The use of data analytics to help suppliers really understand consumer behavior. Suppliers decided to eliminate or stop manufacturing slow-moving SKUs in an effort to focus on consumer needs.

—Greg Forbis

EVP, Strategy and Business Development, RJW Logistics Group

The supply chain is demanding comprehensive, market-based data.

Innovative transportation technologies are emerging, providing a data-driven perspective to strategic decisions. It is an exciting time as leaders find a better way to reduce costs, establish stable networks, and ensure the efficient movement of goods.

—Jenny Vander Zanden

Chief Operating Officer, Breakthrough

A company's digital toolbox will have the greatest impact on supply chain operations. Be it advanced analytics or visibility software, organizations will continue to embrace and use data to avoid risk and ensure business continuity. This digital-first mindset will influence key decisions.

—Grant Koch

Solutions & Innovation Director, BDP International

they are needed at a later date. While JIC is more expensive and requires larger warehouses with greater storage space, it provides a cushion of supplies during black swan events.

—Matt Heerey

President, Manufacturing Division
ECI Solutions

INVESTMENTS IN TECHNOLOGY TO CONNECT ALL NODES OF THE SUPPLY CHAIN

and increase visibility will continue to accelerate and transform operations. With heavy reliance on third-party logistics providers, shippers and carriers will

adopt emerging technologies to improve contract performance.

—Matt Marshall

Senior Vice President, NYSHEX

MANY RETAILERS FINALLY EMBRACED A TRUE OMNICHANNEL

customer experience. To do that, they had to evaluate and innovate their systems to support today's “shop anywhere” culture. Consumers have raised the bar on how they shop; retailers responded by designing a seamless omnichannel experience.

—Archie Black

CEO, SPS Commerce

NEW E-COMMERCE MODELS AND MORE CUSTOMER-CENTRIC SUPPLY CHAINS. Companies will need to locate their suppliers closer to where their customers are located and bolster their transportation networks to increase speed to market.

-Tony Pelli
Practice Director,
Security and Resilience, BSI

TECHNOLOGY THAT MAKES IT EASIER TO CONDUCT BUSINESS FROM ANYWHERE, at any time.

From moving operations to the cloud to adopting self-service solutions so customers can manage their own shipments online, these innovations are making businesses more resilient.

-Gary Nemmers
CEO, Magaya

THE INCREASED DIGITIZATION OF DRIVER CHECK INS AND OUTS is

here to stay. The need to limit face-to-face interactions between drivers and dock workers helped to drive a long-term efficiency gain.

-Nick Shroeger
Chief Solutions Officer
Coyote Logistics

THE FLEXIBILITY IMPORTERS HAVE BUILT into their supply chains will

last post-pandemic. The increased demand for crossdocking at port markets will also live on—steamship lines have found a recipe for profit that currently limits or makes inland point intermodal shipments more costly.

-Dale Young
VP, Warehousing & Distribution
World Distribution Services

CONTINGENCY PLANNING. When thinking about your supply chain operations, get creative. Have a Plan B and a Plan C. Consider the disruption effects and think about the impacts on cost, revenue, and clients. Consider pivoting from fringe market products and focus on your core.

-Brendan Heegan
CEO, Boxzooka Fulfillment &
Global Ecommerce

THE SHIFT IN PRIMARY CUSTOMER DECISION CRITERIA from price to more focus on service and capacity.

Diversifying to Increase Resilience



Diversify your supply chain. The biggest lesson from the pandemic is the urgent need to improve supply chain resiliency to mitigate business risks. Merchants should seek to diversify supply sources and seek partners that offer solutions to reduce reliance on single supply lines and that help navigate risks in the new model.

-Mark Robinson
President, UPS Capital

Diversification is key moving forward. The pandemic underscored: 1) the value of building relationships with several ocean carriers, trucking, and warehouse partners, 2) the necessity of establishing strength in multiple markets and 3) the importance of incorporating various options into your transport strategy, ranging from charters to traditional ocean to air.

-Michael Van Hagen
Senior VP, Supply Chain, UWL

Vendor diversification. During the height of the pandemic, we saw many of the major carriers decide they were at capacity—and suddenly would not be picking up orders from several businesses. This taught many a tough lesson in the need for vendor diversification. I believe this lesson has been learned and very few businesses will depend solely on one provider any more.

-Josh Dunham
Co-founder and CEO, Reveel

Customers still want competitive pricing, but now they diversify their carriers, are more willing to use 3PLs and NVOs, and more open to brokerage to ensure capacity.

-Mike Williams
Executive VP, Commercial & Logistics
ContainerPort Group

driving technology adoption, as merchants demand more visibility and orchestration. Relying on technology enables quicker pivots when disruption inevitably occurs—shifting inventory to new cities, leveraging new ports, or redirecting orders to another warehouse.

-Steve Denton
CEO
Ware2Go, a UPS Company

SUPPLY CHAIN SUCCESS DEPENDS ON FLEXIBILITY—the pandemic made that clear. This focus is

Have a great answer to a good question?

Be sure to participate next month. We want to know:

Has the pandemic accelerated logistics outsourcing? Why or why not?

We'll publish some answers.
Tell us at editorial@inboundlogistics.com or tweet us @ILMAGAZINE
#ILGOODQUESTION

10 TIPS

Optimizing E-Commerce Fulfillment Operations

E-commerce sales are projected to continue rising steadily. In this environment, it is more important than ever for retailers and brands to fill orders quickly, seamlessly, and cost-effectively. Here's how your fulfillment operations can optimize performance.

1 ALLOCATE SUFFICIENT RESOURCES FOR FULFILLING ORDERS.

Picking, packing, and shipping online orders is resource-intensive. E-commerce fulfillment operations can require two to three times the space and labor of traditional warehousing operations, so factor these requirements into your plans up front.

2 MAXIMIZE PICKING CAPACITY.

Design your warehouse to increase storage density and maximize picking capacity. E-commerce facility design typically incorporates higher ceiling heights (36 feet or higher), narrow aisles, and high-density storage solutions.

3 PLAN FOR GROWTH AND FLUCTUATIONS.

Since your business is always growing and evolving, it is important to build flexibility into fulfillment operations. Design your fulfillment solution with scalable space, staffing, processes, and technologies, so you can ramp up and down quickly and easily. If you plan to add additional sales channels (i.e., brick-and-mortar stores, subscription services, third-party marketplaces), make sure your fulfillment operations can support multiple channels and order profiles. And always keep safety and ergonomics in mind as you design processes.

4 INVEST IN ADVANCED TECHNOLOGY.

Automation, large-scale mechanization, and robotics can help fulfillment operations achieve peak performance. With the right solution, you can improve productivity, reduce labor dependency, control operational costs and flex to accommodate business fluctuations. When implementing new technology, make sure you have the right back-end infrastructure to support these initiatives—systems, leadership, etc.

5 TAKE A STRATEGIC DISTRIBUTION APPROACH.

The closer products are to the end customer, the faster and more economically they can be delivered. Utilizing two or more distribution centers in strategic locations can help you deliver orders to consumers more quickly and cost-effectively—often within two days via ground service. Another option is to locate your fulfillment centers to ensure ready access to parcel service providers.

6 OPTIMIZE INVENTORY.

Map out processes for receiving, replenishment, inventory slotting, and pack out to ensure optimal efficiency and service levels. If you store products in multiple locations, utilizing an order management system (OMS) can provide visibility enterprise-wide and help determine the optimal fulfillment source for each order. An OMS can also help you provide customers with real-time inventory availability and order tracking information.

7 CONSIDER POSTPONEMENT.

Moving value-added services such as kitting, labeling, and embroidery closer to the customer allows you to delay product configuration or customization until the last possible moment. This can often help you be more responsive to customer demand, better manage inventory, expand product offerings, and get to market faster.

8 EXPLORE YOUR PARCEL OPTIONS.

Record volume will continue to drive up parcel rates and surcharges, so your best bet to control costs is through efficiency and optimization. You may be able to broaden your carrier strategy with regional carriers or postal workshare options or take advantage of zone skipping to sortation hubs. Distribution modeling and rate shopping software can help to find the most efficient and cost-effective shipping options to meet service expectations.

9 ANTICIPATE RETURNS.

To provide hassle-free returns and quick refunds, ensure that your information systems, distribution network and transportation capabilities work in tandem. Returns processing can be labor intensive and require experienced employees with strong decision-making skills to evaluate merchandise and determine next steps, so factor that into your staffing plans.

10 COMMIT TO CONTINUOUS IMPROVEMENT.

Look for ways to improve efficiency at every step in the fulfillment process. Quality methodologies such as Lean Six Sigma can help to increase efficiency, improve throughput, ensure accuracy, and control costs.

SOURCE: BOBBY HAYS, REGIONAL VICE PRESIDENT, OPERATIONS, SADDLE CREEK LOGISTICS SERVICES



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Thad Bedard
President,
APL Logistics



Whether he is at work or having coffee with his family on Sunday morning, Thad Bedard's brain is constantly churning with ways to take a great company and make it even better.

by Merrill Douglas

Fresh out of grad school, Thad Bedard moved to the San Francisco Bay area hoping to become a professor of American literature. But teaching jobs were scarce.

"To make ends meet, I started working as a warehouseman," recalls Bedard. "I enjoyed the industry. The work challenged a lot of my preconceived notions about business." He started working his way up through a series of supply chain positions.

In 2008, Bedard joined APL Logistics, and in January 2022 he became president. We recently talked with Bedard about the evolution of his career, and what issues are getting most of his attention these days.

IL: How did an experience early in your career help to shape you as a leader?

I was managing a group of organized labor on the waterfront in Richmond, California. The prevailing guidance about managing those teams was to be harsh. I tried that persona, but it didn't work. When I started treating them as human beings—talking about their concerns and how we could work together to accomplish what we had to get done so we could all go home at the end of the day—things started to improve. The lesson? A hard-boiled, take-no-prisoners management style doesn't work.

IL: Since you became president of APL Logistics, what have been your top priorities?

We've been working hard to realize our corporate strategy, which is tied to our first maxim: to become the premier order management provider in the world. To that end, we're doing a lot of work on our product management and operational strategy, getting all aligned toward that common vision. We're also aligning our capital investment strategy, both for the physical movement of goods and in the technology arena.

We also are rolling out the company's first diversity and inclusion program.

IL: What keeps your customers awake these days?

Customers are focused on how to remain relevant and resilient. Aligned with that is their desire to make sense of all the different technology and service offerings, determine what to do with those choices, and still maintain some feeling that their logistics provider is neutral and has their best interests foremost in mind.

In response, APL Logistics is trying to build out a platform that gives customers the best, most advanced, neutral options, providing different opportunities for transport or for consolidation. On the data analytics and measurement side, our role is to help customers understand how their providers and vendors are behaving against their key performance indicators.

IL: How has the pandemic changed the way people look at supply chains?

The pandemic has made everyone aware that product doesn't just fall out of the sky. There's a renewed focus on inbound logistics, and we're realizing that demand for product is the real driver. During the pandemic, consumers started to buy things at a rate they hadn't done in many years. And they wanted those products in ways they hadn't before—at their homes, close to where they got coffee, or where they picked up their kids.

Sellers had to figure out how to get merchandise closer to where consumers were going to be and what specific products they wanted to buy. That leads to the realization that if you don't get demand right, you're going to over-manufacture product and generate a lot of carbon waste. One of the threads to follow with the pandemic is the relationship between demand planning and the climate situation we're in now. I think it's direct.

IL: How would you describe your leadership style?

Collaborative. I build a management team with the premise that it's not an authoritarian regime. Executives from all the disciplines that make up a company—from finance to HR to legal—play an equal role. That doesn't change the fact that I ultimately make the decision, but I am open to and encourage dissent.

IL: What's the hardest aspect of your job?

Balancing all the components of a global organization that's engaged in a lot of businesses. Each geography and business presents its own kinds of challenges. And the world doesn't sleep.

Morning, evening, going out for coffee on a Sunday—I'm constantly checking to see what issues I need to prioritize, what I can delegate, what I can defer for a while, and where I need more information. That has become a constant churn in my brain.

Nurturing Talent Globally

One of the most interesting challenges APL Logistics faces today has to do with the issue of equity, says President Thad Bedard. That subject includes many variables, including employee compensation and access to opportunities.

"The question of opportunity touches on race and gender, but also on regions," Bedard explains. "APL Logistics operates almost everywhere in the world. Figuring out how to provide opportunities for growth to people in places such as Bangladesh and Sri Lanka, and get them into career pathways that lead to director or management-level positions, is an important part of that."

IL: What makes you excited about going to work?

Change, and the opportunity to take what is already a great company and make it an even greater company—one that employees are proud of, that customers want to do business with, and that new employees want to join. Figuring out how to make that work for all parties concerned—from stakeholders to employees—is interesting and forces me to learn new things.

IL: Is there something you believed strongly at the start of your career that you've since changed your mind about?

I used to believe that all bosses were out to get me. I didn't understand the nuances of decision making. Now, I try to remember that the employee's perspective on a company's decision is very important. Employees don't always have visibility into all the variables that go into a decision. I hope I consider all perspectives—management, employees, and customers—when I make a decision and when I communicate it.

IL: Read any terrific books lately?

Horizons by Barry Lopez is a fantastic work. He was in his 70s when it was published, and the book reflects on the adventures he'd had, the landscape around him, what the landscape means, and how it's changed. I wouldn't call it a hopeful book, but it's a beautiful book. I also recommend *The Practice of the Wild* by Gary Snyder. It's about breaking down the barriers between nature and humans, recognizing that we all live in a kind of wilderness.

IL: Beyond work and books, how do you spend your time?

I spend a lot of time with my wife and three children. We go to the beach a lot. I also enjoy all sorts of outdoor activities, including walking and bicycling. ■

Footwear

DOES FOOTWEAR RETAIL NEED A HAND(HELD)?

Handheld mobile devices may be what footwear retail stores need to get a leg up on the competition, according to a new report from technology news platform IMC Grupo.

Challenged by constraints including lack of store employees, time-consuming payment methods, inefficient inventory management, outdated enterprise resource planning systems, and cumbersome exchange and return practices, many footwear retailers have turned to handheld mobile computer solutions to boost efficiency, the report notes.

According to the report, footwear retailers embracing handheld systems can gain the following benefits:

Boost digital transformation and information management. Handheld personal computers handle data and information seamlessly, making it easier to manage retail functions in real time. This ability, in turn, means footwear retailers can more easily transform sales, order replenishment, and distribution processes.

Provide timely and accurate market information. In the apparel and footwear industry, it's incredibly important for a store to keep revising and refining its marketing and product strategies. Handheld mobile computers deliver quick and accurate data that can efficiently inform and shape marketing decisions.

Improve customer service quality. Using handhelds, store employees can quickly and accurately check inventory and help customers find the footwear they are looking for, leading to improved customer service. In the case of a stockout, store clerks can use the handheld devices to help customers place an order for the desired item(s).

Facilitate efficient restocks. Inventory updates are crucial to ensure that footwear stores do not run out of stock. Handheld mobile computers provide swift information regarding goods, facilitating timely restocks without wasting time.



CHINA SC WOES HAVE FOOTWEAR INDUSTRY TIED IN KNOTS

The impact on the supply chain from lockdowns in China was a major theme for footwear retailers in the first half of 2022. Largely reporting lower-than-expected earnings, many major footwear brands pointed a finger at the lockdowns to explain their disappointing performance levels.

Strict and extended COVID-19 lockdowns in Shanghai, Shenzhen, and Qingdao set off a ripple effect across the industry's supply chain, causing many footwear distribution centers, retail stores, and production facilities to close. In addition, the shutdown created transportation and supply chain bottlenecks at local ports, resulting in product scarcity and delays.

As a result, footwear brands are feeling a one-two punch from longer lead times for freight coming from the region as well as lost revenue due to store closures in the area.

Here's a look at how some of footwear's biggest players fared amidst these supply chain woes to date:

- Crocs, Under Armour, Allbirds, and Adidas all reported headwinds to their businesses in China and offered weak guidance for the rest of the fiscal year.
- Wolverine Worldwide (owner of Saucony, Merrell, Sperry, and Sweaty Betty, among others) is retaining a confident outlook for 2022, predicting a growth rate of 15% to 18%. However, the company predicted longer-term impacts to the supply chain that could last through 2023.
- Tapestry, the parent company of Kate Spade, Coach, and Stuart Weitzman, cut its outlook for the fiscal year based on challenges from COVID-related pressures in China.



SPRINTING TOWARD ZERO CARBON FOOTPRINT

Footwear and apparel company Allbirds may just win the sustainability race. The company, known for its commitment to eco-friendly practices, has unveiled a new Tree Flyer performance running shoe that has a carbon footprint of 9.92 kg CO₂e, all of which is offset to zero. How? According to the company, it's a combination of innovative technology, renewable natural materials, and instantaneous material circularity:

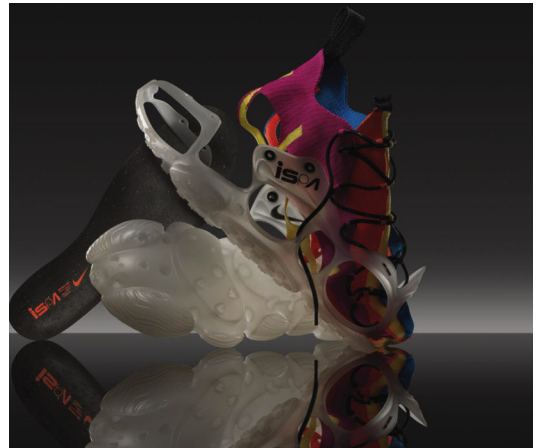
- **Midsoles:** While usually made from petroleum and 100% synthetic, the Tree Flyer's SwiftFoam midsole material leverages natural castor beans, a renewable natural resource that has a 20% lower carbon footprint than a petroleum-based alternative.
- **Waste:** Nearly 100% of the excess waste created while making the midsole is instantaneously recycled to craft the external heel counter.
- **Structure:** The shoe also features a knit structure, made from Allbirds' signature eucalyptus-based tree fiber.

The company notes that it has not sacrificed performance in the name of sustainability. Allbirds claims the Tree Flyer offers more bounce, more propulsion, and a 70% rebound rate that helps give runners more energy with every step.

SIZING UP THE GLOBAL FOOTWEAR MARKET

There must be a lot of Carrie Bradshaws out there, as a new report from ResearchAndMarkets.com estimates the global footwear market will reach \$440 billion by 2026. Here are some key takeaways:

- Casual footwear, one of the most popular segments of the market, is projected to reach \$213.3 billion by 2026.
- The athletic footwear segment, which currently accounts for a 37.6% share of the global footwear market, is predicted to grow by 1.9% CAGR.
- China, India, Brazil, Italy, Vietnam, Indonesia, Mexico, Thailand, Turkey and Spain are the leading producers of footwear.
- Top footwear consumers and importers are the United States, Japan, Germany, UK, France and Italy.



SNEAKERS THAT COME APART—ON PURPOSE

While most footwear companies focus their manufacturing prowess on making sure shoes don't fall apart, Nike is going in the opposite direction with two of its current products, deciding that indestructible shoes may not be the right goal to embrace. Some 300 million pairs of shoes per year are tossed in the trash in America, and take an average of 30 to 40 years to decompose, according to a 2021 Wichita State study.

Instead, in an effort to help boost sustainability in the footwear industry, Nike developed its Nike Link and Link Axis shoes, which incorporate the concept of shoe "disassembly" into their design.

Using its innovative ISPA approach (Improvise, Scavenge, Protect, and Adapt), Nike's designers created the Link models to emphasize flexibility and durability while avoiding the kinds of bonds and adhesives that typically make shoes difficult to disassemble and recycle. The Link can instead be pulled apart into three distinct pieces, eliminating the need for energy-intensive shredding or manual breakdown processes.

Nike also says that removing traditional adhesives also takes some energy out of the sneaker construction process in the way of heating and cooling the bonds, meaning they're more sustainably constructed as well.

Consumers can return the disassembled Nike Link and Link Axis shoes to Nike stores for recycling.

[IN FOCUS]

NOTED

The Supply Chain in Brief

> GOOD WORKS

► **The Coca-Cola Company**, based in Atlanta, donated \$1 million to the Technical College System of Georgia Foundation's Commercial Truck Driving Program. The donation funds driver training programs and helps ensure more drivers are in the pipeline to fill trucking jobs for Coca-Cola and other Georgia businesses. Officials say they hope the donation will result in the state's Technical College System hiring 11 full-time and two part-time instructors at some of its schools.



◀ **Bettaway Supply Chain Services**

launched a hiring, training, and skills development program with WeMake to provide career opportunities for adults on the autism spectrum. The program will launch at Bettaway's Piscataway, New Jersey, facility (pictured) and will help the company acquire workers to support warehouse operations, distribution, and e-commerce fulfillment.

> M & A



■ Philadelphia-based **PSA International** acquired **BDP International**, a logistics solution provider headquartered in Singapore (pictured). Together, the companies offer solutions for supply chain orchestration and cargo flow optimization.

■ To expand its footprint across the U.S. Midwest, Austin-based **Dropoff** has acquired **Rightaway Delivery** of Michigan.

■ SaaS solutions provider **Descartes Systems Group** acquired **Foxtrot**, a provider of mobile route execution solutions. The acquisition bolsters Descartes' route planning and execution solutions and will help shippers reduce last-mile costs while improving customer service, route efficiency, and on-time performance.

■ 3PL **Kane Logistics** was acquired by **ID Logistics**, a contract logistics provider. The new entity, ID Logistics US, totals 3,000 associates across 26 high-volume, high-turn distribution and packaging centers.

■ Global transport firm **GEODIS** has agreed to acquire **Keppel Logistics** of Singapore in order to increase its contract logistics footprint and e-commerce fulfillment services in Singapore and Southeast Asia.

> UP THE CHAIN

• **Renee Krug** (left) was named CEO of **Transflo**, a supply chain platform that connects trucking companies, brokers, and shippers. Additionally, **Frank Adelman** transitioned to chairman of the board, and **Bill Vitti** (right) is now president and chief revenue officer. Adelman, who was CEO for eight years, passed the torch to Krug, who comes to Transflo from her role as CEO of third-party logistics provider GlobalTranz. Vitti was previously president of Swift Logistics.



• **Unique Logistics International**, a global logistics and freight forwarding company, appointed **Migdalia ("Mickey") Diaz** as its new chief operating officer. Diaz will support CEO Sunandan Ray in executing the company's strategy. A 30-year veteran of the industry, Diaz was most recently senior vice president of customer experience for the Americas and vice president of U.S. operations at GEODIS.

> SHOVEL READY

■ Construction will begin in summer 2022 on the first building in a logistics park along Interstate 85 in Tuskegee, Alabama, that will total up to 5 million square feet. When fully built, the *Regional East Alabama Logistics (REAL) Park* will include up to 13 buildings and bring roughly \$385 million in new economic capital investment.



■ DP World completed construction of the first industrial building in the *South Carolina Gateway Logistics Park*. The park, located at the intersection of Highway 95 between Charleston and Columbia, offers an inland and rail-served platform with close port proximity.

> GREEN SEEDS

• **ATA Freight** celebrated a green milestone on Earth Day, April 22, 2022—supporting the planting of 252,000 trees in 101 forest gardens since it began working with Trees for the Future in 2011. The company was also recently recognized with an EcoVadis Bronze Medal Sustainability Leadership Award.



> SEALED DEALS



• Bag retailer and fashion brand **Vera Bradley** adopted **TrueCommerce's** Microsoft Dynamics 365 Supply Chain Management & Finance integration. The solution gives Vera Bradley the ability to automate data transfer between Microsoft Dynamics 365 and its strategic channels.

• **Sumitomo Drive Technologies**, a manufacturer of power transmission components, selected autonomous mobile robot provider **Seegrid's** solutions to support autonomous hauling of parts and equipment between its existing 250,000-square-foot assembly facility and its new 100,000-square-foot warehouse.

• **Anheuser-Busch InBev** implemented incident-monitoring capabilities from **Everstream Analytics** in order to track potential supply chain disruptions and assess incident impacts and risks.

> RECOGNITION

• **J.B. Hunt Transport Services** recognized 69 drivers who logged two, three, or four million miles without a preventable accident as part of its annual **Million Mile Celebration**. Drivers participated in the Million Mile Walk of Fame at an honorary lunch and awards ceremony, where J.B. Hunt distributed a total of \$900,000 in safe-driver bonuses.



J.B. Hunt Dedicated driver Edwina and her family participate in the Million Mile Walk of Fame at corporate headquarters in Lowell, Arkansas. She is the first female driver in the company's history to achieve three million safe miles.

• **Labelmaster**, a provider of labels, packaging, and technology for hazmat transportation, received an **Overdrive Award** as part of General Motors' Supplier of the Year Awards. The award recognizes achievement in sustainability, innovation, relationships, total enterprise cost, launch excellence, and safety.

• Minority-owned global supply chain solutions provider **Magno International** received power management company Eaton's **2022 Premier Supplier Award**. Magno provided exceptional service for Eaton's critical "line-down" shipments to minimize the cost of time lost on plant shutdowns.

• Freight brokerage firm **Tucker Company Worldwide** is one of Philadelphia's **Top Workplaces 2022**, according to *Philadelphia Inquirer* Top Workplaces. The firm made the list by receiving top marks from employees in 15 cultural drivers including alignment, execution, and connection.



• **Highway Transport**, a specialty chemical bulk transportation provider, earned the **Responsible Care Partner of the Year Award** from the American Chemistry Council for the third time. The award recognizes performance and safety records in chemical distribution, transportation, storage, use, treatment, disposal, and sales and marketing.

TAKEAWAYS

Shaping the Future of the Global Supply Chain

Quick Look at the Last Mile

Two new studies take a close look at the last mile and shed some light on the current state of this crucial logistics segment. The quick takeaway? The last mile is becoming more important for customer satisfaction, and as a result, shippers are increasing their focus on it and looking for tools to boost delivery time frames and efficiency.

Brands are responding to customer demand for faster delivery by enhancing their last-mile fulfillment options, finds a survey of more than 200 U.S. retail and supply chain leaders conducted by UPS company Roadie, a crowdsourced delivery platform. The study also examined what brands look for in an ultrafast delivery provider.

Respondents' views on ultrafast delivery reveal three key themes:

1. Customers expect same-day delivery, and they're willing to pay for it.
2. Same-day delivery generates an immediate, positive effect on sales.
3. Brands face challenges in implementing ultrafast last-mile delivery.

"What came through clearly in the survey responses is that organizations know they need to offer same-day delivery because there's a lot at stake," says Valerie Metzker, head of partnerships and enterprise sales at Roadie. "When customers want something quickly, they'll go with the provider that can get the order to them when they need it."

Another report, *2022 State of Last Mile Logistics*, from Brigg, which also offers an online delivery platform, takes a comprehensive look at the last-mile segment. Brigg surveyed 200 logistics and transportation leaders in Europe and North America to determine where they are focusing their last-mile operations today as well as what they believe are the key challenges and priorities for 2022 and beyond.

Overall themes that emerged include:

- Connectivity is needed in order to manage last-mile delivery at scale.
- Strong last-mile and returns services can provide a competitive edge.
- Real-time visibility and automation will be an important focus.

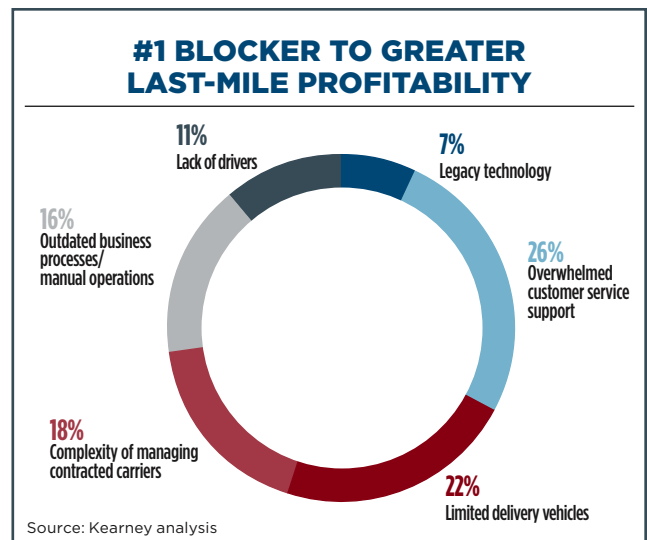
- More efficiency is necessary to increase profitability of last-mile services.
- Better delivery experiences will help drive last-mile revenue growth.
- Logistics providers struggle with managing multiple carriers.

The study also shed light on the top pain points associated with last-mile logistics. When asked to name their biggest last-mile challenges, respondents cite the following:

- Shipper onboarding/integration (44%)
- Outsourced delivery partner/agent visibility (44%)
- Carrier and driver management (41%)
- Driver onboarding and retention (38%)
- Manual delivery scheduling (38%)
- Manual back-office operations (37%)
- Cost to deliver (23%)
- Lack of real-time order tracking and visibility (23%)

In addition, Brigg's survey unearthed insights on what blocks companies from achieving greater last-mile profitability (see chart). The top culprits are:

- Overwhelmed customer service support (26%)
- Limited delivery vehicles (22%)
- Complexity of managing carriers (18%)
- Outdated business processes/manual operations (16%)
- Lack of drivers (11%)
- Legacy technology (7%)





TAKEAWAYS

COMBATING SUPPLY DISRUPTION WITH DIGITAL TRANSFORMATION

Finding effective ways to fight against supply chain disruptions resulting from the pandemic has been top of mind for all businesses of late. Digital transformation appears to be one of the most popular strategies for accomplishing that goal, according to a new report from international spend management company Proactis.

A survey of 1,300 senior business-decision makers in the United States and four European economies shows a new emphasis on using digital transformation. Key takeaways:

- Major U.S. businesses will invest an estimated \$4.4 trillion in digital transformation in 2022 to help their businesses recover from disruption.

- Digital transformation is seen as the most effective route to improve business resilience, protect margins, and improve trading opportunities.
- The most common reasons for undergoing digital change are to create efficiencies and increase profitability.
- 8 in 10 major businesses have already digitized supply chains to tackle disruption.
- One-third of respondents (34%) identify "secure supply chains" as an area of importance for conducting business digitally, with data analytics and automation of processes also critical to create more agile and fluid supply chains that can more effectively adapt to disruption.
- On average, U.S. businesses invested \$7 million in digitization in 2021 across 10 different areas of business, an investment that is higher than the total average investment across the rest of the major economies surveyed.
- Cybersecurity and privacy top the list of priorities, with 60% of major U.S. businesses saying that cybersecurity was important in the context of digital business.



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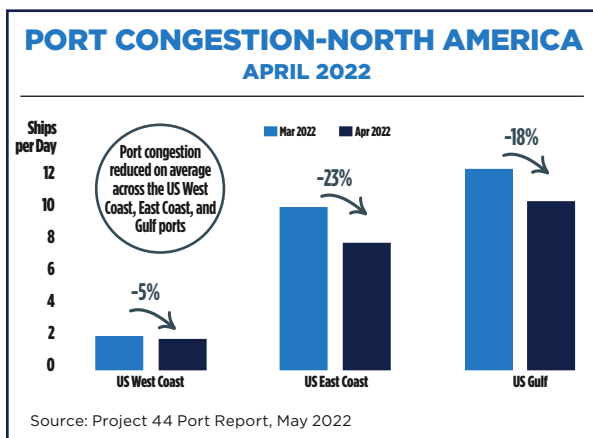
TAKEAWAYS

PORTS OPEN UP

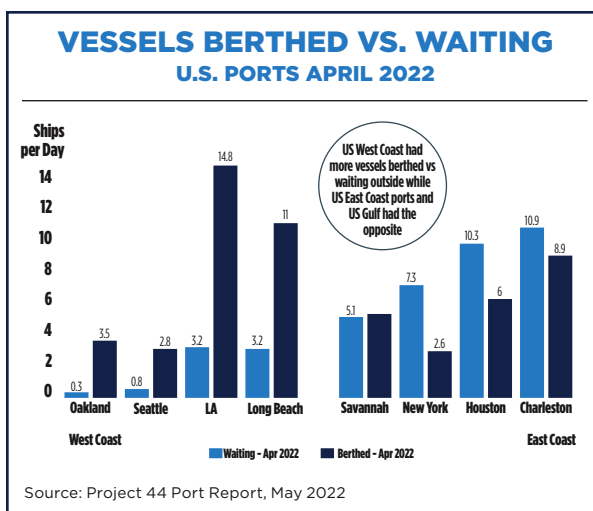
Some good supply chain news for a change: Recent numbers show that congestion at U.S. ports is beginning to ease. The May 2022 monthly Port Report from Project 44 shows that congestion numbers improved in April 2022 compared to March 2022 across all U.S. ports.

U.S. ports also recorded their best month yet in March 2022, unloading more than 2.5 million TEUs, improving overall import throughput, and capitalizing on the lull.

What's behind the improvements? The slowdown in U.S. demand coupled with the COVID lockdowns in China have led to a drop in activity.



Interestingly, the ratio of vessels berthed versus waiting is a mixed bag: The report shows that West Coast ports had more vessels berthed than waiting outside in April, while East Coast and Gulf ports experienced the opposite.



No Packaging Material? No Problem

While the supply instability for packaging material has been causing headaches for chief procurement officers (CPOs), new research from Gartner says three tactics can go a long way toward helping companies navigate the resulting rising costs, delayed deliveries, and sustainability concerns:

- 1. Centralize packaging specifications and build a packaging supply ecosystem:** This allows CPOs better visibility and enables improvements such as harmonizing similar materials, establishing more sustainable alternatives, and fluidly switching suppliers in the event of a shortage.
- 2. Collaborate with suppliers:** Working closely with vendors, collaboration can take the form of agreeing on suitable material substitutions, alternative production facilities, incentives, or streamlined supplier onboarding.
- 3. Segment packaging:** Each level of packaging has its own set of risks, so CPOs must factor that into strategies to mitigate supply shortages. Segmenting packaging across the organization provides a better base for decision-making.

AI ROADBLOCKS

Once thought of only as the stuff of sci-fi movies, artificial intelligence (AI) and machine learning (ML) have become more commonplace in the supply chain, with uses in a range of applications from manufacturing to yard management.

Many companies, however, have yet to tap into AI/ML for supply chain usage—but it is becoming more of a priority. That's the message from research conducted by Symphony RetailAI, a provider of integrated AI-powered supply chain solutions for fast-moving consumer goods (FMCG) retailers and manufacturers, in partnership with Incisiv. The survey reveals:

- 87% of FMCG retailers have not yet taken steps to embrace AI and ML.
- Data-related initiatives—supported by AI/ML tools—are becoming a top supply chain priority: 82% of respondents say they are focusing on data-driven demand forecasting and 61% cite the need to improve master data management.
- 92% of FMCG retailers say that their inability to integrate data from multiple sources prevents them from successfully pursuing AI solutions.
- Respondents cite other roadblocks to AI: poor data quality (79%) and a lack of confidence in AI to make good recommendations (31%).
- 22% of respondents are concerned about falling behind to the competition due to a lack of an AI-based strategy.

FOUR WAYS TO NET ZERO

In the quest to green the supply chain, warehouses play a pivotal role, says Mark Russo, director and head of industrial research for North America at Savills, a commercial real estate services firm.

Pointing out that there is more than 16 billion square feet of industrial property in the United States, with another 750 million square feet in the pipeline, Russo makes the case in a new report that the sheer quantity of warehouses in the United States makes the greening of the sector an essential component of achieving sustainability goals.

Those who pursue net zero emissions in their warehouse portfolios will reap business benefits as well, Russo says. Case in point? Green-friendly LEED industrial buildings significantly outperform the broader market with a 38% rent premium and vacancy rate of 1.9% (versus 4.2% for the U.S. overall), he notes.

Four other highlights from the report include:

1. Site selection is key. Choosing to occupy environmentally friendly buildings in optimal locations near the workforce to limit transportation emissions are two major actions firms can take toward reaching net zero.
2. For ground-up warehouse developments, designing sustainably should be paramount. Construction materials, lighting, and landscaping all impact emissions.
3. Pursuing LEED certification should be more commonplace. The percentage of industrial inventory that is currently certified is relatively small, yet LEED industrial buildings significantly outperform the broader market in terms of rent premiums and vacancy rates.
4. Nearly 30% of LEED-certified industrial properties are located near the central business district in the 30 largest U.S. metros. These properties, which represent green buildings located close to city centers with dense populations, offer the greatest potential to reduce carbon emissions for logistics operations, Russo notes.



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Q What is data-driven supply chain optimization, and why is it important?

A Data-driven supply chain optimization applies prescriptive analytics in mathematical programming and operations research (OR) to provide decision support for supply chain decision-making at the strategic, tactical, and operational levels.

By properly capturing the decisions to make (decision variables), the performance metric to optimize (objective function), and the requirements and/or limitations to satisfy (constraints), an optimization model can prescribe the best (or better) solutions for supply chain network design (strategic), supply chain configuration and production planning (tactical), and resource allocation, routing, and scheduling (operational).

Its data-driven feature makes it possible to separate a model from its input data, and to prescribe optimal solutions and recommendations that are adaptive to today's changing and volatile business environment. Custom designed data-driven supply chain optimization tools, tailored to the unique business setting and decision needs of a company, are key to the company's competitive advantage and success.

Q What are the new trends and opportunities for data-driven supply chain optimization?

A First, fast advancement of information technology (IT) and vast availability of big-data, in volume, velocity, and variety, make it possible to address and solve innovative supply chain optimization problems that were not solvable before. Examples include advanced manufacturing with Internet-of-Things (IoT), climate-smart food and agriculture supply chain, and efficient and

resilient supply chains in healthcare, energy, and telecommunication.

Second, three dimensions of complexity for supply chain optimization are emerging: dynamics, uncertainty, and multiple decision-makers (game-theoretic setting). These call for the integration of multiple techniques in analytics and artificial intelligence (AI): descriptive, predictive, and prescriptive. Moreover, modern supply chain optimization applications must address multiple (often conflicting) performance metrics, e.g., efficiency, cost, profitability, equity, resilience, and sustainability.

Q What is the best practice for developing industrial-strength supply chain optimization applications?

A First, successful development and deployment of supply chain optimization applications require collaboration and concerted work of a team of subject matter experts, optimization modelers, and software developers, supported by stakeholders and leadership.

Second, incremental modeling is recommended for model building. That is, start with modeling the core decision needs to get a prototype for proof-of-concept; then progressively add new features and components with expanded complexity, e.g., those addressing dynamics, uncertainty, or the game-theoretic setting.

Last but not least, engage users and stakeholders from the beginning to the end. Seek their inputs and feedback for modeling building, use case, scenario analysis, graphical user interface (GUI) design, and most importantly, evaluation and assessment of the decision-support and managerial insights provided by the optimization application.

Wooden Pallets Can Play a Crucial Role in a Sustainable Supply Chain Today



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Q How important is sustainability in today's pallet market?

A Sustainability is extremely important because of the vital role pallets play in the supply chain and the volume at which they are generated. At any point in time, there are millions of pallets in circulation—supporting supply chain logistics around the world. Pallet companies have the responsibility to offer a sustainable solution to these supply chains. By offering a sustainable solution, pallets can minimize or offset the negative impacts of an organization's supply chain.

Q How does Kamps' emphasis on sustainability influence your products and services?

A With a 95% recycling rate, the ability to repair and reuse, and the positive impacts on healthy forests, wooden pallets are inherently sustainable. Our strategy at Kamps is to maximize these positive impacts through operational excellence, while placing an emphasis on accurate reporting for the sake of our customers.

Q What has the impact of your sustainability strategy been?

A We have seen a positive impact both internally and externally. Internally, our team is more conscious of our environmental footprint. We are now actively looking at different methods of reducing that footprint.

For example, in 2021, we lowered the average trip time of our fleet by 15%. This was important to us as our Comprehensive Environmental Sustainability Report revealed the majority of our carbon emissions came from our mobile combustion—our fleet. While some of these methods do have a positive impact on different areas of our business, we are still extremely pleased to see our team

trend in a positive direction in regards to sustainability.

Externally, we are now more aligned than ever with our customers' sustainability goals and can offer solutions that provide positive environmental value to their supply chains. Our tagline "Your Platform for Customer Service" truly encompasses all aspects of our customers' needs—including sustainability.

Q What upcoming sustainability efforts are you excited about?

A We are continuously working to increase the positive impact Kamps has both internally and externally. Internally, we are always looking at various initiatives we can implement to lower our environmental footprint. This is important because as we continue growing as an organization, we want to ensure we are doing so in the most sustainable method possible—while still being able to provide the quality of service our customers expect to keep their supply chains optimized.

Externally, by lowering the footprint of our operations, we can extend more environmentally positive solutions to our customers.

We also want to continue to provide the most accurate environmental data and reporting for our customers. Our goal is to do so by investing time and resources in ensuring our data is backed by the latest research and data possible. The landscape of environmental accounting and reporting is continuously shifting and our customers have a wide range of stakeholders that greatly value environmental sustainability. Since 1973, Kamps has been the most trusted pallet organization in regards to service and ethics—and our goal is to carry the same symbol in regards to environmental sustainability.

The Evolution of Audit Gave Rise to an AI-Driven Smart Audit



Hannah Testani
Chief Executive Officer
Intelligent Audit
intelligentaudit.com

Hannah Testani, chief executive officer at Intelligent Audit, has more than a decade of experience helping Fortune 500 companies leverage data across all modes to ship smarter and lower costs.

Q What's in a freight audit?

A It depends on who you ask. Some say a freight audit is a simple process that ensures shippers pay what they're supposed to. Others consider an audit a vital resource for understanding and making more informed decisions around every shipment.

We've transformed the traditional freight audit into something more, but what? And what problems can that solve?

These are vital questions for shippers wanting a truly meaningful way to manage their data, optimize their logistics networks, and make smarter, fact-based decisions.

Q What's a traditional freight audit?

A The best way to understand an advanced audit starts with digging into the definition of a traditional freight audit. At its core a freight audit is an examination of financial records to validate accuracy.

That information is used in payment processing to ensure shippers pay the correct amount for services rendered. That definition, rooted in simplicity, sufficed for linear and siloed supply chains. However, in today's age, disruption has rendered that definition obsolete.

Q What makes a modern-day freight audit stand out from the pack?

A The modern-day freight audit is a technology that leverages all its data to do more than just a freight audit. Shippers can often cut more costs by eliminating inefficiencies in their supply chains.

By ingesting all carrier invoices across all modes of transportation, shippers can access cleansed, normalized data to drill down on any

data point to identify cost savings. However, what sets a freight audit company apart from the pack is when the system can do all that work for you and proactively send you strategies to reduce costs, improve service, and eliminate exceptions.

Q What problems does a freight audit & payment provider solve?

A Standard freight audits revolve around simplicity for each invoice. That's fine on the surface, but the global supply chain needs a mode-agnostic solution that can actually pinpoint and correct things when they go wrong. Applying machine learning within the audit itself provides shippers with greater access to their data in ways they never thought possible, combing through the data repository and finding anomalous patterns.

Such a holistic approach is critical to overcoming disruptions. The ability to quickly identify and mitigate disruptive events—or avoid them altogether—sets industry leaders apart from the laggards. And using next-generation AI (i.e., machine learning) within the platform, gives rise to something shippers have long felt unattainable—an “Easy” button.

Q What's next?

A The days of your father's audit are over, and the modern freight auditor is the number one source for all data across all modes. Therefore, you can have honest conversations with carriers, point to the right KPIs, and keep everything on track for success and savings. Intelligent Audit can help; connect with an expert now.



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Integrating NFC and Blockchain

Supply chains are becoming increasingly globalized and interconnected, and while this brings incredible opportunities for diversified networks, it also poses challenges in securing the products that move through the chain.

Counterfeit supply chains cost U.S. manufacturers upwards of \$131 million, and the problem is growing amid supply chain shortages. This crisis is also exacerbated by a time of technological advancement—not only are supply chains carrying in-demand products, but they also house incredible amounts of data that are susceptible to breach. Of the many security threats this poses, three attacks are most common and most pressing:

1. Modifying product details, such as expiration date
2. Cloning genuine product details on a counterfeit product's tag
3. Reapplying a tag from a genuine product and attaching it to a counterfeit

These challenges represent the convergence of physical and digital security vulnerabilities in a centralized system that can often be ignored and lead to substantial consequences. What can be done to alleviate these threats? The answer is closer than many think: unified near-field communication (NFC) and blockchain technology.

Researchers suggest that a block-supply chain, which relies on NFC to detect

counterfeiting, would bring security and efficiency to supply chain management. The decentralized, distributed qualities of blockchain processing lends security, transparency, reliability, and authenticity to all kinds of systems. Systems using both NFC and blockchain promise high performance for a range of highly secured networks.

HOW WOULD THIS WORK?

Through blockchain-based solutions, engineers and designers can build an immutable digital ledger and transparent exchange of electronic information. However, blockchain alone operates in a purely digital space; there needs to be an intermediate step to connect physical objects to a blockchain and the benefits it could provide.

NFC tags serve as that intermediary. They translate physical objects, locations, and markers into the digital world. The relatively short range of NFC sensors discourages interference from afar, as close physical proximity is needed to interact with the NFC system.

Combining both NFC and blockchain

into a single system balances the weaknesses of either technology on its own: NFC provides a medium for blockchain to interact with the physical world, and blockchain verifies NFC tags to detect and prevent tampering.

In a decentralized block-supply chain, each node maintains a blockchain for each genuine product. Each block in the chain is an authentication event. To change any information in the blockchain, the node that currently has the product proposes a new block (or new authentication event), which is validated by a number of other nodes.

If the other nodes successfully validate the new block, a copy of this new block is added to all nodes in the network.

Highly sensitive, data-heavy supply chains are most at risk for compromise, and see the farthest reaching impact from a breach. By decentralizing existing protocols with blockchain, researchers detected over 95% of modification, cloning, and reapplication incidents in large-scale supply chain systems. In certain industries—like pharmaceuticals—this can dramatically improve product quality of essential goods.

NFC and blockchain offer a unique solution to a growing crisis. Decentralizing processing, encrypting access, and adding a physical element of security can make supply chains dramatically more secure. ■

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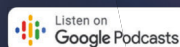
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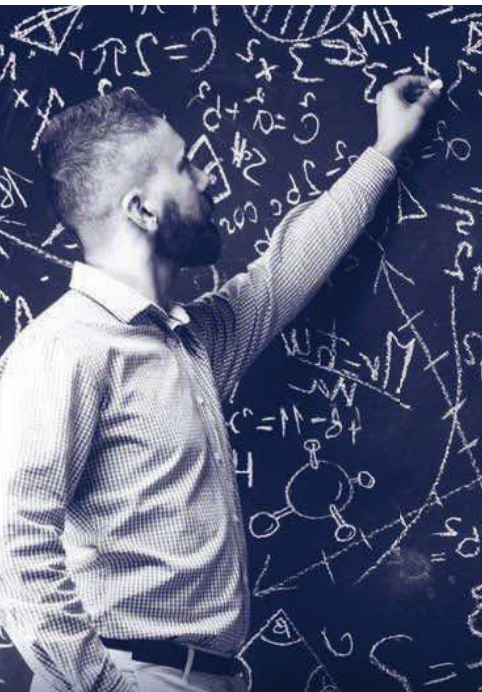
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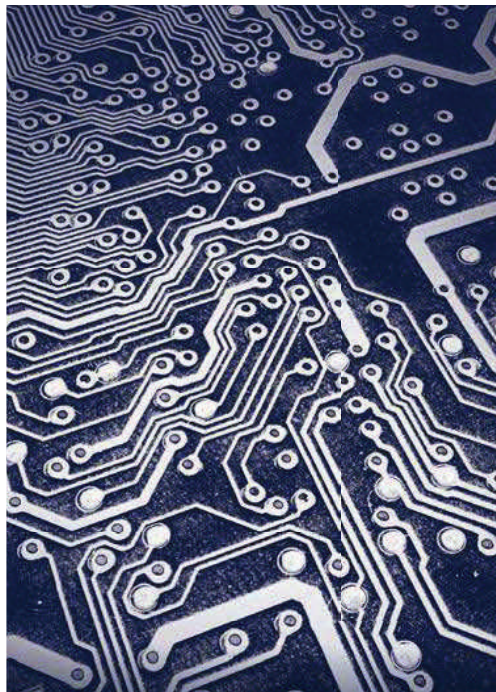
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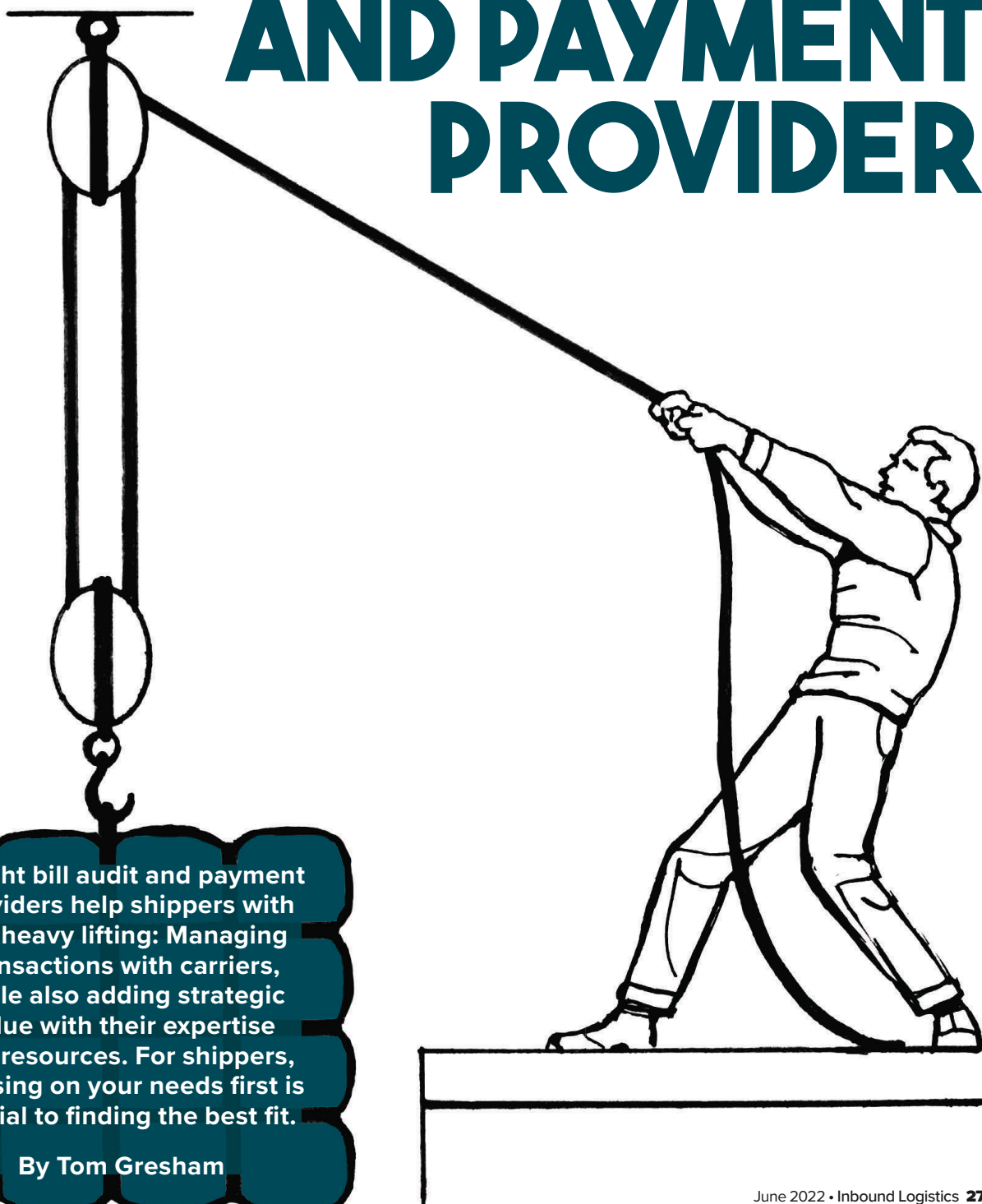
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BLOCK AND TACKLE:

HOW TO CHOOSE A FREIGHT BILL AUDIT AND PAYMENT PROVIDER



Freight bill audit and payment providers help shippers with the heavy lifting: Managing transactions with carriers, while also adding strategic value with their expertise and resources. For shippers, focusing on your needs first is crucial to finding the best fit.

By Tom Gresham

PEARSON SCOTT FORESMAN, PUBLIC DOMAIN, VIA WIKIMEDIA COMMONS

Interest in freight bill audit and payment (FBAP) providers has gained momentum in recent years as the demand for experts to manage transactions between shippers and carriers grows. FBAP providers can help shippers contend with complex transportation processes, while also bringing fresh tools and expertise that can add strategic value to shipper operations.

The freight bill audit and payment market has exploded in recent years and includes providers with diverse service offerings.

“The majority of players in the freight bill audit and payment space provide niche services that focus on one or two transportation modes,” says Josh Miller, vice president of sales for Memphis-based CTSI-Global. “The level of technology and the support model can vary significantly from provider to provider.

“It’s important for shippers to choose the freight audit provider that best meets their specific needs, both from a technical and support perspective,” he adds. “Not all freight audit and payment companies are alike.”

For shippers, the question becomes how to navigate the market of FBAP providers and identify the partner who is the best fit for their operation.

WHO NEEDS A PROVIDER?

Opinions vary about the categories of shippers that are clear candidates for enlisting an FBAP provider. In general, an FBAP provider makes sense for many types of shippers.

“Shippers with a modest and diversified transportation spend can and should consider using the services of an FBAP provider because their support extends beyond logistics activities—they support financial teams as well,” says Scott Matthews, president, freight audit and payment, AFS Logistics, based in Shreveport, Louisiana. “They are specialized and equipped with the operating systems to perform these services at significantly less expense than performing them internally.”

Companies with \$500,000 in freight spend, not including parcel, should consider enlisting outside help.

“The cost/benefit and value proposition are beneficial from a purely economical perspective,” says Allan J. Miner, president of Cleveland-based CT Logistics. “A freight bill and audit payment provider can perform the required steps—if they are ISO [International Organization of Standardization] and SOC [System and Organization Controls] certified—at a fraction of the cost than a shipper’s internal accounts payable department trying to audit, pay, and accrue the open liabilities until payment is effectuated.”

Large, complex companies—including those that are decentralized and have a global presence—are obvious candidates for using a provider because they have “a lot of moving parts and different business groups and regions to consider,” says Jeff Carlson, vice president, global sales and marketing, for St. Louis-based Cass Information Systems.

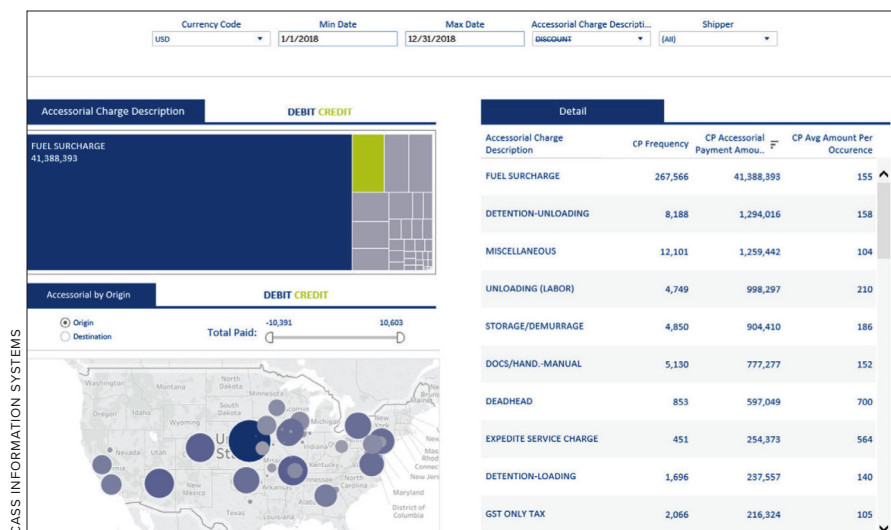
The right FBAP provider not only gives those businesses a more efficient process, but also provides better data about their freight payment transactions that they can use for improved planning, he adds.

DON'T LEAVE MONEY ON THE TABLE

Meanwhile, shippers should partner with a freight bill audit and payment provider when their annual freight spend exceeds \$10 million.

“Carriers consistently invoice 3-5% of your total transportation spend incorrectly,” Miller says. “If you’re not auditing every charge on each invoice, or if you don’t have visibility to your shipment level globally, then you’re leaving money on the table.”

Here are practical tips for choosing the right FBAP provider for your company.



Technology solutions are a crucial factor to consider when choosing a freight payment and audit provider. For example, Cass Information Systems offers CassPort, a customizable portal that provides options for selecting and displaying data.

Design your provider selection process with a sharp eye on their unique operation and needs. Thoroughly understanding those needs is a crucial first step.

“It’s important to identify and document your company’s needs prior to engaging the freight bill audit provider,” Miller says. “Solicit feedback from all departments — finance, transportation, IT, purchasing—that will be impacted by outsourcing the freight audit process.

“Once you have the requirements documented, then research freight audit providers to identify a handful that you feel may be able to meet your requirements,” he adds. “Distribute a detailed request for proposal (RFP) document with sections on operations, finance, technology, and support for both you and your carriers. Then create a scoring system to weigh the supplier responses.”

Miner agrees shippers seeking providers should tailor their inquiries and search to their unique operation, making sure any provider is a good fit.

“Shippers should base their evaluations on the specific solutions they need from the provider,” Miner says. “This includes allocating each shipment’s freight cost to the SKU level and apportioning the cost breakdown by the shipper’s specific internal accounting system general ledger numbers.”

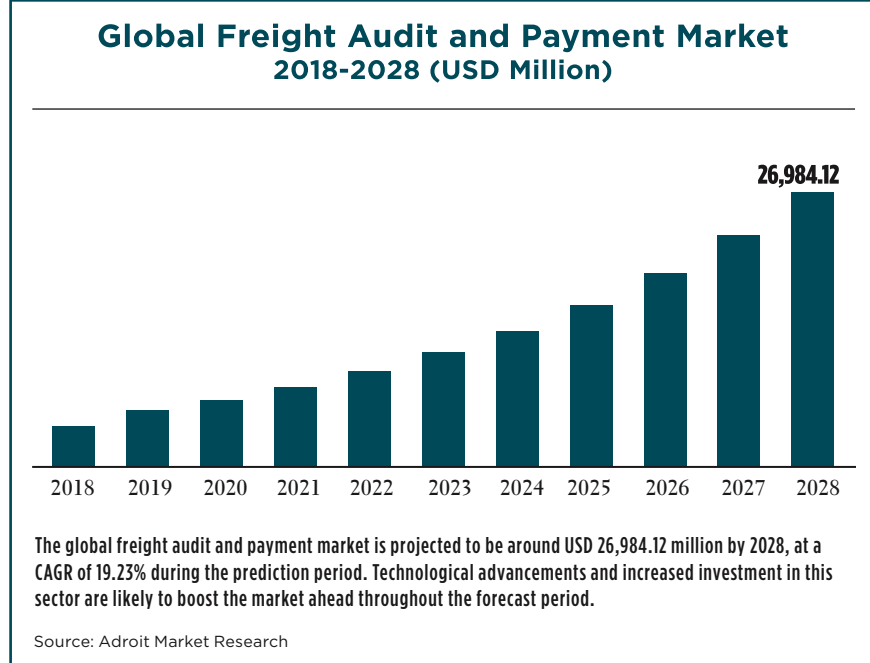
Choose a provider that understands the process nuances specific to their industry, as details and practices can vary by industry.

“Especially with larger companies, it’s good to make sure that the provider you’re considering has at least a good working knowledge of your industry,” Carlson says. “That ensures, especially during the implementation process, that what’s being put in place actually will support your other business needs.”

Ask prospective providers detailed questions related to their capabilities unique to each mode within your network to ensure they can support all the carriers and modes you use.

Make sure providers can support all countries within your global footprint.

“The biggest difference between



implementing freight audit solutions in North America versus other regions is understanding the local regulatory and tax requirements,” Miller says. “Global freight audit is not ‘one size fits all.’ Each country has its own unique requirements that must be accounted for.

“It’s important that the freight audit provider has the necessary knowledge and experience within each required country,” he adds.

For that reason, Miller advocates drilling down into a provider’s capabilities rather than accepting their surface claims.

“It’s easy to put together a flashy presentation that claims a provider can support certain processes,” Miller says. “But to truly gauge a freight audit and payment provider’s capabilities, request to see specific scenarios demoed within their system. The more specific you can be in your scenarios, the better.”

EXCEPTIONS AND ADDED VALUE

Evaluate a potential partner’s emphasis on customer support. Of particular interest is how providers contend with exceptions or discrepancies in the invoice process.

“Look for a provider that takes a proactive approach to supporting their

customers,” Miller says. “You want a provider that actively troubleshoots exception invoices to identify root causes as opposed to a company that puts the burden on you by just slotting the invoices to the customer exception portal.”

Verify that a prospective provider can offer more than just access to a platform to process their transactions.

“Exceptions will exist so having a provider that identifies the root cause to correct immediate issues while implementing solutions to resolve them is of significant value,” Matthews says.

Tech tools and automation are critical but must be accompanied by expertise and collaboration.

“While technology provides for improved velocity, it’s important for the service provider to demonstrate their integrated exception management functionality,” Matthews says. “Managing exceptions requires oversight from the carriers, shippers and the FBAP provider.

“Shippers seeking to choose an FBAP provider should evaluate these processes significantly as it’s the exceptions that can cause disruption in relationships and services performed by all parties,” he adds.

Continued on page 32

KEY POINTS

TO REVIEW WHEN SELECTING A FBAP COMPANY

Time in Business. There is something to be said for how long a company has been in business. It indicates there is a level of competence that the group you are talking with has been able to find its niche and do well with it over time. This should not be the highest ranked item, but worth noting.

Under this heading, I would add that you should look for up and comers that are operating on the fringes that may have found a new mousetrap.

Customer Service & Satisfaction. We would consider customer satisfaction and reputation with carriers in the industry as a top 5 category. You want to know that the company you are working with cares about your business and will be there both in the easy and difficult times.

Reputation with Carriers. There are many companies in the freight invoice processing and settlement business that are notoriously difficult to work with and pay slowly because of this fact. We all know their names and you should make sure you learn them too because they will impact your ability to work with carriers and gain the freight capacity at the best price for your business.

Audit Process. Not all companies audit bills the same, so request a demo and take the time to visit the company to ensure they are a good fit for your business requirements.

Data Capture, Recording, Retention & Document Management. This is another area where not all freight settlement companies operate in the same manner or have the same retention policies, so don't let yourself be surprised and ask the questions. Also, check with how you and others within your organization can access your data and documents.

Funds Transfer. This is a big topic, as the freight audit and pay industry history is based on using a company's float to make its money versus working on a transaction fee. The reason this is important

is any delay by your freight payment company is a direct reflection on your business and its standings within Dun & Bradstreet ratings structure.

With that in mind, validate how long it takes for your payment to them to get to your carriers. Make sure you ask if they pay via check, ach or wire and see what drives their decision to use the various payment methods.

Reporting & Analysis. What are the reporting capabilities? Freight payment data has so much more to offer than just reports on carrier payments and cost allocation, so ask questions on:

- Ease of pulling data down in a form that can be used for analysis.
- Are there capabilities to benchmark your exact freight lane information with other companies.
- The benchmark should not be averages-of-averages, but actual lane information to help you validate your competitiveness in the market and help manage your next request for quote process (RFP). Incredible savings can be had by running this analysis monthly.
- Can the data be worked through an optimizer that is supplied by the freight audit and pay company to review supply chain execution and strategy validation?

Insource or Outsource? Does your company have the technology and expertise to manage the process internally, or will you either have to outsource the entire freight audit and pay process or bring in top tier audit software that would not only audit the invoice, but create them and send the customer bill instantly off the freight audit?

The decision process will be different for everyone. The key is to do your due diligence and find the best fit for your company.

-Rick LaGore, co-founder and CEO of InTek Freight & Logistics

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First and foremost, a provider must be able to manage basic “blocking and tackling” responsibilities, such as taking in freight bills, but he says shippers, especially large ones, should be looking for what other products and services providers have to offer.

“Can a provider do claims management, for instance, or do they have a program that will help facilitate a working capital goal of extending payment terms out, but not in a way that hurts carriers?” Carlson says. “It’s a question of identifying value points.

“Freight payment is a relatively commoditized business,” he notes. “It’s the other services—such as consulting and expertise—that can help a business grow.”

FINDING THE BEST FIT

Ask an array of key questions during the selection process.

Shippers considering providers will want to ask about their IT infrastructure and the security protocols that protect the shipper’s data, Miner says. A provider should have full-time, in-house IT staff and experienced freight auditors for all relevant modes of transportation, among other considerations.

Client tenure is a positive sign.

“Being in this business for years and having tenured clients are good indicators that the provider is worthy of closer consideration,” Matthews says.

Ask for a list of references specific to your industry and geographic region, and poll your carriers.

“A lot of trucking companies have dealt with multiple providers, and they can probably feed you open and accurate information—at least from their viewpoint—about a provider you are considering,” Carlson says.

Investigate the length of service among team members, including the senior management team.

“Is there high employee turnover?” Carlson says. “What is the length of experience at that company? If they are churning through a lot of people within a year or two, it could be a sign of other issues.”



When choosing an FBAP provider, shippers should consider the expertise and experience of a provider’s team. The professionals at CT Logistics have served the market for 99 years.

Meet with the provider’s principals and the key staff supporting their operations.

“If you’re going to make an investment in a relationship, get to know people before you sign a contract,” Carlson says. “There’s no business relationship where everything goes perfectly. When a problem does pop up, can you work together as a team to resolve the problem and move forward? That’s a big piece of it.”

TECHNOLOGY, COST, TRUSTWORTHINESS

Tech-based tools and how they can serve shippers are also important considerations.

“The real thrust of FBAP business today is actionable information that shippers receive via the web or create from their FBAP provider’s website with ad hoc reports,” Miner says.

Even so, providers must prove their tech capabilities.

“It’s important that the freight audit and payment provider demonstrate their commitment to technology,” Miller says. “Do they offer a modern, feature-rich platform? Do they offer a robust reporting package with dashboard analytics? Do they offer additional capabilities, such as a transportation management system, that can drive additional value?”

Providers must demonstrate they are investing in technology with an eye not only on the present but also on the future.

“Are FBAP providers investing in technology not only for today but for the next three to five years?” Carlson asks. “How well do they understand it?

Freight payment providers deliver the most value for clients who have been up and running for a while through data analytics.”

Selecting the provider with the lowest fees could lead to higher costs down the road through higher freight spending than would occur with a provider with higher fees who is more adept at catching overcharges and mischarges.

“Securing a quality service has a marked difference in cost over a bargain service, but price is only part of the overall picture,” Matthews says.

Similarly, Carlson warns against turning the search for a provider into “a pure procurement exercise looking for the lowest cost,” particularly for large, complex enterprises.

“The lowest cost is not always the best, because the question becomes, ‘What am I losing in terms of value?’” Carlson says. “Also, the more efficient and experienced the FBAP, the less your own resources will still need to be involved. That’s very big for shippers.”

Transparency is a critical must-have, and one that shippers should be clear will be part of any provider relationship.

“FBAP providers must offer transparency into data and processes and have the trust of all parties—shippers and their carrier network,” Matthews says. “All parties involved should work to accelerate the velocity of the payment process and eliminate errors resulting in inaccurate information and overcharges.

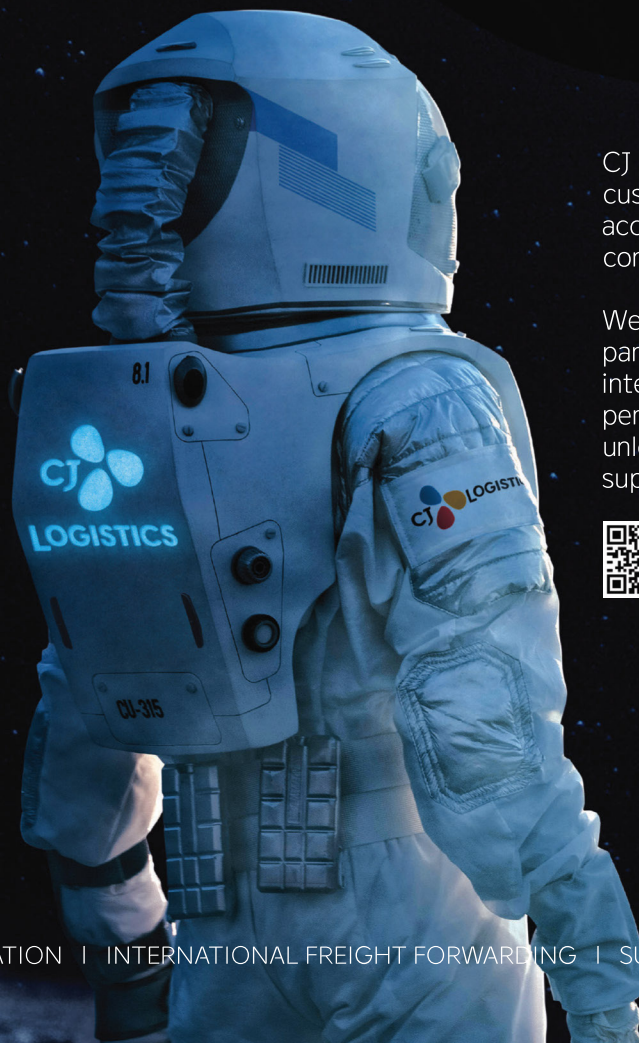
“The objective,” he adds, “is to get freight bill payment and audit done right and expeditiously.” ■

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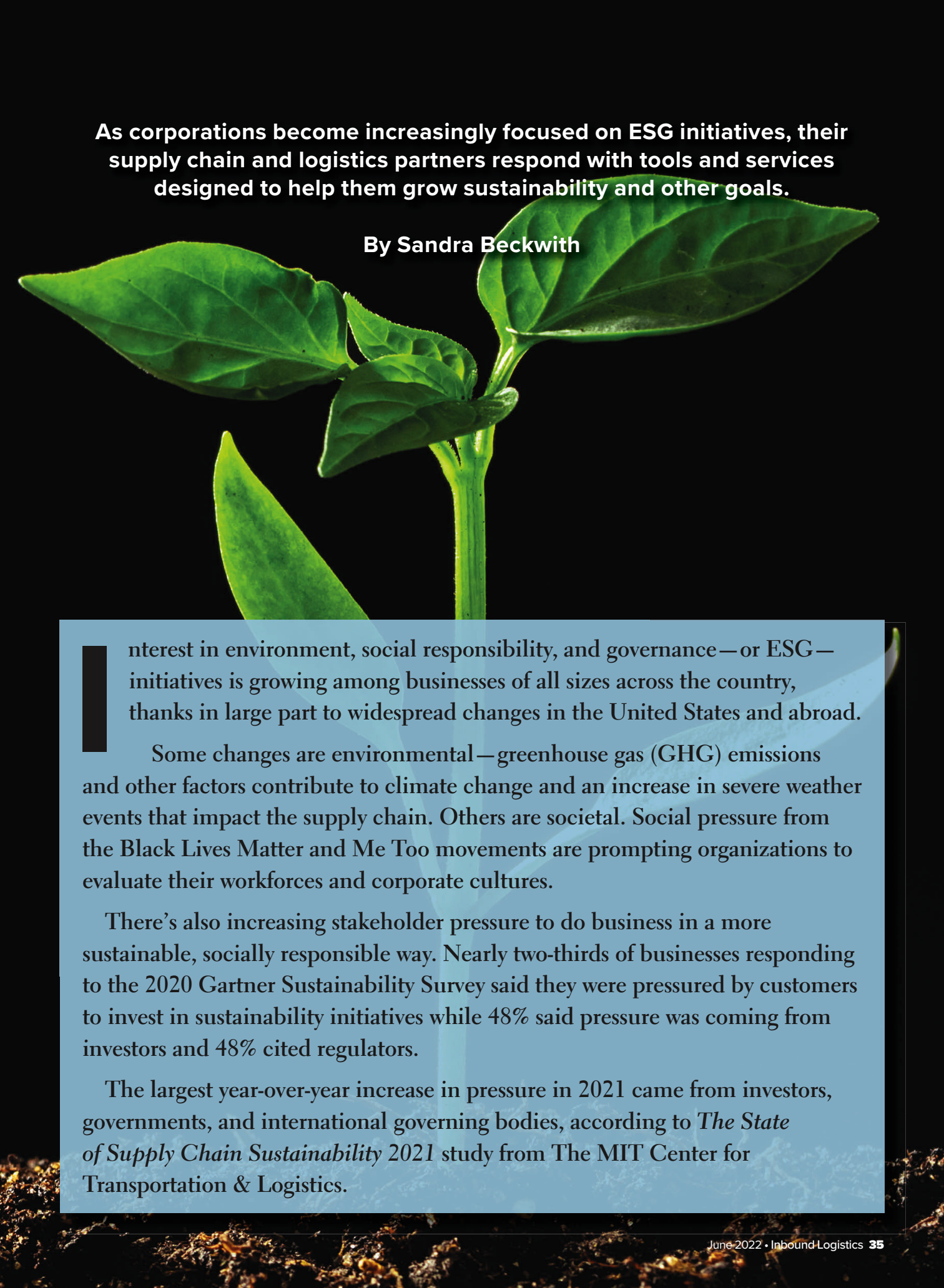


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GOALS



As corporations become increasingly focused on ESG initiatives, their supply chain and logistics partners respond with tools and services designed to help them grow sustainability and other goals.

By Sandra Beckwith

Interest in environment, social responsibility, and governance—or ESG—initiatives is growing among businesses of all sizes across the country, thanks in large part to widespread changes in the United States and abroad.

Some changes are environmental—greenhouse gas (GHG) emissions and other factors contribute to climate change and an increase in severe weather events that impact the supply chain. Others are societal. Social pressure from the Black Lives Matter and Me Too movements are prompting organizations to evaluate their workforces and corporate cultures.

There's also increasing stakeholder pressure to do business in a more sustainable, socially responsible way. Nearly two-thirds of businesses responding to the 2020 Gartner Sustainability Survey said they were pressured by customers to invest in sustainability initiatives while 48% said pressure was coming from investors and 48% cited regulators.

The largest year-over-year increase in pressure in 2021 came from investors, governments, and international governing bodies, according to *The State of Supply Chain Sustainability 2021* study from The MIT Center for Transportation & Logistics.

In addition, the pandemic disrupted the supply chain in ways unheard of before, while supply chain globalization has made it difficult for companies to monitor their suppliers' environmental impact and labor practices.

At the same time, many companies realize that more sustainable transportation efforts not only protect the environment, but they also save shippers money, enhance carrier profitability, and improve truck driver conditions. These factors are strong motivators for change, which is currently focused on transportation, procurement, and supplier requirements and monitoring.

Here's how many companies are turning to their supply chains to meet their ESG goals.

REDUCING EMISSIONS FROM TRANSPORTATION

Transportation generates the largest share of GHG emissions in the United States at 27%, according to the Environmental Protection Agency. That's why reducing emissions is a logical

starting point for many companies, especially since Scope 1 and Scope 2 emissions are within their control. (Scope 1 emissions come from a company's owned or controlled sources; Scope 2 covers indirect emissions generated by electricity, steam, heating, and cooling purchases; and Scope 3 includes all other indirect emissions in the supply chain such as those produced by suppliers.)

Technology has a significant impact on reducing carrier GHG emissions as developers work to create tools that reduce the number of empty and wasted miles, minimize idling while waiting to load, and optimize loads.

Leaf Logistics Inc. is at the forefront as it builds a data-driven, multi-party network that lets shippers, carriers, and freight brokers connect more efficiently.

CEO Anshu Prasad compares what his firm is creating to a power grid. "If you had something comparable to a utility grid for logistics that connected all the parties, you could move the same amount of freight that you move today with 80% of its capacity," he says.

One of the technology company's efforts reduces empty miles and keeps drivers earning when they're behind the wheel by creating driver loops. Prasad cites an example where the system's data has enabled a driver to run the same loop for almost two years. The driver is happier and the carrier's margins have improved.

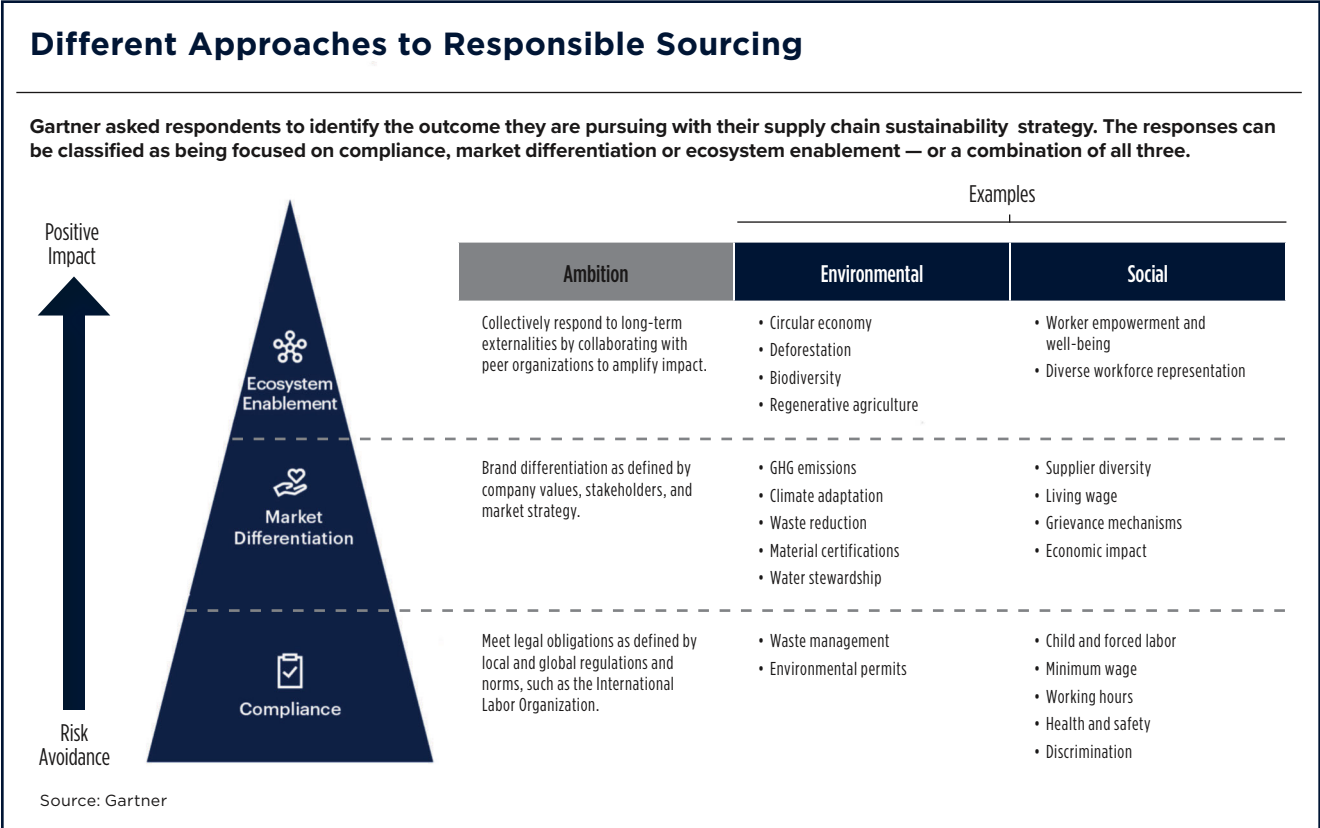
DROP AND HOOK

Leaf Logistics also utilizes its network to expand use of the "drop and hook" concept, where drivers drop a full container at a facility and hook their tractor to a pre-loaded trailer waiting for them.

It doesn't happen a lot, says Prasad, because the process is too cumbersome when it's not automated. His company wants to change that for both shippers and carriers because "it means that their drivers get in and out in 15 minutes rather than four hours," he says.

The company is also using \$24 billion of shipping-level data from more than

Continued on page 38





ESG CAN BE BEAUTIFUL

After working in the beauty industry for three decades, Tina Hedges wanted to help people take care of their skin in a more natural, chemical-free, and socially responsible way.

That's why she founded the world's first zero-waste skincare brand, LOLI Beauty, in 2014. From sourcing to formulating to packaging, LOLI Beauty focuses on sustainability and social responsibility.

Made with food that might otherwise be wasted, the brand sources ingredients directly from trade farms and co-ops around the world. This helps ensure that none are hydrogenated or radiated. Access to technology provided through membership in organizations such as Made in a Free World allows the company to verify that slave labor is not used to grow or harvest ingredients and materials.

In addition, LOLI Beauty products are MADE SAFE-certified as vegan and cruelty-free. "We decided that vegan for us meant we wouldn't even use beeswax," Hedges says. "It's harder to formulate without it, but unless you work directly with a small beekeeper—which isn't scalable—it's hard to determine that bees weren't hurt in the process."

The brand uses food-grade, reusable, and recyclable glass jars and fully compostable Mushroom Packaging made from just two ingredients—hemp and mycelium (the root structure of a mushroom). Customers can add next-level sustainability benefits by choosing carbon neutral delivery via Ecocart.io at checkout, too.

But it isn't easy being green. Direct-to-consumer competitors promising organic, natural, and sustainable products often sell at lower price points. The price is a sure sign they don't meet LOLI Beauty standards, though.

"It's difficult to do the right thing in the right way and offer it to consumers at a discounted price," Hedges says.

Case in point: Hedges was recently asked to evaluate a beauty product promoted as clean and sustainable. It was neither.

"The main ingredients—90% of the formula—were water and petrochemicals," she says. "It was in a single-use container that was shrink-wrapped and dropped into a package with foil."

To counter misinformation, the brand uses its website and social media to educate discerning consumers about its products' quality ingredients and social mission. But none of that matters if the products don't perform.

"Once we have a customer, we maintain a strong relationship with them after they experience the products and feel the difference," she says. "They become emotionally connected to our mission."

Part of that mission involves helping both consumers and other beauty brands see that being sustainable "takes a mindful, conscious approach," Hedges says. "It is possible to be soulful and sustainable at the same time."

LOLI Beauty does it with focus, diligence, and commitment.

Continued from page 36

400 large consumer packaged goods companies to knit together network moves that improve efficiency and reduce emissions.

“A broker working with one load at a time would need 19,000 customers to see the number of moves we see with just four shippers,” says Prasad.

BlueGrace Logistics, a transportation management-focused third-party logistics (3PL) provider, also uses proprietary technology to reduce GHG emissions by eliminating empty legs and optimizing loads, among other things.

In addition to stressing the importance of the network size it can achieve as one of the largest 3PLs in the United States, “You also need to have a unification point for the different parties in your network to work within,” says Azad Ratzki, the company’s chief technology officer.

With visibility into both shipper and carrier systems, BlueGrace is positioned to maximize efficiency. “Because multiple parties come to us, we’re able to view both sides of the coin and optimize how goods are delivered,” Ratzki says.

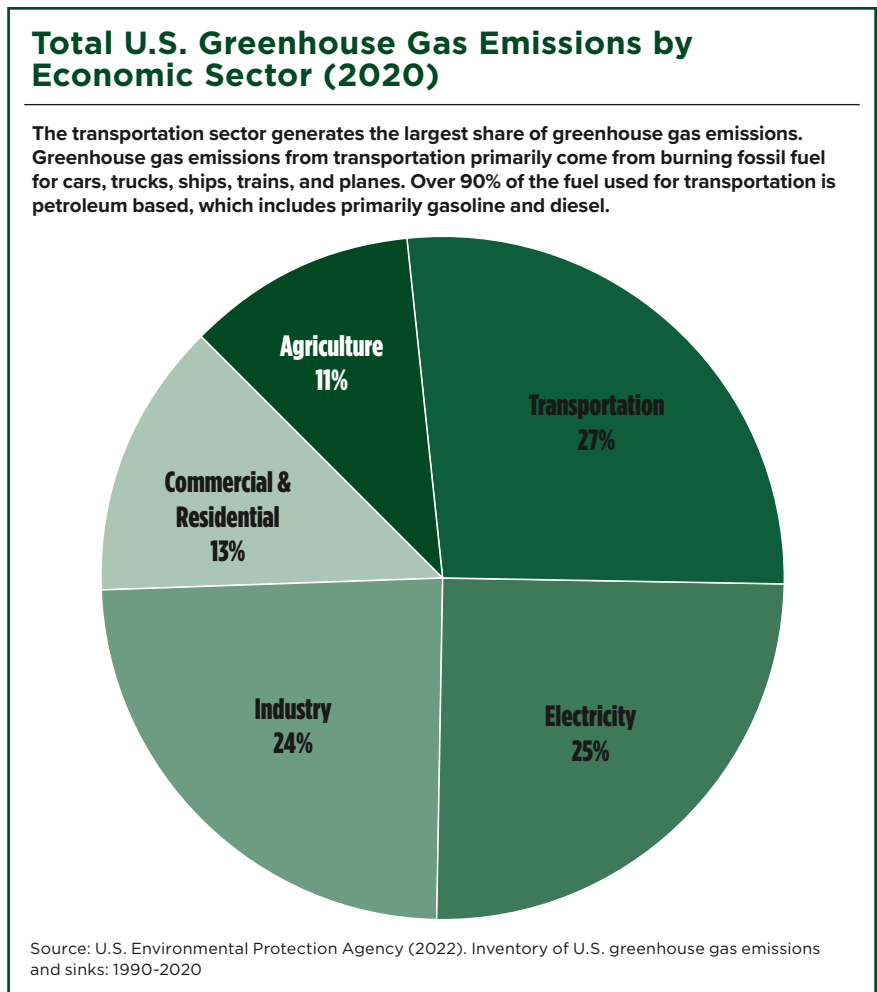
“We can eliminate a leg of the journey or any number of stops and make sure that transportation is fully used,” he adds. “If shippers or carriers were doing it separately, they would have a much larger environmental footprint.”

MATCHING EMPTY CONTAINERS WITH LOADS

In addition to reducing emissions by optimizing over-the-road loads, there are opportunities to reduce the number of empty containers returning from railyards to steamship lines at ports.

Blume Global’s Street Turns solution matches empty containers with loads that take them closer to their final port destination. In the process, it maximizes driver time and asset use while reducing fuel consumption and carbon emissions.

Once again, network size is key. “You can’t do it alone,” says Jerome Roberts, vice president of product marketing at Blume Global. “The information about asset availability requires a network with



connectivity to make efficiency and transportation sustainability happen.”

Blume Global’s relationships with Class 1 railroads—the company provides the platform they use to manage their entire asset management and reservation process—helps facilitate that.

In addition to using its technology to help shippers and carriers reach their sustainability goals and improve reliability, digital freight marketplace provider Transfix also documents shipper and carrier progress in its first ESG report.

Released this year, the 40-page document details how Transfix technology is helping to eliminate inefficiencies and subsequently, GHG emissions. It also reports on progress Transfix is making toward its own ESG goals.

“It’s part of the roadmap we use to continue to give our shipper and carrier partners even more details about their CO₂ impact and the efficiencies that we’re helping them drive,” says Christian Lee, chief financial officer.

“It also highlights the commitments we’re making to continue to invest in the calculations that help shippers understand their carbon footprint and reduce those empty miles,” he adds.

These types of progressive logistics partners that are helping shippers and carriers meet their sustainability goals are also turning inward to reduce their own carbon footprint.

In addition to providing tools and services that help its customers meet their sustainability goals, DHL has a number of its own sustainability goals and initiatives in place. These goals include carbon-neutral warehousing

and a commitment that by 2030, 30% of its line-haul trucks will use diesel-alternative fuel.

“We have an obligation, a responsibility, as the biggest in this space to do something about it,” says Stephan Schablinski, vice president, operations excellence-GoGreen, at DHL Supply Chain.

PROCUREMENT PLAYS A ROLE

More organizations are turning to their procurement teams to examine supplier ESG practices.

“Several decades ago, the role of procurement was primarily focused around unit cost reduction and saving money,” says Omer Abdullah, co-founder of procurement intelligence firm The Smart Cube. “But in recent years, procurement has become far broader to encompass aspects of innovation, quality, and sustainability.”

These efforts are driven partly by outside pressure. “Stakeholders ask not only about their operations, but also their suppliers’, so it’s no longer acceptable to say you only focus on your own operations,” says Miguel Cossio, procurement research director and analyst, supply chain, at Gartner. “That’s where the procurement function becomes critical to the puzzle.”

Companies are prioritizing these efforts, starting with suppliers that have the greatest impact on their businesses. They’re educating and motivating suppliers with summits; writing ESG requirements into contracts; adding sustainability to cost, quality, and delivery in supplier performance evaluations; and offering incentives such as better payment terms.

SUPPLIER REQUIREMENTS AND MONITORING

Businesses use a range of tools and strategies to help them better understand supplier impact on their ESG goals, whether the issue is sustainability or social responsibility. Many start by mapping out the supply chain.

With the help of technology, organizations ask Tier 1 suppliers

to provide information about their suppliers, who provide information on theirs, and so on.

“This entire process takes a lot of time and is based on a collaborative spirit among all the supply chain partners,” says Sayan Debroy, associate vice president and supplier risk intelligence expert, The Smart Cube.

Companies are also identifying sub-tier suppliers with blockchain, bill of lading data, and trade data.

John Armstrong, chief technology officer of Higg, a software platform that offers insights into materials, products, factories, and stores, cites the importance of network size in the same way that transportation technology providers do.

“While the Higg Index is exclusive to us, we’re starting to host other companies’ carbon and traceability tools

to leverage the connectivity we provide,” he says. “It’s a partnership platform.”

The Higg suite of tools was first created by the Sustainable Apparel Coalition, but has expanded to related vertical markets such as toys and home goods.

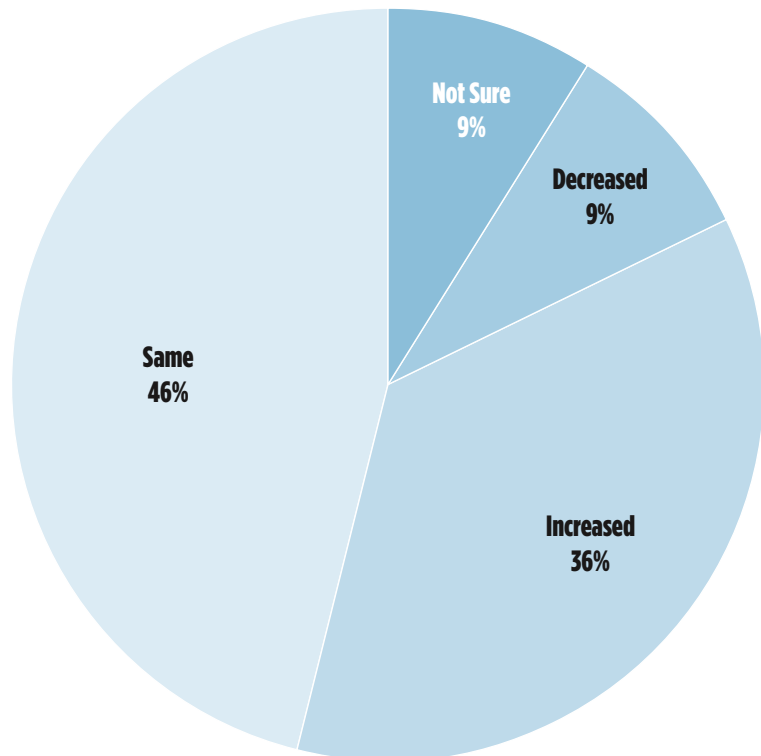
Collaboration is a common denominator throughout many supply chain ESG initiatives. It’s necessary for building the large networks organizations need to do everything from reducing GHG emissions to eliminating suppliers with unfair labor practices from their supply chain.

“Radical collaboration is the future,” says Armstrong. “If you’re not radically collaborating, you probably won’t have relevance in a few years.

“The needs are too extreme, the data is too huge, and the supply chain is too complicated,” he adds. ■

Since the start of the pandemic, my firm’s commitment to supply chain sustainability has:

Breakdown of respondents by how their firm’s commitment to supply chain sustainability has changed since the start of the pandemic.



Source: State of Supply Chain Sustainability 2022 study, MIT Center for Transportation & Logistics and CSCMP

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- Energy-efficient lighting

NOTABLE ACHIEVEMENT

AAA Cooper Transportation's LTL system flow improvements enhanced loaded fill rates, reducing the number of miles per shipment required.

provider since 2006 and was one of 62 companies to receive an Excellence Award distinction in 2019, representing the best environmental performers of SmartWay's 3,600 partners.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels

NOTABLE ACHIEVEMENT

Building its fleet of refrigerated equipment with the most current technology enables Alliance Shippers to move refrigerated goods via rail, reducing CO2 output by approximately 67% or 1 billion pounds vs. moving goods over the road.

Americold

www.americold.com

In 2021, Americold invested more than \$6 million to complete 45 sustainability projects, ranging from energy-saving

LED lighting to rooftop rainwater harvesting systems. It works closely with customers to optimize their supply chains with a focus on reducing transportation mileage to decrease CO2 emissions.

Americold continually evaluates technology to drive improvements in energy efficiency, water usage, greenhouse gas emission reductions, and overall stewardship of its resources. Energy teams lead Americold's sustainability efforts in direct partnerships with every operations leader in the company, engaging the entire organization to practice sustainability stewardship.

Americold converted five cold storage sites to high-efficiency lighting in 2021. This resulted in a total reduction of 2.5 million kWh of consumed energy. At year-end 2021, 179 Americold sites were operating LED lighting.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Americold was recognized as the #1 cold storage leader for energy excellence by the Global Cold Chain Alliance.

Alliance Shippers Inc.

www.alliance.com

Alliance Shippers' refrigerated trailers and containers have two-way cellular tracking devices, drawing power from a solar-powered battery source within the company's refrigeration units. This allows the company to continuously track the GPS location on assets as well as monitor temperature, check for fuel levels, and turn the refrigeration unit on and off at any time. Alliance Shippers Inc. has been a SmartWay participant



ArcBest

www.arcb.com

To maintain an efficient fleet, ArcBest regularly replaces trucks to keep its fleet age low and utilizes speed governors, engine shut offs, aerodynamic packages, and SmartWay-verified tires to reduce emissions. ArcBest has purchased two electric Class 6 trucks, two electric forklifts, and two electric yard tractors.

The company is constructing its second LEED-certified building and adding solar power to one service center, with plans to expand in the future. Recently, it completed the first phase of a data project to calculate and disclose its Scope 1 and Scope 2 emissions.

ArcBest is updating many of its 240+ service centers with LED lighting, among other upgrades, to improve efficiency.

ArcBest hired an ESG program manager to be a sustainability advocate, identify future initiatives, and facilitate reporting.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

ArcBest has been a signatory to the UN Global Compact since 2020 and has reported to CDP, a charity that runs a global disclosure system, for five years.

Arrive Logistics

www.arrivelogistics.com

Arrive Logistics eliminated 10,200 metric tons of CO2 from empty miles thanks to the growth of its private fleet and committed capacity programs. The private fleet program identifies and fills backhauls for fleet routes to minimize empty mileage and CO2 emissions. Its committed capacity program

maximizes coverage and minimizes empty miles within a carrier's network, optimizing loads and reducing emissions.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

In 2021, the freight brokerage began a partnership with Sustainable Travel International as a Climate Ranger Partner. The partnership enables Arrive to better assess its current carbon footprint and implement a new strategy to continually offset carbon emissions.

Averitt Express

www.averittexpress.com/green

Averitt's measurable achievements include reducing carbon dioxide emissions by 38%, reducing nitrogen oxide emissions by 96%, and saving 6.2 million gallons of diesel fuel.

Averitt Express provides drivers access to a roadside service that enables them to reduce tractor idling when parked for long periods. The company also maintains a balance within its network to reduce empty miles, decreasing emissions and fuel usage.

The company became a charter member of the EPA's SmartWay program in 2004. As one of 52 charter members, Averitt Express agreed to meet specific environmental and energy-saving goals while sharing its progress annually with the EPA. As a result, the company has earned a SmartWay score of 1.25, which represents Outstanding Environmental Performance, according to the EPA.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage

- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Averitt has been recognized with numerous sustainability awards, including the 2020 Clean Diesel Award from the Tennessee Trucking Association.

C.H. Robinson

www.chrobinson.com

As of 2021, C.H. Robinson achieved 90% of its 2025 carbon reduction target. The company increased renewable-energy purchases year over year by 30% and reported its scope 3 emissions for the first time.

C.H. Robinson created Emissions IQ, a technology to measure, benchmark, and reduce emissions. It also helps customers redesign and optimize supply chains for sustainability. For its carriers, it enhanced its technology to recommend loads based on fewest deadhead miles.

C.H. Robinson provides a free greenhouse gas emission calculator for customers, renewable energy credits, and carbon offsetting.

An EPA SmartWay partner since 2005, C.H. Robinson collaborated with MIT and SmartWay to create a new standard of measuring LTL emissions. It joined Smart Freight Centre, the World Economic Forum, and leading companies to develop a book and claim chain of custody systems for transportation emissions reduction.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

The company was awarded the EcoVadis Bronze Medal for sustainability.



Canadian National Railway Company

www.cn.ca

CN is committed to advancing circular economy principles in all aspects of its operations. Each year, by engaging employees, customers, and suppliers, CN continues to divert approximately 90% of its waste from landfills through its reduce-reuse-recycle-renew programs.

Since 2011, its EcoConnexions program has empowered employees to reduce energy consumption, minimize waste, and improve housekeeping practices. Its \$5-million annual CN EcoFund enables the railway to implement energy-efficient upgrades in its buildings and yards. CN continues to invest in retrofits to boilers, air compressors, HVAC systems, and LED lighting, improving its carbon efficiency and cutting costs.

CN is listed on the Dow Jones Sustainability World Index.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Since 2011, CN has achieved a 30% reduction in electricity consumption at key yards, avoiding more than 171,000 metric tons of carbon. CN is the first

North American railroad to commit to setting a net-zero target by joining the Business Ambition for 1.5°C and the United Nations' Race To Zero campaign.

Cargo Transporters

www.cargotransporters.com

Cargo Transporters continues to invest in technology to improve the fuel efficiency of its tractors and trailers. With recent advancements, fuel MPGs improved 2.4% over the previous year.

The company also replaced local fleet tractors from the Cascadia P3 Sleeper to a smaller New Cascadia P4 Day Cab.

Continuing to partner with SmartWay, Cargo Transporters was a past winner of the Excellence Award. The company has been active in the North Carolina Department of Transportation's Adopt-A-Highway for 33 years.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Cargo Transporters increased shorepower connections for tractors and continued to move all facilities to energy-efficient lighting.

CEVA Logistics

www.cevalogistics.com

As part of the CMA CGM Group, CEVA Logistics maintains a three-pronged approach to its corporate social responsibility efforts: acting for the planet, people, and responsible trade. CEVA seeks to be net carbon zero by 2050.

CEVA Logistics' environmental initiatives in North America include expanded use of environmentally conscious transportation partners, tree planting programs, park trash clean-up programs, additional certified natural



gas tractors, expansion of electric materials handling equipment in facilities and electric vehicles on the road (including mid-duty and Class 8 trucks).

The company also engages in numerous recycling programs and continued LED lighting projects.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

CEVA Logistics analyzed internal ground transport data and redesigned its U.S. hub and routing guides to optimize mileage, cost, and emissions. These efforts saved 1 million miles, reducing emissions by 1,600 tons of CO₂ in 2021.

CJ Logistics America

www.cjlogisticsamerica.com

CJ Logistics monitors energy usage and identifies sustainability projects to implement in its warehouses in partnership with customers.

Transportation efforts include consolidated shipping, SmartWay certification, and a strict no-idle policy. Consolidating multiple customers with a single destination onto a shared truck reduces trucks on the road, miles traveled, and cost.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting
- Donate damaged food items

NOTABLE ACHIEVEMENT

CJ Logistics regularly engages in large-scale network modeling projects for customers. While network redesign yields efficiency and cost reduction, better-placed warehouses and optimized transportation routes also result in a more sustainable network with a reduced carbon footprint.



Crowley

www.crowley.com

Crowley has designed and started construction on the first fully electric tug, which will operate in the Port of San Diego in 2023.

In 2021, the company expanded its EPA Tier IV tugboat fleet on the West Coast to help reduce emissions in harbors. Its Alaska truck fleet has been updated to increase fuel efficiency, and equipment in Latin America and the Caribbean leverage tire reuse programs in order to limit landfill and production emissions impacts.

Crowley's sustainable solutions in its daily operations include a reuse and recycle program, sustainable packaging and LED technology in offices, warehouses and facilities. Its terminals are embarking on electrification strategies toward decarbonization.

A founding member of Blue Sky Maritime Coalition, Crowley was awarded the biennial William M. Benkert Environmental Protection Award by the U.S. Coast Guard. The award recognizes outstanding achievements in marine environmental protection that go beyond compliance with industry and regulatory standards.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

As part of its net-zero commitment, Crowley became the first maritime company to implement Salesforce's Net Zero Cloud in partnership with PwC to account for and reduce greenhouse gas emissions throughout its operations and total supply chain.

Crown Equipment

www.crown.com

Crown works to deliver energy-efficient lift trucks that use fewer parts, require less maintenance, produce less waste, and last longer, offering improved productivity, lower costs, and reduced environmental impacts. For example, the company offers lithium-ion battery technology as an alternative power solution.

By designing energy-efficient features into its products, Crown helps customers meet their own sustainability goals. By manufacturing up to 85% of the parts used in its lift trucks, Crown achieves a high level of environmental compliance.

Crown commits to recycling and reusing materials, preserving natural resources, and reducing waste and energy consumption.

GREEN INITIATIVES

- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater

- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Crown has won more than 20 sustainability awards. Multiple facilities achieved zero-landfill status and ISO 14001 certification.

CSX

www.csx.com

CSX practices transparency and adopts new technologies to achieve its goal of reducing Scope 1 and 2 greenhouse gas emissions intensity by 37% between 2014 and 2030. This goal, approved by the Science Based Targets initiative, has led freight rail and other transportation companies to adopt strategic and significant goals of their own.

CSX is also investing in near-term efficiency efforts and long-term transformational technologies to drive the company toward achievement.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

The Center for Climate and Energy Solutions and The Climate Registry named CSX as a 2021 Climate Leadership Award recipient in recognition of the company's commitment to reduce greenhouse gas emissions.



CT Logistics

www.ctlogistics.com

CT Logistics invested in software developments throughout 2022 to provide shippers the tools to make greener choices in their supply chain. CT enhanced its FreightRater Lion software to help shippers drive energy efficiency with supply chain routing analysis technologies that maximize lane effectiveness and facilitate optimal transportation mode selections.

CT Logistics developed the FreightRater Lion software to consolidate small shipments into a truckload with stop-offs to reduce costs and fuel. This software enables shippers to choose environmentally conscious routings, mode selections, and carriers with the shortest transit times to reduce fuel consumption and lower CO2 emissions.

GREEN INITIATIVES

- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

At least 40% of the company's 6-acre corporate campus will remain undeveloped and wooded. CT Logistics utilizes intelligent thermostats in its buildings, incorporating off-hour energy conservation. Additionally, the company embraces internal green initiatives such as recycling all cardboard and paper, copier/printer toner/ink cartridges, and outdated technology.

DHL Supply Chain

www.dhl.com

As part of Deutsche Post DHL Group, which has announced a global commitment to net zero logistics-related emissions by 2050, DHL Supply Chain has set specific targets and initiatives such as additional expenditures of up to \$8 billion in sustainable operations by 2030, 60% e-vehicles in pick up and delivery by 2030, 30% share of sustainable fuels in air/ocean freight and road transport, and all new buildings climate neutral. DHL also promotes environmentally



friendly packaging options. EcoVadis rates Deutsche Post DHL Group among the top 3% of evaluated companies industry-wide.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

DHL Supply Chain North America purchased 100% of electricity from renewable sources in 2021. It has mandated that new yard trucks be electric and has invested in green heavy-duty vehicles.

Dimerco Express Group

www.dimerco.com

Dimerco adjusted work practices to lower the carbon impact of activities on the environment. In recognition of its initiatives and efforts, Dimerco is certified with ISO 9001 (quality), ISO



27001 and NIST CSF (information security), ISO 45001 (health & safety), and ISO 14001 (environment).

Dimerco prioritizes mode optimization, developing green logistics solutions to shift to more eco-friendly freight options, such as direct flight, cross-border road freight in Southeast Asia, China-to-Europe rail, and sea/air combination services. It also consolidates shipments to reduce fuel use and carbon footprint.

The Green Building Council introduced Dimerco's certified green building in Jakarta, Indonesia, in 2018. In 2019, Dimerco supported the installation of Villanueva Solar Park in Mexico. Additionally, the company has applied LED tubes to all its offices in Taiwan and keeps air conditioning at 25°C for all 167 offices worldwide.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Through its business intelligence technology applications and data integration efforts, Dimerco supports paperless processes and e-freight projects. For example, it reduced the project time for booking, milestone update, and electronic billing by more than 50% with an EDI/API integration.

Dimerco implemented a reduce/reuse/recycle green policy for 167 operating units around the world, including eco-friendly purchasing and deploying electric trucks and forklifts.

Echo Global Logistics

www.echo.com

Echo works with its shipper and carrier partners to adopt procedures that reduce waste through recycling practices, minimize impact by reducing pollutants, increase the use of environmentally acceptable materials,

and actively promote environmental awareness. Echo is certified in the ISO standard 14001:2015. This means that Echo's environmental management system meets ISO's thorough requirements. Since 2010, Echo has partnered with the EPA's SmartWay program to measure, benchmark, and improve its environmental footprint. Echo shares its freight activity with the EPA, which tracks emissions of carbon dioxide, nitrogen oxide, and particulate matter. Echo's emissions scores rank above average and continue to improve over time.

Internally, Echo promotes company-wide recycling efforts, encourages employees to use public transportation when commuting, and provides staff with health and wellness options that benefit them and the environment.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Echo is reducing its environmental footprint by identifying energy efficiencies within its facilities, leveraging renewable energy, and participating in conservation projects including single-sort recycling in its offices; e-recycling, with the goal of recycling all electronic devices; procuring Energy Star electronic devices; and paperless invoicing.

enVista

www.envistacorp.com

enVista fosters sustainability across labor, inventory, transportation, and network design. enVista completed a project designing and optimizing a \$300+ million retailer's supply chain network and inventory management strategy. It implemented tools to maintain inventory and ship from stores, eliminating the need for costly DC operations and saving an average of \$4.1 million per year.

enVista optimizes less-than-truckload and truckload freight, and models private fleets. Its analysis and

implementation is designed to reduce total miles and required assets to move freight, which reduces CO2 emissions.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reduce energy usage

NOTABLE ACHIEVEMENT

enVista offers EPA-aligned carbon emissions and sustainability reporting, analyzing shippers' carbon footprint by mode, carrier, account, service level, and lane. The report provides insight into total transportation-based emissions, cost to offset, and what-if modeling, revealing opportunities to reduce emissions.



Estes

www.estes-express.com

Estes has acquired more than 190 renewable natural gas tractors and continues to expand its fleet of alternative fuel vehicles. It built solar-powered systems in four of its terminals, and has plans to begin installation on four additional solar-powered systems in 2022.

Estes continues to grow its fleet of electric forklifts and implement strategies to reduce, reuse, and recycle in its day-to-day logistics. Estes reduces emissions by using newer equipment and through route optimization.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Carbon-capture technology

NOTABLE ACHIEVEMENT

Estes is the first LTL carrier to participate in the 2022 inaugural pilot of Remora, a new carbon capture technology that vastly reduces the amount of CO2 a semi-truck releases into the earth's atmosphere. It was also one of the first trucking companies to join the EPA's SmartWay Transport Partnership in 2004.

Evergreen Line

www.evergreen-line.com

Evergreen's corporate social responsibility policy focuses on environmental protection, social commitment, ethical compliance and risk management, and sustainable procurement. Evergreen seeks to provide sustainable marine transportation services and adapts these measures in its daily operations. The company also develops and utilizes state-of-the-art technology to help safeguard marine ecology and ports.

Evergreen is seeking to reduce its fleet's CO2 emissions rate by 50% in 2030 and by 70% in 2050 from a 2008 baseline, with overall CO2 emissions reduced by 50%.

GREEN INITIATIVES

- Reuse/recycling program
- Reduce energy usage
- Sustainably source materials
- Use scrubbers to reduce sulfide emissions

NOTABLE ACHIEVEMENT

Evergreen practices sustainable procurement, defining and applying its supplier code of conduct to the global supply chain. It evaluates suppliers on environmental protection, regulation compliance, health, and safety.





FedEx

www.fedex.com

FedEx invested more than \$2 billion in three key areas—vehicle electrification, sustainable energy, and carbon sequestration—to achieve its goal of carbon neutral global operations by 2040.

FedEx is converting its entire parcel pickup and delivery fleet to zero emission electric vehicles by 2040. This will be accomplished through phased programs to replace existing vehicles. For example, by 2025, 50% of FedEx Express global parcel pickup and delivery vehicle purchases will be electric, rising to 100% of all purchases by 2030.

The company is also building on its Fuel Sense initiatives to continue working to reduce aircraft fuel consumption.

FedEx continues to invest in alternative fuels, efficient facilities, renewable energy, and long-term transformational solutions.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

In 2020, the company's aircraft modernization and Fuel Sense programs saved more than 255 million gallons of fuel and avoided more than 2 million metric tons of carbon dioxide equivalent emissions.

Flock Freight

www.flockfreight.com

Flock Freight's shared truckload solution, FlockDirect, helps shippers emit fewer greenhouse gases by maximizing truck space and skipping processing facilities during transit.

FlockDirect shipments use advanced algorithms to identify shared truckloads (STL) that optimize multi-stop routes and fill trucks to capacity, ensuring freight moves faster, safer, and more efficiently without compromising price or service. STL reduces carbon emissions by up to 40% per shipment compared to traditional truckloads and up to 15% compared to less than truckload through streamlined transit.

Additionally, every time a customer books FlockDirect, Flock Freight buys carbon credits that offset the shipment's remaining impact at no extra cost.

GREEN INITIATIVES

- Reduce greenhouse gas emissions

NOTABLE ACHIEVEMENT

A certified B Corporation, Flock Freight appointed employee impact teams that focus on improving sustainability efforts at its office locations, as well as within its communities. These efforts span from recycling programs to leveraging 100% renewable energy at the company's Encinitas, California, headquarters.

Forward Air

www.forwardair.com

Forward Air reduces emissions and energy consumption through several programs, including installing LED lighting in various facilities, installing skirts on all trailers to improve gas

efficiency and reduce fuel usage, and using electric lifts for its intermodal and final mile divisions' facilities.

Forward Air is also aligning with industry certifications and continues to be a SmartWay-certified company.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Forward Air published its first ESG report in 2021 and is committed to reporting annually moving forward. Aiming to reduce vehicle idling, Forward Air focuses on education and communication, with training campaigns at the driver level and the use of telematic data to evaluate improvement and progress.

GEODIS

www.geodis.com

GEODIS aims to achieve a 30% reduction in its greenhouse gas emissions by 2030 through low-carbon transport and multimodal solutions that combine air, road, maritime, inland waterways, and rail, as well as natural gas and electric vehicles.

GEODIS offers customers a sustainable alternative fuel for air and sea freight, in addition to the solutions already available for road freight.

In 2021, GEODIS offered 330 light commercial vehicles and heavy trucks from Iveco running on bioNGV fuel to help reach the target of ensuring 100% carbon-free deliveries in the city centers of 37 metro areas by 2023.

Additionally, its Green Team and Green Site Certification programs promote sustainability and implement recycling initiatives at its facilities to prevent waste from going to landfills. In 2021, Green Teams assisted in diverting landfill waste by 75%. All GEODIS facilities also are green-site certified.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

GEODIS offers carbon offsets and renewable energy certificates. Its free online emissions calculator performs calculations that take into account the goods being shipped, their origin, destination, and transportation mode before providing a quantitative evaluation of the shipment's greenhouse gas and air pollutant emissions.



Hub Group

www.hubgroup.com

Hub Group provides a broad suite of sustainability focused services, including intermodal, LTL consolidation and network optimization to drive a meaningful impact on customers' carbon dioxide footprint.

The company proactively conducts an analysis of each customer's supply chain to identify opportunities to implement an efficiency program.

Hub Group's sustainability strategy focuses on reducing greenhouse gas emissions for customers, and investing in equipment and technology to offset its own emissions. The company invested to reduce the age of its trucking fleet by adding newer, more energy-efficient equipment with the latest safety technology.

A successful electric truck pilot resulted in a plan to convert some diesel-powered trucks to electric.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting
- Rainwater harvesting
- Mode conversion
- Reporting and visibility

NOTABLE ACHIEVEMENT

In 2021, Hub Group helped its customers avoid nearly 3.1 billion pounds of CO2 emissions by converting truckload shipments to more efficient intermodal transportation.



Hyster Company

www.hyster.com

Hyster helps operations in intensive industries mitigate environmental impact and meet strict emission standards with alternative power options. Hyster recently launched the J40XNL, a 4,000-pound capacity integrated lithium-ion lift truck built for application in the trucking industry that is rapidly electrifying and demands high efficiency and smart sustainability.

Innovations from Hyster include solutions for heavy-duty applications that have historically depended on internal combustion engines. Hyster has introduced multiple counterbalanced lift trucks engineered around factory integrated lithium-ion power, in load capacities up to 36,000 pounds.

Several of its lithium-ion forklift models deliver performance comparable to diesel power without the emissions during operation or off-gassing during charging.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse / recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Hyster's global emissions decreased 21% in 2021 compared to its 2015 baseline, representing 70% progress toward its 2026 goal.

iGPS Logistics

www.igps.net

iGPS rents out plastic pallets that are 100% recyclable. Should an iGPS pallet be damaged (which is rare), it is simply remolded into a "new" one with no added material. In addition, because iGPS pallets are 35% lighter than wood-block alternatives, considerably less fuel is used and fewer emissions are produced during their transport.

iGPS's business model ensures that its pallets are used and reused by customers in the same geographic area, minimizing deadhead miles or pallets being shipped long distances.

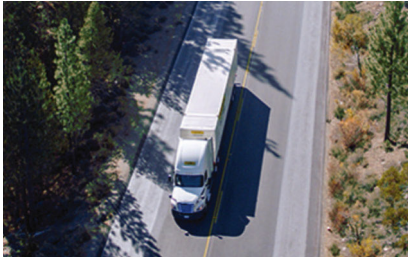
In 2021, iGPS repurposed more than 32,000 pounds of post-consumer plastic into new pallets. By shipping lighter pallets, iGPS customers saved more than 1,000 gallons of fuel from being burned, and kept more than 28,000 pounds of greenhouse gas out of the atmosphere.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

iGPS plastic pallets have 28% less impact on global warming—for every 100,000 shipped iGPS pallets, nearly 1,000 gallons of fuel are saved, and more than 20,000 pounds of greenhouse emissions (based on EPA fuel usage data) are prevented.



J.B. Hunt Transport Services

www.jbhunt.com

In 2021, J.B. Hunt reduced CO₂ emissions (versus an all-truck alternative) by approximately ~3.9 million metric tons by converting over-the-road loads to intermodal. Since 2020, J.B. Hunt has avoided nearly 6 million empty miles by successfully matching the empty segments with unutilized trucks through its technology platform, J.B. Hunt 360.

Recently, J.B. Hunt announced plans to expand its intermodal fleet to 150,000 containers in the next three to five years as part of a joint initiative with BNSF Railway. JB Hunt's CLEAN Transport program provides intermodal customers with a flexible method to acquire carbon offset credits equivalent to the emissions created by their shipments. Analysts calculate environmental impact and connect customers with verified climate-protection projects to reduce their footprint in a customer-focused format.

Additional company sustainability initiatives include reducing engine idle time, governing top speed limits, and using biodiesel fuels.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

J.B. Hunt has received the SmartWay Excellence Award from the U.S. Environmental Protection Agency for 12 consecutive years.

Kamps

www.kampspallets.com

For internal green initiatives, Kamps focuses on two areas that deliver the greatest impact: transportation and wood resource solutions (WRS). Kamps invested time and resources to further optimize fleet routes and reduce idle time, which decreased average trip time by 15% year-over-year.

Kamps' WRS team is responsible for end-of-life sustainable solutions that deliver the greatest carbon offsets and ensure zero wood waste. Kamps expanded this division through organic growth and acquisitions—generating more than 31,600 tons of biofuel.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Sustainable packaging
- Sustainably source materials
- Improve sustainability reporting and data collection

NOTABLE ACHIEVEMENT

Kamps recycled 200 million pallets in 2021, saving 5.6 million metric tons of CO₂ from being released and reducing landfill waste by 3.7 million tons.

Kenan Advantage Group (KAG)

www.thekag.com

Kenan's tire recycling program eliminates ~1.7 million pounds of waste annually. Company-wide recycling policies are in place for both electronics and paper waste, and energy-efficient LED lighting is installed in most facilities to reduce overall energy consumption.

Kenan partners with third-party specialists to ensure the proper removal of hazardous waste.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Kenan Advantage Group is an EPA SmartWay participant and has improved mileage to reduce CO₂ emissions by ~15% over the past five years.

Kenco Logistics

www.kencogroup.com

Kenco Logistics is focused on balancing economic performance with responsible environmental stewardship—it engages stakeholders from executive management to warehouse workers.

Kenco reduces greenhouse gas emissions for warehousing, transportation, and other businesses by utilizing data analytics and optimization to improve efficiency throughout its operations.

The company reduced its carbon footprint from transportation solutions by 7% to 15% through network and transportation optimization, inventory planning, and packaging redesign.

In addition, Kenco Logistics reduced its warehousing carbon footprint by 10% to 25% through the use of LED lighting, sensor switches, energy-efficient heating and cooling systems, electric material handling equipment. It also employs energy-efficient kitchen equipment and office appliances, and waste recycling.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Kenco Logistics operates LEED-certified facilities, uses hybrid vehicles in the company fleet, and implements Lean Six Sigma methodology to minimize waste and cost.



Lufthansa Cargo AG

www.lufthansa-cargo.com/green

Lufthansa Cargo has completed its fleet rollover from the MD11F and operates a single B777F freighter fleet with an average age of 5.2 years. After this rollover, Lufthansa achieved a 52% fuel efficiency increase in the past 25 years. Three B777Fs and seven new-generation B777-8Fs will add further capacity and efficiency for both the short and long term.

To reach its goal of halving CO₂ emissions by 2030 and achieving CO₂ neutrality by 2050, Lufthansa Cargo is deploying new technology throughout its fleet such as "sharkskin" on aircraft, light nets in handling, sustainable aviation fuel, and other innovations.

As an add-on service, Lufthansa customers can opt to minimize CO₂ emissions if desired, allowing for additional reduction in greenhouse gases.

Lufthansa recently completed its 100th biofuel flight, and also signed an acceptance agreement with refineries and customers for future-oriented electricity-based aviation fuels.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

In 2021, Lufthansa Cargo joined with the Science Based Targets Initiative—a collaboration between the CDP, the

United Nations Global Compact, the World Resources Institute, and the World Wide Fund for Nature. Lufthansa Cargo also received an award from the journal *Verkehrsrundschau* for its multi-company Green Mobility trainee program, where Master's graduates can work on solutions toward more sustainable, future-oriented action within logistics and mobility.

Lynden

www.lynden.com

Despite operating in some of the most steep terrain and extreme conditions, Lynden's fleets consistently score among the most efficient in the nation in terms of CO₂ per ton mile as measured by SmartWay.

Lynden's bulk tanker company consistently scores in the top 1% of tanker carriers in the nation for low carbon monoxide, nitrous oxide, and particulate matter emissions per ton mile. Lynden also redesigned its locations for energy efficiency, including replacing more than 100 propane forklifts with electric models.

Lynden's procedures and equipment are designed to prevent accidental spills and manage stormwater pollution. All trucks and planes are designed with aerodynamic features to reduce drag, and more than 80% of the fleet is less than five years old.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Lynden is the first Alaska-based transportation company to be recognized by SmartWay (2008) and the first trucking company to earn the Green Star Award for Alaskan businesses. The company was also named Contributor of the Year by Alaskans for Litter Prevention and Recycling for its recycling efforts.

Marten Transport

www.marten.com

Marten reduces overall mileage via internal equipment changes, temperature initiatives, network restructuring, and multimodal carrier conversions from truckload to intermodal, reducing carbon footprint by more than 60% per load. The carrier created the Loading Warm & Reefer Run initiative using temperature technology to educate customers and reduce reefer usage.

Marten has added solar panels at all 14 terminals and on tractors, has converted all lighting to LED, and has installed a lithium battery bank at its Jurupa Valley, California, terminal.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Marten has made the Smartway High Performance list year after year for improving freight efficiency. The company has also been awarded Pioneer in Intermodal Development from CSX, Energy Efficiency Leader from Thermo King, and the most Progressive Carrier of the Year from Coca-Cola.



Matson Logistics

www.matson.com

Matson Logistics' environmental strategy focuses on reducing greenhouse gas emissions to mitigate climate change, improving air quality, recycling retired ships responsibly, and protecting ocean health and biodiversity. The freight transportation provider has been a member of the EPA SmartWay Partnership since 2008.

Additionally, Matson Logistics has invested in green building features in its warehouses. Its warehouse in Pooler, Georgia, is LEED certified. Other facilities use "passive night air" cooling systems and will upgrade from fluorescent lighting to more efficient LED lighting.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Matson is nearing the completion of its Hawaii fleet renewal program, where the company commissioned four new state-of-the-art vessels with multiple environmental features designed to help reduce emissions. With this initiative, Matson is now retiring seven older and less efficient steamships, where the ships were recycled at U.S. facilities that comply with international ship recycling standards.

MPO

www.mpo.com

The MPO platform offers smart order management for minimal environmental impact. Customers can incorporate greenhouse gas emissions into their planning, allocate emissions to shipments, input personalized parameters, and optimize flows in line with EN 16258 regulations and GLEC



methodology. The company offers real-time CO2 analytics per order to help execute flows against the lowest carbon footprint.

MPO enables sustainability as a quantitative metric through carrier scores and factoring greenhouse gas emissions into carrier selections based on fuel efficiency.

The MPO platform offers the ability to include carbon footprint considerations in e-stores for e-commerce vendors, and its smart business logic allows teams to choose the most environmentally friendly way to handle returns.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels

NOTABLE ACHIEVEMENT

MPO uses smart energy technology in its facilities company-wide.

NFI

www.nfiindustries.com

NFI is investing to grow its clean vehicle fleet and create scalable zero-emission transportation solutions, partnering with industry leaders DTNA, Volvo, and Hylion. NFI is an award-winning SmartWay partner and High Performer.



By 2023, NFI will operate the first 100% zero-emission drayage fleet in the United States. This deployment will help establish the first zero-emission goods movement corridor in the country.

NFI will also develop one of the United States' largest networks of commercial fleet chargers including 38 high-capacity DC fast chargers, and will install 5MWh of energy storage and solar energy capable of generating 2.4 million kWh of zero-emission energy annually.

Green equipment—electric and propane-powered forklifts, lithium battery forklift demonstration units, robotic stretch wrapping, and recycling programs—is in place across NFI distribution centers.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

NFI has already operated more than 750,000 miles on battery-electric tractors and has won more than \$107.7 million in competitive grants with its partners to build a foundation to scale zero-emission technologies.

Northwest Seaport Alliance

www.nwseaportalliance.com

The Northwest Seaport Alliance (NWSA) unites port stakeholders and communities across the Puget Sound to reduce environmental impacts.

With the company's Clean Truck Program, all drayage trucks serving NWSA terminals are 2007 models or newer, resulting in 90% cleaner trucks. The program reduced diesel particulate matter emissions by more than 90% since 2005 and brought zero-emission cargo handling trucks to the NWSA in 2022.

The company is also installing shore power on terminals and building an electrification roadmap to reach a zero-emission goal by 2050. In addition, NWSA keeps waterways clean with innovative stormwater treatment systems, tenant education, and technologies to efficiently manage stormwater in an industrial setting.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Since 2016, the NWSA has been an active member of Green Marine, North America's largest voluntary environmental certification program for the maritime industry. The NWSA is currently working toward its Quiet Sound underwater noise reduction program to protect the Puget Sound's orca population from seafaring vessel noise.

Odyssey Logistics & Technology

www.odysseylogistics.com

Odyssey announced impressive first-year results from its Cloverleaf Sustainability Program aimed at reducing carbon emissions in supply chain logistics. Using advanced data collection tools and European Chemical Industry Council and European Chemical Transport Association guidelines, Odyssey estimates the program reduced carbon emissions for its clients by 489,831 tons in 2021—surpassing the original projection of 300,000-plus tons.



In 2022, Odyssey expects even greater declines in carbon emissions through the Cloverleaf Program, with an anticipated reduction target of 529,017 tons in 2022.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources

NOTABLE ACHIEVEMENT

Odyssey leverages innovative applications of electrification such as alternative fuel vehicles, internet of things (IoT)-enabled devices, predictive/prescriptive analytics, telematics, and other evolving technologies to enhance supply chains.

Old Dominion Freight Line

www.odfl.com

Old Dominion Freight Line is investing in new technologies and processes that drive environmental stewardship. As part of the company's ongoing investment in its fleet and service center network, OD purchases new equipment, adopts new technologies, implements efficient process improvements, and makes alterations to facilities and fleets that improve efficiency and reduce environmental impact.

OD strives for continuous improvement through capital investments and by assessing and managing energy usage, waste levels, emissions, and carbon footprint.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources

- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting
- Custom built tractors

NOTABLE ACHIEVEMENT

OD's fleet is kitted out with custom gearing, speed limiters, trailer skirts, air dams, deflectors, low-rolling resistance tires, telematics systems, and other technologies to achieve maximum fleet efficiency.

Onepak

www.onepak.com

Onepak greens the reverse supply chain through managing IT asset recovery and loop logistics as part of the circular economy. The company minimizes the carbon footprint of all managed client logistics by optimizing routing and load consolidation.

Onepak calculates and offsets all emissions from its activities to provide documented carbon-neutral reverse logistics services for both freight and parcel shipping. This includes providing shipping kits for individual IT asset returns that are made from at least 40% post-consumer waste and are 100% recyclable.

In 2022, the company will debut a reusable laptop shipping kit to further reduce the carbon impact of individual asset recovery activity.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Sustainable packaging
- Sustainably source materials
- Provide guidance and resources to supply chain partners

NOTABLE ACHIEVEMENT

To date, Onepak has collected more than 600 million pounds of consumer e-waste and transported it to R2-certified facilities for responsible recycling.



ORBIS Corporation

www.orbiscorporation.com

ORBIS Corporation drives the circular economy through environmentally friendly product design, sustainable operations, and material usage.

Designed to replace single-use packaging in the supply chain, 100% of ORBIS' packaging solutions are developed with sustainability in mind. Using life-cycle assessments to compare reusable and single-use packaging, ORBIS helps customers reduce their overall environmental impact. In its own operation, ORBIS reuses 99% of water in the manufacturing process.

At the end of a long service life, ORBIS packaging can be recovered, recycled, and reprocessed into new packaging. In 2021, ORBIS' buyback program saved 85 million metric tons of CO2 emissions.

Additionally, ORBIS' Ocean in Mind program repurposes plastic waste at risk of entering the oceans into reusable packaging. Each year, this program diverts ~1 million lbs. of single-use plastic waste from oceans and waterways.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting
- Use ocean-bound plastic waste in manufacturing

NOTABLE ACHIEVEMENT

ORBIS' reusable totes are proven to reduce energy usage by 31%, solid waste by 79%, and greenhouse gas emissions by 38% for packaging suppliers.

PECO Pallet

www.pecopallet.com

PECO's pallet pooling model is based on reusing, repairing, and recycling pallets to reduce the waste and



inefficiency associated with single-use or low-quality pallets. In addition to providing sustainable solutions for customers, PECO Pallet also implements environmental initiatives within the company to conserve resources and reduce its carbon footprint.

PECO has installed wood waste shredders at its larger pallet depots to divert material from the landfill. The wood chips are hauled to a wood recycler to be reused, often for animal bedding. PECO also uses a Fleet Recovery app to optimize pallet recovery routes and reduce wasted miles, fuel consumption, and emissions.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

PECO Pallet completed its first-ever GRESB Asset Assessment in 2021 and received a score of 88 out of 100 (over the average of 72) to earn an overall 4-star rating. PECO also earned a 2021 EcoVadis Silver rating, ranking in the top 22% of companies in its market segment.

Penske Transportation Solutions

www.gopenske.com

Penske has been supporting and maintaining alternative fueled vehicles for more than 30 years. The company continues to work with OEM partners to incorporate alternative fuel vehicles into

the Penske fleet. The company will take delivery of 750 all-electric Ford E-Transit cargo vans in 2022.

Penske is also implementing numerous facility-level sustainable programs, such as renewable energy infrastructure, energy efficiency upgrades, and waste reduction policies that will reduce the carbon footprint of facilities, including refrigerated distribution centers.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Penske's dedicated contract carriage fleet has been awarded the EPA SmartWay Excellence Award for sustainably delivering goods for each of the past five years. The EPA's Green Power Partnership program also recognizes that Penske's energy portfolio currently comprises 22% renewable energy.



Performance Team, A Maersk Company

www.performanceteam.net

A SmartWay partner and member of the Coalition for Responsible Transportation, Performance Team pushes for greater fleet fuel efficiency, lower-emission trucks, and the adoption of alternative fuel sources.

To reduce its carbon footprint, the company makes maximum use of recycled materials and utilizes energy-efficient technology. Performance Team requires waste reduction from

its business partners and promotes the use of environmentally friendly products.

Performance Team maintains a Clean Truck fleet that operates environmentally friendly trucks in the Ports of Long Beach and Los Angeles.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Performance Team uses more than 65 clean diesel tractors and clean equipment in its dedicated retail fleet operations and is expanding its electric truck fleet.



PITT OHIO

www.pittohio.com

In 2021, PITT OHIO continued to improve efficiency and reduce carbon emissions. The company saw an increase in business as the economy opened up in 2021, but gallons of fuel only went up 4.6% for an estimated savings of over 200,000 gallons of diesel fuel.

PITT OHIO accomplished this by utilizing straight trucks over tractors and updating preventive maintenance schedule intervals to ensure vehicles and tires perform optimally. The estimated reduction to oil was 12,000 gallons annually.

PITT OHIO also continues moving older vehicles out of the fleet. In addition,

these older vehicles were often used to help offset supply chain impacts to truck parts.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

At two of its terminals, PITT OHIO patented a renewable energy microgrid that transfers wind and solar energy into a battery system to generate, store, and consume renewable energy on-site. Excess renewable energy is sent back to the utility when generation exceeds demand, allowing the terminal to function autonomously and indefinitely.

Plastic Pallet Pros

www.plasticpalletpros.com

Plastic Pallet Pros' Buy-Back program provides customers the opportunity to recycle their plastic pallets and bins when they are no longer serviceable. The company gives a credit toward the purchase of new plastic pallets and bins.

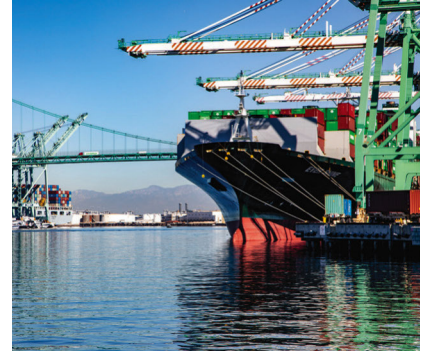
Pallets account for 90% of wood waste that heads to the landfill. The average time that wood takes to decompose in the landfill is 13 years. The durability of plastic pallets compared to wood, 250 trips versus 6, means fewer pallets are produced and less waste goes to the landfill. It also reduces cost per trip for customers.

GREEN INITIATIVES

- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

The majority of products that Plastic Pallet Pros provides are made with 100% recycled plastic and are recyclable.



Port of Los Angeles

www.portoflosangeles.org

The Port of Los Angeles, along with Port of Shanghai and C40 Cities, is working with leading industry partners to create the world's first transpacific green shipping corridor, including a goal to begin transitioning to zero-carbon fueled ships by 2030.

Additionally, the Port of Los Angeles and neighboring Port of Long Beach have debuted a new Clean Truck Fund, a major initiative designed to help incentivize the development and deployment of zero-emission trucks and infrastructure at the ports. Approximately \$90 million is expected to be collected the first year, moving the San Pedro Bay port complex toward a goal of being serviced by a 100% zero-emission drayage truck fleet by 2035.

Since 2005, port-related air pollution emissions in San Pedro Bay have dropped 90% for diesel particulate matter, 63% for nitrogen oxides, and 97% for sulfur oxides.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

To date, the port has installed nearly 3 megawatts of photovoltaic solar power systems, including installations at the World Cruise Center, CRAFTED at the Port of Los Angeles, and at other locations on port property.

Prospensive Logistics

www.prospensive.com

Prospensive Logistics' sustainability committee meets quarterly to discuss current and future state initiatives, benchmarks, and metrics to deliver a more sustainable supply chain. This committee is focused on advancing operational goals, employee recycling programs, technology initiatives, local community engagement and clean-up efforts, and independent office benchmarks.

The company constantly finds innovative ways to optimize routes and identify the most efficient lanes to limit driving time and maximize fuel usage, reducing carbon emissions while preserving shipment quality.

Prospensive Logistics installed Nest thermostats in all offices for more efficient heating/cooling and motion sensor-activated lighting for more efficient use of energy.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Prospensive Logistics has launched a "35 by 35" program—a commitment to reduce greenhouse gas emissions by 35% by 2035.

Raymond Corporation

www.raymondcorp.com

Across the organization, Raymond works to minimize its direct and indirect impacts on the environment through formalized environmental goals. To achieve these goals, Raymond associates participate in shutting down equipment during rest breaks and weekends to eliminate power draw.

Raymond has upgraded software for automated logic and lighting control programs to zone and control factory and office lighting, as well as



heating and air conditioning, based on utilization. The company has also incorporated LED lighting systems and adopted a reuse/recycle program.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting
- Reduced compressed air leakage system
- EPA Energy Star Treasure Hunt
- ISO 14001 certification

NOTABLE ACHIEVEMENT

Energy Essentials Distributed by Raymond lithium-ion batteries provide a comprehensive lithium-ion, high-performance energy solution that enhances productivity, including increased uptime and reduced electricity consumption, by allowing for more time between charges.

Redwood Logistics

www.redwoodlogistics.com

Redwood has been working toward sustainability since its inception in 2001 and has been a Smartway partner for more than 10 years.

The company introduced an innovative sustainability tool, Redwood Hyperion, that provides freight emissions

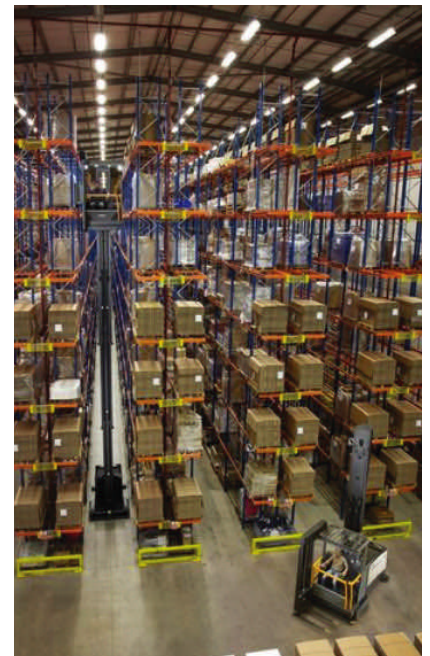
calculations and access to verified carbon credits. The program provides a customizable suite of carbon visibility, reduction, and offsetting tools to provide actionable insights that help shippers reach sustainability goals.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Redwood's asset division, F/X, reduced 907,522 pounds of CO2 in the first quarter of 2022. The company has decommissioned 800+ servers since 2020, reducing CO2 even further.



Rinchem Company

www.rinchem.com

The company has installed solar panels at its Marlborough, Massachusetts, location and installed LED and motion sensor lights in 19 facilities across the United States. It also recycles all cardboard and pallets.

Eighty-five percent of Rinchem's forklift fleet is electric and it uses automatic trucks to reduce carbon footprint and miles per gallon.

Rinchem is a Smartway partner and California Air Resource Board compliant. The company operates on a just-in-time model, bringing in only as much material as needed to avoid excessive inventory and transportation.

It also maintains a reverse logistics program that supports the use of returnable totes/drums, which reduces waste and disposal of plastics.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Rinchem offers paperless transactions through ChemStar, its custom online system.

RJW Logistics Group

www.rjwgroup.com

RJW cultivates efficient business practices that yield long-term sustainable benefits for customers and stakeholders.

RJW's retail consolidation program and in-house value-added services limit the number of trucks on the road, eliminating an average of 13 LTL shipments that would otherwise make multiple stops throughout one route.

RJW's recycling program averages 100 tons monthly across its network. Its trucks are fuel efficient and recent vintage with clean diesel emissions

technology and they operate with no-idle policies.

The company's facilities are LEED-certified and equipped with motion sensor lighting, skylights, and battery-operated equipment. RJW is recognized as a SmartWay carrier.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

RJW provides employee incentives for sustainable practices.

Romark Logistics

www.romarklogistics.com

Romark Logistics continues to make significant investments in renewable energy and has implemented many sustainable practices in collaboration with its customers that aid in reducing its carbon footprint. The company has a primary goal to operate all its locations as landfill- and carbon-free facilities.

Romark has invested in and operates solar installations at several locations, utilizes energy-efficient technology including LED lighting, water conservation equipment, cooling towers, and high-efficient battery chargers that reduce energy costs up to 30%.

The company increased rack density at its facilities and improved MHE monitoring for safety and maintenance. Company-wide recycling requirements



are in place for paper/cardboard, plastics, glass, and metal.

Idling and speed management policies reduce unnecessary fuel consumption and energy costs.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Romark Logistics owns and operates a 2-megawatt rooftop solar array on one of its refrigerated locations consisting of 8,512 solar panels and replaces 40% of the total facility utility usage.



Ruan

www.ruan.com

Ruan focuses on utilizing cleaner fuel options, including compressed natural gas (CNG), renewable natural gas, biodiesel blends (primarily B20) and renewable hydrocarbon diesel.

Since starting its CNG program in 2011, Ruan has operated more than 160 CNG trucks that have logged 100 million+ miles on natural gas power, including 80 million miles on renewable natural gas derived from cattle manure. The renewable natural gas has resulted in greenhouse gas reductions of 70,000+ metric tons and millions of pounds of CO₂ emissions reductions. Ruan has recently retrofitted 10 CNG tractors with new ultra-low NO_x engines for operation in California, running on renewable natural gas.

Ruan has purchased well over 150 million gallons of biodiesel blends since 2014, resulting in CO₂ emissions reductions in excess of 350,000 metric tons. Ruan purchases approximately 1 million gallons of renewable diesel annually.

Overall, Ruan has made great strides in improving its MPG percentage, with an 11% increase over the past three years.



GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Ruan has been a SmartWay member since 2014 and has been honored with the SmartWay Excellence Award numerous times. In addition, Ruan is one of only three for-hire transportation companies selected for the National Clean Fleets Partnership (NCFP) membership and participates in their Clean Cities annual study. The NCFP helps fleets implement strategies to advance alternative fuels and energy-efficient vehicle technologies.

Ryder System

www.ryder.com

Ryder invests in alternative fuel technology and other emerging technologies that improve fuel economy and reduce emissions. The company collaborates with electric vehicle manufacturers and companies providing charging infrastructure.



Ryder facilities employ Lean methodologies that continually improve operating processes, maximize efficiency, and minimize waste.

For automotive waste, Ryder contracts vendors who recycle or refine and reuse most of its wastes, including nearly 3 million gallons of used oil from Ryder maintenance and fueling locations.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Ryder has received significant awards and recognition from customers, industry associations, and regulatory communities, such as the U.S. EPA SmartWay High Achiever Award (2020) and SmartWay Excellence Award (2013-2014, 2017, 2021).

Saia LTL Freight

www.saia.com

Saia LTL Freight reduces the impact its operations have on the environment through sustainable business practices, equipment optimization, and more. For instance, in 2021, Saia deployed its first zero-emission, all-electric tractors and launched five compressed natural gas tractors.

Saia sits on Daimler Trucks North America's Electric Vehicle Customer Council and



is evaluating how electric vehicles can support its sustainability goals.

The company is a SmartWay partner and continues to invest in various conservation and recycling efforts.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Saia LTL Freight partnered with Daimler Trucks North America to test a battery electric Freightliner eM2 box truck in its Portland, Oregon, pickup and delivery operations.

Scan Global Logistics

www.scangl.com

Scan Global Logistics has been a SmartWay partner since 2007. In addition to early adoption of the SmartWay partnership program, Scan Global Logistics has been a signatory to the United Nations Global Compact since 2015.

The company's approach to climate change and environmental issues is anchored in science; to that end, Scan Global joined the Science Based Targets initiative and committed to a goal of limiting global warming to 1.5°C and reaching net-zero emissions by 2050.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

In 2021, Scan Global Logistics partnered with Neste, the world's largest producer of sustainable aviation fuel (SAF), to provide an independent solution to decarbonize customers' air freight emissions. Neste's SAF is made from sustainably sourced 100% renewable waste and residue raw materials and can reduce greenhouse gas emissions by up to 80% over the lifecycle compared to fossil jet fuel.

Schneider

www.schneider.com

Schneider has set sustainability goals to reduce CO2 emissions by 7.5% per mile by 2025; achieve a 60% reduction in CO2 emissions per mile by 2035; double its intermodal size by 2030, thus reducing CO2 emissions by an additional 700 million pounds per year; and reach carbon neutrality in all company-owned facilities by 2035.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Schneider has received the SmartWay Award of Excellence from the Environmental Protection Agency every year since its inception.

The Shippers Group

www.theshippersgroup.com

The Shippers Group has been more purposeful in focusing on reducing or eliminating consumer emissions and sustainable living plans for fair compensation, health, and safety. The company helps food and consumer packaged goods companies reduce their carbon footprint through its contract packaging services.

Warehouse customers who use the company's co-packing services substantially reduce the consumption of fuel and emissions by eliminating freight movements.

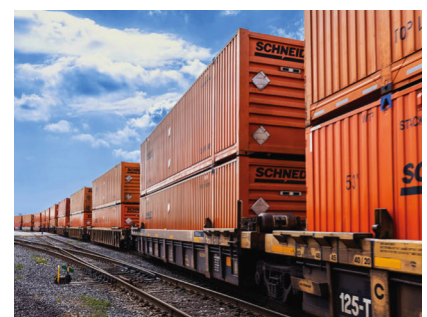
The Shippers Group bases its procurement decisions on products that minimally impact the environment.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting
- Contract packaging operations

NOTABLE ACHIEVEMENT

In the past year, The Shippers Group has invested nearly \$260,000 in just the recycling of about 7.2 million pounds of recyclable plastics and cardboard.



Southeastern Freight Lines

www.sefl.com

Southeastern Freight Lines' fleet services and operations teams continuously make improvements across its fleet and operations to conserve fuel and reduce environmental impact.

By investing millions of dollars each year in new tractors and trailers, SEFL maintains trade cycles that provide an efficient and dependable fleet. SEFL has been a SmartWay partner since 2004 and remains focused on reducing mobile greenhouse gas emissions.

The company harvests rainwater for irrigation at its South Houston and Fort Lauderdale service centers, and its Support Center and 80 service centers are fully equipped with LED lighting and occupancy/daylight harvesting sensors. Four additional LED retrofits will be completed in 2022.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

The company produces solar energy at three of its service centers and has produced more than 16,400 MWh of electricity since 2013. SEFL will continue to expand renewable energy production in 2022 with a 191.3 kW roof-mounted solar panel system at its support center in Lexington, South Carolina.

Symbia Logistics

www.symbia.com

In 2021, Symbia planted 3,000 trees (20 for each of its 150 clients), with a goal of 50 trees per client in 2022, or 7,500 trees.

The company acquired 130,000 square feet of LEED-certified warehouse

space in Bolingbrook, Illinois, and in Kansas City it attained Warehouse and Repacking Organic Certification for 66,000 square feet of storage.

At each of its warehouses, Symbia operates recycling programs and has installed LED and motion-activated lighting.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting
- Educational outreach

NOTABLE ACHIEVEMENT

Symbia Logistics' forklift fleet is now 92% electric (77 electric, 6 propane).

TCI Transportation

www.tcitransportation.com

With the help of REP Solar, TCI Transportation installed solar PV systems in three of its 10 locations, and counting. This will lead to a decrease in the cost of annual energy bills, as these panels are the equivalent of 38,004 gallons of gas per year, 45 cars off the road per year, planting 275 trees, and powering 62 homes per year.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting



NOTABLE ACHIEVEMENT

TCI Transportation has purchased electric trucks/tractors from GreenPower Motor Company, Nikola, Phoenix Motorcars, and Electric Freightliners.

Transportation Insight Holding Company

www.tiholdco.com

The company runs a robust community affairs program that partners with environmental groups to plant trees and clean rivers in local communities. In 2022, Transportation Insight and Nolan Transportation Group (NTG) employees will plant more than 2,000 trees and remove more than 1,000 lbs. of debris from local waters.

In working with a third-party sustainability party, TI is actively developing programs and guidelines to reduce the carbon footprint of its carriers and shippers.

The company's Beon Shipper and Beon Carrier products and digital solutions limit empty miles, map more efficient routes for carriers and perform load consolidation across LTL and partial loads to reduce trucks on the road.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

NTG is a Smartway Transport Partner. In 2021, the company launched its "Go for Neutral" sustainability program designed to help shippers and carriers reduce their carbon footprint through operations, technology, community affairs, and office space initiatives.

Trinity Logistics

www.trinitylogistics.com

Trinity Logistics is focusing on sustainability through its Responsible Care partnership and EPA Smartway partner membership. Trinity

offsets its carbon footprint through carbonfund.org.

In recent years, Trinity has updated its facilities to more energy-efficient LED lights and uses thermostats on a timer to reduce wasted energy. All of the packaging for Trinity's lunchwagon program and paper products are recycled as well

GREEN INITIATIVES

- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Trinity Logistics became part of the Responsible Care Partnership in 2009 and strategically develops operating procedures in line with its key principles to ensure the safe arrangement of chemical shipments.

Through Responsible Care, Trinity commits to improve company performance through community awareness and emergency response, security, distribution, employee health and safety, pollution prevention, and process and product safety.

Union Pacific

www.up.com

UP's commitment to sustainability dates back more than 35 years with the establishment of an industry-first Environmental Management group and is reflected today in its target to reduce absolute Scope 1 and 2 and locomotive well-to-wheel greenhouse gas emissions by 26% by 2030 from a



2018 baseline on the path to net zero emissions by 2050.

UP also will begin using a higher biodiesel blend in locomotives acquired from Wabtec, which helps it work to increase the percentage of low-carbon fuels consumed to 10% of total diesel consumption by 2025 and 20% by 2030.

In 2021, UP estimates its customers eliminated about 22.9 million metric tons of greenhouse gas emissions by choosing rail over truck transportation.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Union Pacific plans to purchase 20 battery-electric locomotives

for testing in yard operations—the largest investment in battery-electric technology by a major U.S. railroad.

UPS

www.ups.com

UPS has committed to 100% carbon neutrality in 2050 and set goals and plans along the way, offering solutions such as carbon neutral shipping, supply chain optimization, and carbon calculators to help shippers with their sustainability journey.

The company's innovation-driven investments include 30+ urban logistics projects to improve last-mile deliveries in cities, 9,400+ compressed natural gas vehicle purchases, up to 10,000 custom-built all-electric delivery vans from Arrival, 100% renewable electricity in all U.S. data centers (as of Jan. 1, 2022), and 70% renewable sources in European facilities.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels or energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Solar panels

NOTABLE ACHIEVEMENT

Since 2016, UPS has purchased 150 million gallon equivalents of renewable natural gas—the largest purchase commitment in U.S. history.



USA Truck

www.usa-truck.com

USA Truck has been a SmartWay partner since 2005. Among other sustainability initiatives, the company tightened tractor-to-trailer gaps to reduce aero drag, partnered with engine and transmission manufacturers to optimize vehicle parameter settings for optimal fuel economy, and implemented automated transmissions for fuel economy gains.

USA Truck also implemented an ambient air temp-controlled idle control system to reduce idle time for battery charging; tested solar power battery charging for reduced idle, fuel burn, jump starts, and increased capacity; installed trailer skirts to maintain aerodynamic advantage and increase fuel economy; replaced incandescent lighting with LED in all facilities; and purchased 10 electric tractors in 2022.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

In recent years, USA Truck has reduced CO2 emissions by more than 8,800 metric tons and has recycled more than 85 tons of metal.

Wabtec Corporation

www.wabteccorp.com

Wabtec helps its customers reduce their overall carbon footprint through the development of low-emitting

locomotives, such as its Tier 4 and battery-electric locomotives, and the use of alternative fuels such as biodiesel, renewable diesel, and hydrogen.

In 2021, Wabtec delivered the first heavy-haul, 100% battery-electric locomotive, called FLXdrive. Throughout its pilot, the FLXdrive successfully reduced overall fuel consumption by more than 11%—the equivalent of 6,200+ gallons of diesel fuel saved and approximately 69 tons of CO2 emissions reduced.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources

NOTABLE ACHIEVEMENT

In late 2023, Wabtec plans to deliver the next version of the FLXdrive, which is anticipated to further reduce fuel consumption and emissions by up to 30%.



Werner Enterprises

www.werner.com

Werner announced its Environmental, Social & Governance (ESG) initiative in 2020, which enhances efforts to communicate ESG progress to associates, customers, shareholders, suppliers and the general public. The company set a goal to reduce carbon emissions by 55% and plans to double intermodal usage by 2035.

Werner continues to concentrate on sustainability focused advanced equipment technology/features, fuel conservation training, and on-site fuel tank removals to eliminate spillage and contamination risks.

Werner is piloting a number of emerging technologies—battery electric vehicles, renewable diesel, autonomous technologies—to work toward moving a minimum of 30% of its total miles in zero emission vehicles by 2035. In 2021, Werner earned the SmartWay Excellence and SmartWay High Performance awards.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainably source materials
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Since 2007, Werner has eliminated 348 million gallons in fuel consumption, improved fuel efficiency by over 30%, and reduced more than 3.9 million tons of CO2.

Wesco

www.wesco.com

Wesco's approach to sustainability is two-fold: minimize the negative impacts of its own operations and help customers and suppliers attain their sustainability goals through its products and services.

Specifically, from 2016 levels, Wesco reduced landfill waste at its locations by 13%, reduced greenhouse gas emissions by 23%, reduced facility energy intensity by 9%, and improved the fuel efficiency of its trucks by 3%. Wesco also supplies customers with LED lighting, smart building controls, and electric vehicle charging stations.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Use wastewater
- Reduce energy usage
- Solar panels
- Energy-efficient lighting
- Smart building controls

NOTABLE ACHIEVEMENT

In partnership with its customers, Wesco has provided solar and wind

energy products that produced more than 200 million kilowatts of renewable energy generation capacity, with the potential to reduce greenhouse gas emissions equal to 141,883 metric tons of carbon dioxide equivalent.

WSI (Warehouse Specialists, LLC)

www.wsinc.com

WSI is a Responsible Care certified and Responsible Distribution verified 3PL and participates in Ecovadis' Together for Sustainability program, a global program to assess, audit, and improve sustainability practices in the supply chain.

The program's assessments and audits are conducted based on a pre-defined set of criteria and shared across its 30 member chemical companies. These assessments streamline chemical companies' processes to analyze their sustainability efforts and increase visibility for supply chain partners with exemplary practices. Maintaining these certifications holds WSI accountable as a supply chain steward.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reduce energy usage
- Energy-efficient lighting
- Spill prevention

NOTABLE ACHIEVEMENT

The company built a large, state-of-the-art industrial agricultural distribution facility designed to contain and safely drain any spills should there ever be an incident. This was a significant undertaking, requiring the collaboration of a large team of engineers, safety professionals, government officials, and various other stakeholders. Concurrently, other projects focus on improving existing facilities and processes.

Yale Materials Handling Corporation

www.yale.com

Yale continues to add to its lineup of integrated lithium-ion lift trucks, expanding power options throughout the warehousing industry. Innovations in lift truck power have meaningful sustainability and operational benefits. Lithium-ion batteries generate zero harmful emissions while in operation or charging, and a lithium-ion battery pack can last more than four times longer than a lead-acid battery, helping reduce recycling waste.

Going beyond a single source, the Yale Power Suite offers power options across a comprehensive range of lift trucks, for unrestricted choice of hydrogen fuel cells, lithium-ion batteries, internal combustion engines and lead-acid batteries. This choice enables a solution built around an operation's cost, labor, maintenance,

emissions, and space requirements. The result is a more sustainable option that helps eliminate harmful emissions, off-gassing and other hazardous chemicals.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Energy-efficient lighting

NOTABLE ACHIEVEMENTS

Yale's key performance metrics include offering alternatives that enable customers to cost-effectively reduce carbon emissions such as fuel cell engine development and lithium-ion battery powered products. The company aims to reduce carbon emissions by 30% and to achieve zero waste to landfill at all sites.

Yusen Logistics

www.yusen-logistics.com

Current examples of Yusen Logistics' initiatives to reduce greenhouse gas emissions include promoting the use of sustainable aviation fuels and carbon offsetting for ocean freight forwarding services. The company has switched to environment-friendly vehicles in many locations and continues to transition all operations.

Yusen actively promotes the use of LEDs, has installed solar panels and conducts tree-planting activities in cooperation with local governments.

GREEN INITIATIVES

- Reduce greenhouse gas emissions
- Use alternative fuels/energy sources
- Reuse/recycling program
- Reduce energy usage
- Sustainable packaging
- Sustainably source materials
- Solar panels
- Energy-efficient lighting

NOTABLE ACHIEVEMENT

Yusen Logistics set a goal of achieving net-zero emissions for all services it provides to customers by 2050. As an interim goal, it aims to start providing net-zero emissions services by 2030.



POP QUIZ

SUPPLY CHAIN EDUCATORS ANSWER PRESSING QUESTIONS

Recent interest in supply chain management is attracting students in record numbers. How are education programs preparing those students for a supply chain career? We quizzed some of the top academic programs in the country to find out.

By Karen Kroll

F

or much of the decade prior to the pandemic, the number of students in supply chain programs couldn't match industry's need for supply chain professionals. "The biggest challenge was convincing students it was a real career path," says Brian Fugate, chair of the department of supply chain management at the University of Arkansas.

As the scope of the pandemic and its impact on supply chains and logistics became clear, just about everyone gained some familiarity with the concept of a supply chain. Many supply chain programs, like those at the University of Arkansas, became "beyond overwhelmed" with increases in enrollment, Fugate says.

Most students choosing transportation, supply chain management, and related majors will be well-prepared for roles in industry. "The academic infrastructure for transportation and supply chain management programs in North America is excellent," says David Fisher, executive director of the Transportation & Supply Chain Institute at the University of Denver. "This is an advantage we need to leverage as a nation."

Here is how some of the top supply chain programs in the country are preparing students for an evolving industry.

Q: HOW DO YOU SEE CAREERS IN SUPPLY CHAIN MANAGEMENT CHANGING?

David Fisher, University of

Denver: In my 30-plus year career in transportation, logistics, and supply chain management, I've never seen so much potential for change. Companies are testing driverless trucks, warehouses that run robotically, and systems that optimize freight using advanced algorithms. These are macro changes.

The jobs of tomorrow will increasingly be found in advanced technology, optimization, coding, and other non-traditional elements that make up the thrust of change in logistics.

Anna Nagurney, University of

Massachusetts, Amherst: The new supply chain professional is more of a data scientist. At the University of Massachusetts, we emphasize innovation. Students gain an excellent grounding in data and technology, modeling, and the software packages they'll use in their careers.

They also need expertise in a supply chain domain—such as healthcare, manufacturing, or food products—as well as knowledge of business strategy and finance, along with operations, so that they can model risk management.

Students also need to understand the geopolitical risk around the world. And I can't overemphasize enough the importance of communication skills, both in giving presentations and in collaborating with others on a team.

Q: WHAT SKILLS WILL BE KEY TO FUTURE SUPPLY CHAIN PROFESSIONALS?

Edward Anderson, University of

Texas: The ability to leverage business intelligence—to extract information from data and then craft a story around it to help reach decisions—is more important than it used to be. We don't need full-on data analytics, but we do need to be able to understand data at a level that wasn't necessary 10 or 20 years ago, when data was hard to come by. Now it's not.

The sponsor companies we work



Supply chain management programs at Michigan State University's Broad College of Business prepare students for careers in the field by integrating topics from manufacturing, purchasing, transportation, and distribution into a unified program.

with have stated emphatically that they don't want to lose sight of leadership capabilities, such as being able to speak clearly and persuade.

Often, in supply chain, you don't have much direct control to get everyone on the same page. So, leadership capabilities become more important.

Tobias Schoenherr, Michigan State

University: In my sourcing courses I emphasize the skills that are needed to succeed as a purchasing professional, including how to develop strong buyer-supplier relationships, trust, empathy, and talent management.

Kelly Lynch, Michigan State

University (MSU): Key skills are communication, data analysis, interpersonal skills, end-to-end supply chain management thought processes, and a broad set of core courses—writing, history, and others—that are required of all MSU students.

Brian Fugate, University of

Arkansas: What's shifting is how we enable students to think better and to have a command of soft skills, like communication.

In teaching project management, we used to teach the six-month waterfall management approach. Now we do scrum project management, helping students become more agile.

And while we teach solutions like Agile Project, we still use Excel because many companies still do.

Q: HOW DO YOU PREPARE STUDENTS FOR CAREERS IN AN EVOLVING FIELD?

Fisher: Along with transportation and supply chain management, we teach leadership, finance, trade, regulatory affairs, and technology. We also help students embrace life-long learning as a habit, to have a well-rounded and maximized potential for advancement. There is no such thing as having too much knowledge.

As the past several years have demonstrated, we live in a complicated world. It is essential that logisticians keep moving forward so the world can as well.

Fugate: If you were going to design a program to make sure students are *not* prepared to deal with issues such as trade wars and the conflict in Ukraine, you would take the traditional approach of lectures and exams. We are moving beyond that.

While students still need to know the basics, the pandemic showed us how important it is that students are prepared to adapt, solve changing problems, and face uncertainty. We throw students into projects that have more ambiguity and that change partway through the process. It's frustrating for students, but they learn to deal with change.

We also require all students to get internships. The difference between students with experience versus those without it is night and day.

Robert Glenn Richey, Jr., Auburn University: It used to be that you taught just transportation and logistics. Now we also teach quality management and new product development, as well as an international content covering, among other subjects, importing and exporting and port operations.

We also have a required internship or co-op program. Students land in positions in purchasing, transportation, brokerage, and analysis, and other functions. It allows them to get a feel for the job and apply their book learning to a real environment.

Students also travel to conferences where they can hear from top minds in supply chain management and participate in case study competitions.

Q: HOW HAS THE PANDEMIC IMPACTED SUPPLY CHAIN CURRICULUM AND PROGRAMS?

Nagurney: Supply chain education has changed in the past few years. We're not focusing just on supply chain cost. Now, risk and resilience are important. It's more just-in-case versus just-in-time.

We discuss how to recover from and plan for various disruptive events. For example, if the ports shut down or are congested, how can we identify alternate routes?

Schoenherr: In my strategic sourcing and supply management courses, I have integrated the impact of the pandemic on purchasing, starting with illustrating the importance of purchasing, and then weaving through topics such as supplier selection and evaluation, global supplier footprint, supply chain design, buyer-supplier relationships, and risk management.

All of this illustrates that supply chain management matters, and that companies need to put the "management" back into "supply chain management."

Anderson: Before COVID, the main concern was building students' analytic capability. That's still important, but COVID showed the importance of relationship management. Evidence shows that companies with better



A Bachelor of Arts in Transportation and Supply Chain from the University of Denver involves hands-on instruction in procurement, inventory management, international trade, supply chain logistics, and project management, among other topics.

supplier relationships got first dibs.

Companies also ask us to give feedback on team interaction between students. It's not just leadership that's important, but also interpersonal skills and creating situations where students work together. While there's much talk of numerical, analytic, and modeling capabilities, the discussion now also recognizes you can't lose sight of other skills. Otherwise, companies would hire just technology people.

Lynch: The biggest change is that companies that previously did not know or understand how strategic supply chain management can impact their company before the pandemic do so now.

Companies have to understand how supply chains can impact their costs, time to market, innovation, and margins, and how they're missing the boat if they don't embrace strategic supply chain management.

Q: WHAT OTHER CHANGES ARE OCCURRING IN YOUR PROGRAMS?

Fisher: We just launched a bachelor degree in transportation and supply chain for adult learners with full-time jobs. We strategically established this program because the industry increasingly needs people who already are in careers to have growth potential. It also helps with retention.

We also have broadened our courses in transportation and supply chain environmental, social, and governance (ESG) topics. We focus on social issues and how the supply chain can impact areas such as trafficking and diversity.

And we've strengthened our courses in government policy, because our industry is subject to significant and ever-changing regulatory shifts.

Nagurney: ESG and cybersecurity are more prominent. I also teach a course on humanitarian logistics and disaster management, bringing in real-world events, such as the pandemic and the conflict between Russia and Ukraine. The overall message: You need to be able to adapt and to be agile.

Anderson: Supply chain resilience is more important. We look at a number of strategies to achieve this, like geographic diversity of suppliers, and then teach it in a way that recognizes the complexities.

For instance, most sub-suppliers of semiconductors are located in Asia. So, if you manufacture semiconductors and decide to source more from Mexico, you may still need to get some components from Asia.

ESG concerns, and particularly environmental concerns, have become important to students. However, reducing a company's carbon footprint is more complex than it might seem. For instance, if you switch your fleet to electric vehicles, you need to know the locations of fast-charging stations your vehicles will use.

Lynch: MSU students learn end-to-end supply chain management and that the only way you optimize your supply chains as a company is to strategically align the supply management (procurement), operations, and logistics functions together. That is the key.

In addition, risk management,

sustainability, and the resiliency of a company's supply chains are critical to success. It's not only about optimizing costs, but also enhancing the revenue side of the equation. Strategic management of the supply chain can give companies a competitive edge.

Richey: During the pandemic, we launched both an online and an on-campus supply chain management Masters program and have about 35 students. Some students come with a supply chain background, but many ended up in supply chain, even though their background is in something else.

Q. HOW HAVE RECENT DISRUPTIONS IMPACTED INTEREST AND ENROLLMENT?

Fugate: We see massive growth at the undergraduate level. We actually need more teachers and professors.

It's so attractive to work in supply chain, the cost of giving up, say, four years to become a supply chain professor is steep. Those who choose to become a supply chain professor never regret it.

Richey: Seven years ago, about 180 students were in our program. Now, at least 550 students are in the undergraduate supply chain program. It's a massive adjustment.

Many are transitioning from accounting programs; in supply chain, you're not behind a computer screen all day. We also see growth in the number of women in the program.

Nagurney: The pandemic increased the general public's awareness of supply chains. Now parents and family members understand that supply chains are extremely important, so they know that if their children are interested in the topic, it can be a great future professionally. Demand for classes has grown by about 40%.

At the same time, CEOs and company boards understand how critical supply chains are. That helps when I invite guest speakers in my classes or when we ask for funds for development. I honestly can't think of a more relevant or a more exciting subject to be teaching now or learning about than supply chains. ■

ROLL CALL

Meet the professors who participated in this roundtable discussion.



Robert Glenn Richey, Jr., Ph.D.

Harbert Eminent Scholar and Chair
Department of Supply Chain Management
Auburn University
Raymond J. Harbert School of Business



Tobias Schoenherr

Hoagland-Metzler Professor
Purchasing and Supply Management



Kelly Lynch

Director of Corporate and Student Relations
Michigan State University
Eli Broad College of Business



Brian S. Fugate, Ph.D.

Chair, Department of Supply Chain Management
Oren Harris Endowed Chair in Transportation
and MIT Fulbright Scholar
The Sam M. Walton College of Business
University of Arkansas



David Fisher

Executive Director,
Transportation & Supply Chain Institute
University of Denver



Anna Nagurney, Ph.D.

Ph.D. Coordinator in Management Science
Eugene M. Isenberg Chair in Integrative Studies
Director, Virtual Center for Supernetworks
University of Massachusetts Amherst
Isenberg School of Management, Department of
Operations and Information Management



Edward G. Anderson Jr., Ph.D.

Professor of Management,
Operations Management Group
Mr. & Mrs. William F. Wright Centennial Professor
for Management of Innovative Technology
University of Texas
McCombs School of Business

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CHEMICAL LOGISTICS: CRITICAL CHALLENGES *DRIVE* CREATIVITY

Chemical shippers and their partners keep critical shipments moving safely and efficiently—refining their strategies and getting creative despite considerable challenges. Here's how leading providers formulate solutions for the chemical industry.



The chemicals that make their way across the country and around the world are critical to multiple essential industries—agriculture, healthcare, and manufacturing, to name a few. Chemical logistics companies take to heart their role in ensuring the products they move arrive at their destinations safely, accurately, and as timely as possible. “Many chemical shipments go to key pieces of business in America,” says Jennifer Braun, vice president of Kansas City operations with Trinity Logistics. “They cannot be delayed.”

Yet chemical logistics companies are confronting the same challenges—capacity and labor shortages, geopolitical upheaval, port congestion, and factory slowdowns—impacting supply chain and logistics functions in all industries. On top of the supply chain challenges most companies face, chemical logistics companies face additional challenges. The total number of licensed truck drivers able to carry hazardous materials makes for an even smaller pool to hire from, says Dustin Miles, vice president of global transportation with Rinchem Company, Inc., a provider of chemical management solutions.

Many drivers currently can earn more by driving crude fuel oil, says Randy Strutz, president of Quality Carriers, Inc., which operates the largest liquid bulk chemical trucking network in North America. “It’s a boom-and-bust business. Right now, oil prices are up, and business is booming.”

In addition, some of the chemical plants taken offline when a mammoth winter storm struck Texas in February 2021 are still recovering. While companies are generally able to access products from other plants, they’re often located farther away. “All our customers are scrambling,” Strutz says.

Another challenge is that “rates for hazardous material or tanker endorsed shipments skyrocketed 60 to 70% during much of 2021 and early 2022,” Braun says. “Supply chain volatility continues, and recently costs on the spot market have declined.”

The fragmentation of the U.S. trucking sector became even more pronounced during the pandemic, as many drivers left their fleets to start their own small businesses.

However, if diesel prices remain high while spot rates fall, the newer entrants likely will struggle. “If small owner-operators don’t know how to handle these shifts, there may be a bigger swath of bankruptcies,” Braun says. That could mean even less capacity.

Indeed, the rate of loads tendered and then rejected reached as high as 25% during 2021 and early 2022, Braun estimates. Some shippers are charged detention fees because their containers are stalled at the ports, even though they have little control over the delays.

Shippers are not the only ones penalized. “Drivers make money only when their wheels are turning,” says Curt Gonya, senior vice president, chemical and specialty products logistics with KAG Logistics. Drivers who suspect they might be delayed with one load are increasingly willing to find other loads to move.

LEVERAGING TECHNOLOGY

Challenges notwithstanding, the market for chemical logistics providers is forecast to grow by nearly 4% annually between 2020 and 2027, when it’s estimated to top \$322 billion, according to Allied Market Research.

Technology is proving key in chemical logistics. “Capacity management and visibility solutions are critical,” Gonya says. Chemical logistics providers increasingly need to offer technical tools that boost shippers’ ability to access capacity and monitor their shipments throughout their order lifecycles.

Through features such as collision avoidance and lane control, technology also has helped improve safety. “While not unique to chemical logistics, it’s



The market for chemical logistics providers is forecast to grow by nearly 4% annually between 2020 and 2027, when it’s estimated to top \$322 billion, according to Allied Market Research.

one of the biggest positive impacts of technology,” Strutz says.

Over the next several years, artificial intelligence solutions that can track goods coming from outside a country at the container level and provide live updates will become more mainstream, says Scott Buber, director, operations and chemical division with WSI Supply Chain Solutions.

Restructuring jobs through technology also is proving key to attracting and retaining employees. For instance, in addition to boosting pay scales and offering hiring incentives and bonuses, WSI has largely automated how it schedules trucks, Buber says. Carriers and other logistics partners can log in and edit their schedules if, say, a driver is delayed.

“The providers can manage this themselves versus coordinating through someone else,” he adds.

INTERMODAL AS A SOLUTION

Another tool to blunt the impact of the driver and capacity shortage is greater use of intermodal transportation.

“Moving products on domestic rail versus over-the-road allows shippers to reduce their dependence on drivers and other non-controllable factors,” says Robert Boyle, business unit leader with Odyssey Enterprise Managed Services, a unit of Odyssey Logistics.

During Q1 2022, railroads moved more chemicals than in any other quarter in history, according to the American Association of Railroads.

This is particularly true with long-haul shipments, as more drivers leverage high demand for their services to choose routes that allow them to return home most evenings, says Diane Lyons, vice president, sales, with Odyssey Tank Intermodal. Shifting portions of trips to intermodal helps address this, as rail transportation generally requires fewer employees.

Along with potentially moving to more intermodal tanks versus traditional drums or totes, some suppliers and end users source more regionally as opposed to globally, Miles says.

This approach requires rationalizing a company’s logistics networks, reevaluating just-in-time inventory strategies, and placing even more emphasis on real-time shipment tracking to understand delivery risks. “At the same time, this creates a ton of benefit by avoiding trans-Pacific logistics challenges,” Boyle says.

BECOMING A SHIPPER OF CHOICE

Shippers looking for ways to secure capacity will want to take steps to become shippers of choice. “For the first time we see situations where money does not buy a shipper’s way out of the situation,” Boyle says.

While rates remain important, solid forecasting; the reliability and/or repeatability of lanes; good site behavior, such as few or no delays; and predictable shipper behaviors are all essential to enabling shippers to address capacity challenges.



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Another development—driverless trucks—has generated a great deal of buzz over the past few years. While it may be a way to expand final-mile capacity, it's unlikely to make a dent in the hazardous chemical world.

“Driverless trucks are not something that will be on the forefront of solutions in the next four to five years,” says Joe Hassenfratz, sales and marketing manager with The Logistix Company.

What's more likely is a continued shift to alternative fuel trucks, such as fuel cells and electric vehicles. Most companies, no matter where they're located, face pressure to reduce carbon emissions in quantifiable numbers. “Everyone wants to get ahead of this before any sort of fees, taxes, or regulations are levied,” Hassenfratz says.

Longer term, all decision makers who can make a positive impact on the U.S. supply chain must work together to make it easier to do business by improving the responsiveness and resiliency of the entire transportation network, Gonya says.

While many reasons account for the poor condition of much of the U.S. infrastructure, a key one is the gap between election cycles and investments.

“Election cycles are short, and infrastructure investments are long-term,” says David Vieira, chief executive

officer with CLX Logistics, LLC. “Untangling the current logistics challenges isn't simple.”

Many logistics providers, however, are taking steps to meet these challenges and ensure their clients' products move safely, securely, and on time. “There's great demand for creative solutions,” Vieira adds.

The chemical logistics providers highlighted here offer a range of creative solutions.

CLX LOGISTICS: CONFIGURABLE SOLUTIONS

Quality people, processes, and technology are key to the success of CLX Logistics. “With these three elements, we make solutions happen,” Vieira says.

CLX's technology stack is focused on chemical shippers. “It's configured for chemical shippers and can handle the constraints they face,” Vieira says.

For example, the CLX TMS (transportation management system) is the only globally deployed, enterprise-scale, software-as-a-service TMS with a focus on chemical products.

The TMS covers all regions and modes, and allows chemical shippers to plan, execute, and optimize their transportation operations, ensure delivery performance, and comply with

regulations. Deployed in more than 60 chemical industry implementations, the CLX TMS offers shippers visibility and control over their day-to-day transportation operations.

Shippers can identify outliers and potential problems that require attention, and more easily manage and optimize logistics operations on any mode and region. With the TMS, shippers also can calculate the carbon impact of their shipments.

Another solution, CLX Gravity, offers advanced analytic management capabilities that can help shippers gain supply chain visibility to drive improvement, optimize spend, and reduce risk. The tool accomplishes this by pulling data from the TMS as well as other information systems.

For example, with this solution, a vice president of supply chain can access a dashboard that identifies all sites that have shipped products, and also monitor the progress of those shipments. “It's infinitely configurable,” Vieira says.

FOCUS ON INTERMODAL

CLX's focus on and experience with intermodal transportation is another way it stands apart. The company is the largest intermodal transport company and provider of domestic, door-to-door, intermodal transportation service for the bulk liquid chemical market.

Not only does this help shippers mitigate the truck driver shortage, but it also can slash transportation costs by up to 30%, when compared to domestic tank truck shipments of hazardous and non-hazardous chemicals.

The Managed Transportation solution CLX offers is a robust suite of à la carte solutions that chemical shippers can customize and adjust on demand, according to their requirements. The solutions include capacity management, brokerage, intermodal services, Gartner-recognized freight rate benchmarks and bids, carrier negotiation, rail fleet management, and detailed reporting.

By leveraging these solutions, shippers can lower costs, improve service, and fill in any gaps in their knowledge



CLX Logistics offers a cost-effective BulkTainer service, which uses a combination of truck and rail to deliver shipments via ISO tank.

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*Compared to OTR

with a proven team specializing in the chemical industry.

As an example, CLX worked with a company that produces chemical pigments in Mississippi and ships them via rail to transload locations in the northeastern United States, where they're moved to trucks and delivered to customers. CLX and the company collaborated to help book, schedule, and manage bulk tanker operations in the Northeast. The result? Streamlined, more efficient processes and reduced costs.

While technology is key, so are the people that make up CLX, Vieira says. Their industry expertise and knowledge of the myriad regulations that govern the transportation of chemicals set them apart. They can help shippers optimize their spending on chemical shipments, while also ensuring they comply with the relevant regulations.

"Our employees know how to handle the freight, they know the opportunities, and they can maximize cost and performance," Vieira says.

KAG LOGISTICS: PURPOSE-BUILT TECHNOLOGY

A subsidiary of The Kenan Advantage Group, Inc., KAG Logistics is a leading tank truck transporter and logistics provider across North America. KAG Logistics provides industry-leading transportation management solutions and value-added logistics services designed for the chemicals, energy, specialty products, food, and merchant gas supply chains across North America.

"We were one of the first managed transportation and logistics providers in the chemical space," says Curt Gonya, senior vice president, chemical and specialty products logistics with KAG Logistics. Supported by KAG's resources, KAG Logistics has the capacity to grow, invest in infrastructure, and remain a leader, he adds.

Among other services, KAG Logistics offers multimodal transportation, carrier management, procurement, emergency fuels delivery, enhanced tracking and alerts, fuel management with best-buy sourcing, and inventory



KAG Logistics provides transportation management solutions and value-added logistics services designed for the chemicals, energy, specialty products, food, and merchant gas supply chains across North America. Its carrier management team has deep experience in multiple modes.

optimization and management.

When working with its customers, no matter their size, KAG Logistics can scale to meet their needs. "Because of our size and growth, we've been able to invest in technology and build a strong stable of logistics experts with a deep understanding of the chemical industry," Gonya says.

KAG Logistics has also established a robust carrier management team with deep experience in multiple modes, Gonya says. Ongoing communication strengthens the commitment between KAG Logistics and its carrier partners, allowing the carriers to operate with maximum performance and efficiency within their desired network. A dedicated logistics team and a 24/7/365 logistics operations center offer additional support.

"Best-in-class technology solutions are core to the KAG Logistics solution set," Gonya says. One such solution is KAG Logistics Optimate TMS, which offers both capacity management and visibility, selecting the best mode, equipment, and contract to safely and cost-effectively transport shipments.

KAG Logistics' shipment execution technology enables optimal routing and contract compliance while meeting customers' business rules and contract requirements.

Recognizing each customer has a unique set of transportation needs and requirements, KAG Logistics ensures its technology "is purpose built to every customer's specifications," Gonya says.

Because the technology is based on a cloud computing architecture, it delivers exceptional performance and simplicity that allow straightforward and rapid implementations.

ENABLING IMPROVEMENTS

When working with a large chemical shipper, KAG Logistics leveraged its solution set to view the sales and operations-planning side of the company's supply chain and react quickly to potential challenges. The customer drastically improved its transportation cycle time and KAG Logistics earned a global supplier award for its technology, proactive communication, and capacity management ability.

Looking ahead, data and technology will remain core to KAG Logistics' support of its chemical customers. "Data allows a deeper understanding of events, so customers can proactively confront the continuing pressures they face throughout their supply chains," Gonya says. "Our data and technology enable chemical shippers to pivot and make better decisions."

ODYSSEY LOGISTICS & TECHNOLOGY CORPORATION: EMPOWERING AGILITY

With its origin in chemical logistics, Odyssey's team has developed a level of expertise that sets it apart.

"Our customers can tap into the knowledge base we've developed over our decades of experience," says



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As a leading provider of bulk intermodal services across North America, Odyssey provides ISO tanks that utilize an extensive rail network for the long-haul portions of domestic shipments. This helps address the cost, capacity, and sustainability challenges of shipping bulk over long distances.

Diane Lyons, vice president, sales, with Odyssey Tank Intermodal.

Odyssey, a multimodal logistics provider, has worked through numerous and wide-ranging challenges. It continually monitors the laws governing the transportation of hazardous and non-hazardous products, and can rely on its extensive infrastructure and ability to ship products across transport modes. These resources allow it to help chemical shippers tackle whatever challenges they may confront.

Among other services, Odyssey offers 3PL, 4PL, domestic ISO, intermodal, asset and brokerage bulk tank transport, and international transportation management. Odyssey is certified by the American Chemistry Council as a Responsible Care partner company.

Through its fully outsourced solutions, Odyssey provides the ability to manage global chemical supply chains.

“We essentially take over the logistics function for a chemical manufacturer,” says Robert Boyle, business unit leader with Odyssey Enterprise Managed Services, a unit of Odyssey Logistics.

Along with handling the basic blocking and tackling of chemical logistics, Odyssey can tap into its multiple divisions to leverage a range of synergies. “We have the capacity to craft end-to-end logistics solutions,” Boyle adds.

The company’s logistics experts can apply their analytical skills to identify opportunities for greater efficiency and effectiveness and provide increased visibility and control.

Among other initiatives, the Odyssey team is dedicated to developing technology that allows shippers to quickly and automatically access capacity, and carriers to bid on lanes.

LEVERAGING THE NETWORK

As a leading provider of bulk intermodal services across North America, Odyssey’s chemical ISO tanks utilize an extensive rail network for the long-haul portions of domestic shipments. This helps address the cost, capacity, and sustainability challenges of shipping bulk over long distances.

Odyssey’s leadership team is evaluating a new service to use rail farther into Mexico. Currently, Odyssey typically rails to Laredo, Texas, and then trucks shipments from there. “Intermodal allows the existing driver pool to be more efficient by shifting the long-haul portion of the move to rail,” Lyons says.

On top of that, intermodal offers the unique ability to turn long-haul freight into more appealing local work for many truck drivers. “Intermodal can help play a part in attracting more drivers to the industry by changing the parameters of the shipments,” she adds.

Through its Cloverleaf Program, Odyssey helps clients address their Scope 3 sustainability reporting challenges and measure and optimize sustainability, service, and cost, Boyle says. The Cloverleaf Program, has also helped Odyssey to optimize nearly 1.2 billion miles to more sustainable modes and reduce yearly carbon dioxide

emissions by more than 489,000 tons in 2021, among other achievements.

Moving forward, Odyssey’s initiatives will be centered around two core aspects: market awareness and technology. Quick changes in market dynamics are to be expected in the future, Boyle notes.

Odyssey’s ability to respond to these changes in real time will be critical. To that end, Odyssey devotes a great deal of resources to helping customers determine how to spend their transportation budgets most effectively, while meeting their business requirements.

“Combining multimodal services with the ability to be technology-forward allows us to focus on our customers’ specific needs,” Lyons says. “We help them navigate current and future market challenges, while empowering a more agile supply chain.”

QUALITY CARRIERS: EXPERIENCE AND SCALE

Quality Carriers, a division of leading transportation supplier CSX Corporation, has designed new domestic intermodal ISO tanks that can offer a safe, efficient rail option for chemical shipments. Randy Strutz, president, notes that bulk chemical intermodal shipments haven’t gained much traction in the chemical industry in the United States.

“We designed the equipment to U.S. standards with U.S. fittings, ground level vapor recovery, and other features to make it easier for customers to switch to intermodal from over-the-road,” Strutz says.

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The newly designed tank, for which a patent is pending, is scheduled to hit the market in summer 2022. For deliveries, among other advances, it uses a slider chassis so that the rear valves are flush with the bumper, allowing for safer unloading.

“The tank provides a simple, safe, environmentally friendly conversion option for customers,” Strutz says.

LONG-TERM EXPERTISE

This advance is just one benefit of Quality’s long history in the chemical transportation industry. The company has been transporting goods and materials since 1913, when founder B. F. Leaman began delivering lime and milk in Lancaster County, Pennsylvania, from a single Pierce Arrow truck.

From that modest start, Quality Carriers, now based in Tampa, Florida, operates more than 2,500 trucks and 7,400 trailers, making it North America’s largest bulk tank trucking fleet. A network of more than 100 company-owned and affiliate terminals and facilities across the United States, Canada, and Mexico supports Quality’s drivers. “We have the scale to handle all business anywhere in North America,” Strutz says.

Quality Carriers and its employees bring to each customer and shipment



Through its global network, Rinchem safely handles more than 4 billion pounds of chemicals and gases each year. Chem-Star, a proprietary web-enabled warehousing and transportation management system, provides inventory visibility across Rinchem’s network of warehouses.

the experience they’ve gained from more than one century of delivering freight. That experience, along with Quality’s size, means it can handle almost every customer’s requirements and meet even extended surges in demand.

“We provide a lot of custom equipment solutions that other companies won’t touch,” Strutz says.

Another point of differentiation is the volume of chemical shipments Quality Carriers handles that require crossing the U.S.-Mexico border. “When transporting chemicals, these trips can be difficult to

navigate, but we have the experience to handle them,” Strutz says.

Quality Carriers is a registered SmartWay Transport Partner. Through this program, it’s committed to reducing its environmental footprint and advancing supply chain sustainability by measuring, benchmarking, and improving freight transportation efficiency.

RINCHEM COMPANY: END-TO-END SOLUTIONS

A global provider of chemical management solutions, Rinchem thrives when applying its expertise against the fiercest obstacles to create and manage safe and efficient supply chains for high-purity, pre-packaged chemicals, and gases.

“We want the most demanding and challenging customers and supply chains,” says Dustin Miles, vice president of global transportation. “We thrive on building end-to-end, custom solutions that tackle these challenges.”

Through its global network, Rinchem safely handles more than 4 billion pounds of chemicals and gases each year. It is a leader in end-to-end, cold-chain chemical management with operations in the United States, Israel, Ireland, South Korea, Malaysia, and Taiwan. Rinchem works to manage the entire supply chain process with full visibility, while many other companies must involve several partners to execute, Miles says.



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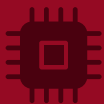


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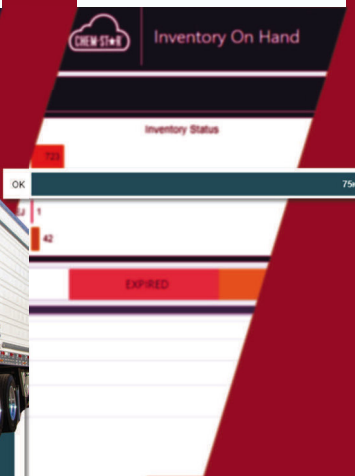
WAREHOUSING



TRANSPORTATION



TECHNOLOGY



Rinchem's diverse network of warehouses are temperature-controlled and comply with relevant hazardous materials regulations. In conjunction, its global fleet of more than 300 hazmat-trained drivers operates temperature-controlled trucks and trailers customized to handle hazardous materials.

As an owner of three trucking companies, Rinchem offers industry-leading pay and numerous regional, "pony express" routes so drivers can get home more often. This has been helpful in addressing some of the driver shortages, Miles says.

Chem-Star®, a proprietary web-enabled warehousing and transportation management system, provides inventory visibility across Rinchem's network of warehouses. "Our customers expressed the desire to track their freight," Miles says. "We listened to them and soon made technology advancements to develop our 'glass pipeline.'"

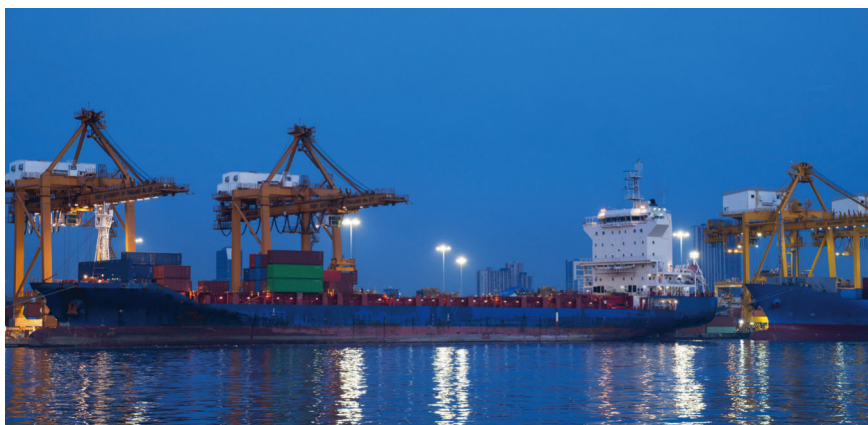
Chem-Star is available to Rinchem customers at any time and offers an expansive range of real-time inventory queries and reports.

Within its warehouses, Rinchem leverages radio frequency barcoding technology to improve receiving, picking speed, and accuracy. It also offers direct customer web access and eliminates human error caused by keystroke entries or misplaced documents.

INCREASING CAPACITY

In response to current supply chain challenges, Rinchem leverages its buying power with its preferred carriers and even chartered vessels to capture space and minimize the supply chain risk to its clients. "We've become more proactive and creative in adjusting to this new normal," Miles says.

Rinchem expanded its service capabilities by growing its asset fleet and acquiring two strategic trucking companies. Carolina Tank Lines specializes in refrigerated, dry van, hazmat, and pharmaceutical freight. Rinchem also purchased JS Transportation in Taiwan, the market leader for spec gas transport in the semiconductor industry.



TLC can handle complex chemical shipments, from soup to nuts. For example, it helped a company that was importing ISO tanks with customs approval and documentation. It also arranged drayage so the tanks could be moved from the Port of New York & New Jersey (pictured), transloaded into totes, and distributed to the end user.

These additions, plus Rinchem's established U.S.-based CGL Transportation and its global Rinchem Trucking fleets, provide increased capacity in full-truckload, less-than-truckload, final mile, temp-control LTL, refrigeration, hazardous, and bulk offerings.

Rinchem continues to enhance its service offerings, including intermodal tank yards in the United States, Asia, and Israel; it's also planning to offer these in Europe. Among other steps, and following customer requests for the service, it's evaluating the purchase of ISO tanks for chemical suppliers or semiconductor manufacturers. This would free them from the capital outlay and the maintenance these tanks require.

"We continue to expand through organic growth and acquisitions, and we're looking to increase our service offerings to best meet our customers' needs," Miles says.

THE LOGISTIX COMPANY: FROM SOUP TO NUTS

The members of The Logistix Company's (TLC) leadership team each bring at least 15 to 20 years of experience, says Joe Hassenfratz, sales and marketing manager. Their experience, along with the company's national network of carriers and service providers, enable TLC to provide a diverse suite of offerings.

Among other capabilities, TLC offers steaming and anti-freeze facilities, liquid bulk and less-than-truckload shipments, warehousing, international freight forwarding, customs clearing, and rail transit.

In addition to standard dry van shipments, TLC can arrange refrigerated, temperature-controlled shipments, international shipments, and blind/double-blind options.

"There's not a transportation lane or need with which we haven't had some partnership," Hassenfratz says. "We offer diverse capabilities paired with excellent customer service."

ASKING THE RIGHT QUESTIONS

TLC's expertise also means it knows the questions to ask to ensure it can properly handle complex chemical shipments. "We've dealt with a range of scenarios and lean on that experience to ask the right questions," Hassenfratz says.

For instance, before drivers can legally handle some shipments, they need specific documentation or classification. Similarly, transporting some liquid bulk chemicals requires specific equipment. TLC checks for all this, boosting safety and helping to avoid delays and potential fines.

For example, TLC had been working with a company that was importing ISO tanks. However, the company lacked the customs approval and documentation needed to move the tanks into the United States. TLC's legal team worked with the company to help it properly obtain the documents needed to gain customs approval.

That wasn't the end of TLC's role, however. Once the tanks made it to the United States, the company's customer couldn't accept them because it lacked the necessary equipment. TLC arranged



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drayage so the tanks could be moved from the Port of New York & New Jersey, transloaded into totes, and efficiently distributed to the end user. “From soup to nuts, we can provide solutions,” Hassenfratz says.

When it comes to transporting goods via ocean vessel or intermodal shipment (railroad), TLC’s decades of experience managing ISO and 20- or 40-foot shipping containers come into play.

Along with managing the movement of physical freight, TLC understands import/export processes, customs brokerage, shipment tracking, how to move goods in and around ports, and transloading, among other functions.

Through its years of logistics experience, TLC has been able to build a private fleet of carriers to transport freight across the nation and around the globe. These carriers are experienced and eager to grow and develop with TLC’s customer base.

As a result of the range of solutions it offers, its network of carriers and other business partners, and the quality service it provides, TLC has enjoyed outstanding growth over the past two years.

“We are looking to continue that,” Hassenfratz says. “Customers want to solve their supply chain needs and we can provide those solutions.”

TRINITY LOGISTICS: ONGOING, QUALITY SERVICE

Trinity Logistics is one of a few companies in the logistics arena with a largely female leadership team, many of whom started at entry-level jobs and then worked their way up. This approach, along with focus on its employees and business partners, helped Trinity recently reach \$1 billion in rolling 12-month revenue.

“That was a huge benchmark,” says Jennifer Braun, vice president of Kansas City operations with Trinity Logistics.

To celebrate and reward the employees who made this milestone possible, the company held several giveaways; among them were two cars.

As a unit of Burris Logistics Company, Trinity, which has been a Responsible Care Partner since 2009, can provide the resources and solutions required to meet the needs of any size customer and working in any transportation mode.

Among the services it offers are drayage, ISO, access to C-TPAT providers, pollution liability coverage, business intelligence and reporting, cybersecurity and emergency preparedness, and the technology to track and measure shipments.

“We take a customized approach to working with customers, and provide each one with a single point of contact,” Braun says.

Trinity brings more than 40 years of experience in shipping hazardous materials and complies with the Department of Transportation’s HM-232 Hazmat security plan regulations. Its industry-leading operating procedures help ensure safety, and the Trinity compliance team monitors carrier certificates to ensure its trucking companies and driver partners also comply with regulations.

Shippers benefit from Trinity’s market knowledge and ability to be nimble, quickly pivoting to ensure their costs decline when the market fluctuates downward, Braun notes.

OPTIMIZING VIA TECHNOLOGY

Technology is a core element of Trinity’s services. The Managed Services solution handles clients’ logistics functions, enabling these companies to gain control and visibility of their shipments. This solution can integrate with customers’ operating systems, minimizing the need for calls and emails to check the status of their shipments, no matter the mode.

The Managed Services solution also tracks every piece of information, such as package size and weight, on each shipment. It can even calculate the price per gallon to ship, for instance, from California to Texas, and then show how this varies by month.

The solution can provide this information in a continual feed. By leveraging this data, shippers can determine information such as their most frequently used lanes, while identifying ways to contain costs and enhance service. “With this information, we can help customers make optimal moves,” Braun says.

In one case, a global agricultural company leveraged Trinity’s Managed Services solution to improve on-time performance and cut costs. Based on several independent analyses, Trinity’s Managed Services solution consistently helps lower the company’s total freight expenditures to about 15% below prevailing market rates.

In addition, all customers, including



Trinity Logistics, which has been a Responsible Care partner since 2009, offers drayage, ISO, access to C-TPAT providers, pollution liability coverage, business intelligence and reporting, cybersecurity and emergency preparedness, and the technology to track and measure shipments.

Here to Help Your Chemical Business Succeed

Trinity Logistics is well-versed in the chemical industry and understands your complicated market. We have an expert Team available so you can find customized freight and technology solutions for your unique needs. We're here to help you gain efficiencies and data-driven insights into your logistics, allowing you to focus on your business' growth and success.



TRUCKLOAD



LTL



MANAGED SERVICES



INERMODAL



DRAYAGE



HAZMAT

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As a Responsible Care® Partner since 2009, we are committed to serving the chemical industry. Through our stringent carrier vetting and strongly built relationships, you can reduce your risk by knowing the carrier handling your freight is experienced, certified, and aware of current regulations.

Lets Connect

If you're ready to get a handle on your chemical logistics, then let's get connected.



those that aren't using Managed Services, can leverage Trinity's online portal to access information on shipments, quotes, payments, and place and track shipments they've placed with Trinity.

Along with its technology, the team at Trinity Logistics helps differentiate it and ensure shippers benefit from ongoing, quality service. Trinity recently added a vice president of digital strategy and a director of user experience, with a goal of ensuring all customer interactions are positive and productive.

Trinity continues to improve and expand, most recently adding a location in Scottsdale, Arizona. It also offers a network of about 120 agents.

"Trinity is constantly looking to improve, update, and revamp," Braun says. In doing so, they're helping customers optimize their transportation spend and service.

WSI SUPPLY CHAIN SOLUTIONS: ONE-STOP SOURCE

For more than 50 years, WSI has provided reliable, integrated third-party logistics. It is one of the largest privately held 3PL solutions providers in the country, with a family of companies that includes: Warehouse Specialists, LLC; Material Logistics & Services, LLC (MLS); Fulfillment Specialists of America, Inc. (FSA); American Warehouse, LLC; WSI Transportation, LLC; and WSI Freight Solutions.

WSI's Materials Logistics & Services (MLS) division offers a range of chemical logistics solutions, including transportation, warehousing and storage, distribution, sampling, blending, and packaging. The company can offer custom chemical packaging in virtually all forms and sizes, including drums, boxes, and bags. Its reliable and capable global transportation network includes intermodal shipping capabilities.

Because of the broad range of services it provides, chemical shippers can turn to WSI as a one-stop source for chemical logistics. In fact, WSI provides chemical logistics services for some of the top chemical companies worldwide. Its Material



WSI's Materials Logistics & Services division offers a range of chemical logistics solutions, including transportation, warehousing and storage, distribution, and packaging.

Logistics & Services, LLC division brings extensive experience in safely and efficiently handling hazardous and non-hazardous materials in accordance with environmental regulations.

WSI was one of the first 3PLs to earn Responsible Care Partner accreditation. "It's not just how we do things, but who we are," says Scott Buber, director, operations and chemical division. "In a specialized field, we planted our flag and said, 'This is who we are, and how we'll operate, communicate, document, ensure safety, and maintain our sites, day in and day out.'"

For instance, employees at all WSI sites know how to safely respond if they receive a leaking drum. They know the steps needed to eliminate the leak and ensure employees and nearby communities are safe.

In addition, WSI establishes partnerships with local regulatory agencies, like fire departments and planning commissions, and works with them to ensure safety across the communities in which they operate.

"That sets us apart," Buber says. WSI is working hard to dispel the sometimes inaccurate, often negative stereotypes

around chemical warehouses and operations, he adds.

In addition to its emphasis on safety, WSI works closely with clients to help them manage their chemical transportation spending as effectively as possible. For instance, one client's manufacturing plant was located about one mile from a WSI distribution facility. Yet, the client had been shipping its product, a polymer, about 50 miles away for processing, before returning it to the WSI facility.

WSI invested in the equipment needed to process the polymer, and constructed a clean processing area within the warehouse, complete with air filters to contain the dust produced. This enabled WSI to process, package, store, and distribute the product, eliminating the need for the product to travel for processing.

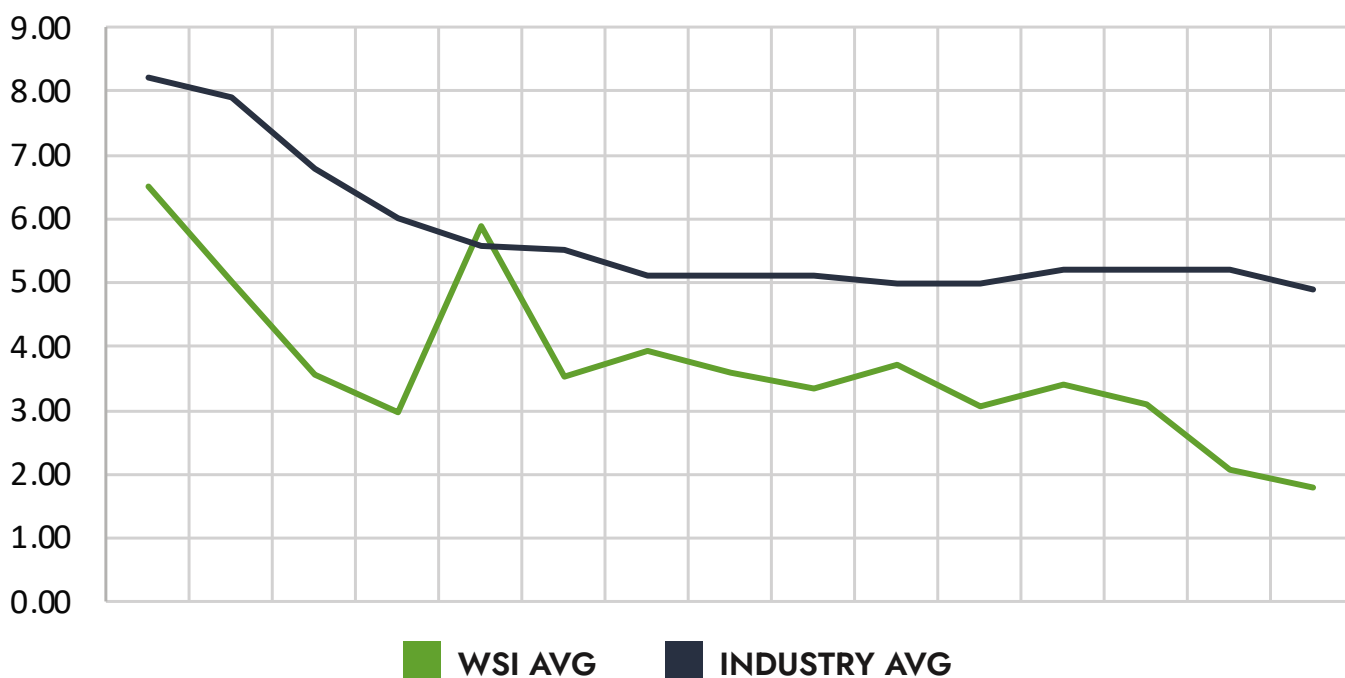
As a result, the company saves hundreds of thousands of dollars in transportation costs annually, while also cutting lead times and inventory levels.

"We look outside our own box," Buber says. "We ask customers how we can partner with them to boost their performance." ■



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GROCERY SHORTAGES: THE WORM IN THE APPLE



**Grocery shortages are spoiling 2022.
But food retailers can take a bite out of
the challenge through advance planning,
visibility, and a focus on supplier
relationships.**

By Helen Mann

It started with toilet paper. Spurred by the onset of the pandemic, consumers bought toilet paper rolls in droves.

Sales of the product rose 60% annually in March 2020, according to the Statista Consumer Market Outlook. On April 19, 2020, toilet paper was out of stock in nearly half of U.S. grocery stores, estimated NCSolutions, the North Carolina state consumer products data tracker.

At the time, empty store shelves were a symptom of changes in consumer behavior and drastic new demands on the food supply chain, explains Troy Prothero, senior vice president of product management, supply chain solutions at Symphony RetailAI. But in 2022, food products are once again harder to procure, and financial conditions and world events are to blame.

“In terms of supply shortages, the overall picture is pretty grim,” says Joan Driggs, vice president of thought leadership at IRI, a market research firm based in Chicago. “A 95% to 97% in-stock rate is typical. But the edibles category is below 90%.”

Product shortages have been a near constant throughout 2022, according to IRI’s CPG Supply Index, which tracks the availability of items throughout the United States. In April, food products averaged an 87% in-stock rate. The in-stock rate for items like refrigerated baked goods and energy drinks dipped into the low 80s, but no products were stocked at a rate higher than 92%.

Product shortages have been a worm in the apple for shippers who are trying to avert empty shelves.



A SMORGASBORD OF SHORTAGES

Shippers working to get products onto grocery store shelves have had to wrestle with an array of challenges in 2022. Shortages ranged from truck drivers to raw materials to shipping containers to plastics. Most of the imbalances aren't new, but they have converged to create ongoing headaches for anyone who works in food logistics.

One example is labor. The Great Resignation made headlines in 2021, but since then, many food manufacturers still haven't been able to retain enough manpower.

"Labor turnover is still high at the distribution and manufacturing levels, and that's driving a lack of productivity," says George Eversman, executive vice president of business development at Dot Foods, a foodservice redistribution company based in Mt. Sterling, Illinois. "Processing plants can't keep up with demand, especially in protein categories."

Even if companies are able to maintain an appropriate headcount, they may have to contend with a paucity of plastics and aluminum. Plastic resins, for example, were in short supply for 10 months straight in 2021, according to the Institute for Supply Management.

The shortages are undermining companies' ability to put products on store shelves.

"Constraining some of the manufacturing throughputs within that supply chain does not help," says Alex Hempel, senior director of the retail supply chain at Orbis Corporation, a reusable plastics and metals provider based in Oconomowoc, Wisconsin.



For instance, some shippers don't have adequate packaging to furnish sports drinks and bottled water products.

"The latest data says that shortages are trending up in water and sports drinks, largely driven by packaging," says Scott Shaw, consumer products supply chain lead at Durham, North Carolina-based Clarkston Consulting. "While the plastic is secondary to the product, it's driving the shortage right now."

GEOPOLITICS TAKES A BITE OUT OF AGRICULTURAL SUPPLY

Even shortages elsewhere in the world are impacting the domestic food supply. Take grains and oils, for example.

In a normal year, Russian and Ukrainian exports account for roughly one-quarter of the global wheat supply, and nearly three-quarters of the world's sunflower oil, according to the U.S. Department of Agriculture.

Wheat prices spiked by 40% following the conflict between Russia and Ukraine, shows data from the CME Group. From February to May 2022, the price of Hard Winter wheat rose from \$8 to \$11 per bushel.

Most U.S.-based companies don't source these commodities from Eastern Europe, but they still feel the effects of scarcity wrought by regional turmoil.

"More markets are competing for the same supply sources, which leads to a rise in costs," explains Dr. Madhav Durbha, vice president of supply chain strategy at Coupa, a business spend management platform based in San Mateo, California. "Companies are feeling an impact, whether they are sourcing specifically from a war-torn region or not."

THE PAIN OF GRAIN

On top of limiting the current supply, geopolitical tensions have even compromised the ability to produce grains. Russia typically supplies 23% of the world's ammonia and one-third of the world's natural gas, two of the primary ingredients in fertilizer, according to data from the Fertilizer Institute.

Regional hostility is reducing fertilizer exports, which could jeopardize crop yields and even trigger export bans.

"Russia has stopped most of its fertilizer exports, and Ukraine can't get many exports out," says Dr. Elliot Rabinovich, AVNET Professor of Supply Chain Management at Arizona State University Carey School of Business. "That could ripple throughout the world as more countries impose restrictions on their own agricultural exports."



U.S. companies, such as Dot Foods, that are working to get food products to grocery shelves are dealing with multiple supply chain challenges, including a shortage of warehouse labor.

VISIBILITY: A KEY INGREDIENT

Most, if not all, of the recent shocks have been impossible to foresee, explains Shaw. Instead of trying to predict disruptions companies should build resilience into their supply chains by maximizing visibility.

“The key is not so much to know every event that’s going on around the world,” he explains. “One year ago, nobody would have predicted that the Port of Shanghai would be in lockdown or that there would be a land war in Europe. You can’t predict what the next disruption is going to be.”

He recommends instead that companies be familiar enough with their sourcing to know what impact an unforeseen event could have. A food manufacturer, for example, needs to know where their brokers and suppliers source raw materials from and whether a product ships through an impacted area. Even if their sources aren’t directly impacted, shippers need to know how a shortage could reverberate back to them.

“Basically, know your supply chain,” Shaw says.

FUEL PRICES EAT INTO POCKETBOOKS

In 2022, shippers have had to contend with rising fuel costs while bringing food to grocery shelves. Diesel prices across the United States surged from \$3.61 per gallon in January, to a national average of \$5.51 at the beginning of May.

It’s driving up the cost of other food inputs according to *Russia-Ukraine Crisis and Its Impact on Food Prices*, Food Industry Association report.

As the report explains, gas prices will impact transportation costs in the short term. Further out, the growing cost of fuel could ratchet up the price of feed, fertilizer, and other products, with consumers feeling the impact weeks or months later.

“The food industry is very energy intensive in order to bring food to the shelf,” notes Doug Baker, vice president of industry relations at the Food Industry Association in Arlington, Virginia. “When energy becomes more expensive, that will immediately impact food.”



Using materials handling systems such as Orbis Corporation’s beverage can tower to transport and store unitized loads can help speed food distribution product flows.

The key to navigating high gas prices is to focus on maximizing transportation efficiency. Baker suggests backhauling or even sharing space with competitors and trading partners to ensure that trucks are full when they run. By avoiding deadhead miles and half-empty trailers, shippers can ensure an optimal use of fuel.

A second development aimed at improving efficiency is an e-bill of lading. A 2019 American Transportation Research Study showed that 49.5%

of drivers spent at least two hours in detention every time they arrived at a facility, while 9.3% reported waiting six hours or more to get loaded or have papers signed.

E-bills of lading could cut down on driver dwell time, and the fuel that gets used up in the process.

“Think of it like being at an airport,” Baker says. “There’s the TSA Precheck line. There’s the Clear line. Then there’s the line where everybody else goes who’s still doing it the old way, and that takes forever. The Precheck line goes a little faster, and the Clear line goes really fast.

“Our goal is to have these express lanes for trucks,” he adds. “We want to minimize the amount of wait time because while drivers wait, they’re burning fuel.”

RISING PRICES EGGS-ACERBATE CHANGES IN DEMAND

It doesn’t take an industry insider to see that food prices skyrocketed this year. The consumer price index for food accelerated from 7% annual growth in January 2022, to 8.8% expansion in March, finds The Bureau of Labor Statistics. The Department of Agriculture’s Economic Research Service expects the cost of food



consumed at home to grow between 5% and 6% in the full year of 2022.

“One factor that’s driving these shortages is inflation,” says Durbha. “Take eggs, for example. The animal feed cost has gone up by 50% or more, which traces back to grains, in part. Animal feed constitutes 60-70% of the cost to produce an egg.”

Inflation isn’t only raising the cost of inputs, it’s also nudging consumers to make different choices at the grocery store. Under these circumstances, businesses need to prepare for shifts in demand.

Companies can ameliorate these disruptions with robust demand forecasting and artificial intelligence, Prothero says. Traditional forecasting methods rely on historical consumption data, which can be useful—until an external event causes demand to drastically change. Artificial intelligence and machine learning can leverage large, complex data sets compared with statistical methods alone.

These technologies are designed to anticipate demand signals early, and give retailers more opportunity to work with suppliers to adjust procurement or replenishment accordingly.

A GOOD SUBSTITUTE

One concept that artificial intelligence can help to decipher is substitution. Inflation put a dent in demand for higher-priced products, leading consumers to seek out lower-priced alternatives.

“The major impact for consumer packaged goods is that rising prices suppress demand and impact revenue,” says Prothero. “Demand for fresh meat and produce is falling, and customers are switching to beans.”

Artificial intelligence can pull from a variety of data sources to glean insights into substitution decisions. Some of the results might not be intuitive, like a connection between the price of meat and demand for canned fruit.

There’s a lot of food for thought on keeping grocery stores stocked. ■



CLEAN UP ON AISLE SIX

Keeping aisles stocked means grocers are branching out to new products and suppliers. Retailers have become more willing to accommodate new brands, packaging, or different items altogether.

“A good example is chicken wings,” explains George Eversman, executive vice president of business development at Dot Foods. “Wings are in short supply, so retailers might try to offer more thigh or other dark meat products instead.”

Upstream, shippers can prepare to accommodate these changes in a few ways. One strategy is to concentrate on producing the SKUs that are highest in demand, and allocate supply to where products are most needed.

There are a few ways to slice this approach. For example, consumers might buy more over-the-counter allergy medicines in certain parts of the country. Shippers could map out where that need will be, and then prioritize supplying medications in those regions. Or leading up to a holiday, companies could limit SKUs to items that are needed for observances.

Admittedly, reducing the assortment of SKUs means fewer options to choose from, “But this is a way to ensure there are products on the shelf,” says Joan Driggs, vice president of thought leadership at IRI.

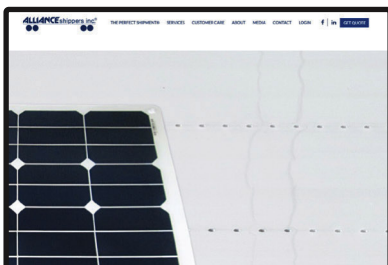
Food manufacturers could also expand their pool of ingredient suppliers. In the past, businesses may have had one or two sources of supply. More recently, it has become expedient to include a third or fourth option, in case a source experiences bottlenecks of their own.

Companies should establish relationships with new suppliers as early as possible to avoid getting lost in a sea of phone calls. “If you try to move to a tertiary source, and you haven’t already established that relationship, you’re stuck waiting in line,” warns Doug Baker, vice president of industry relations at the Food Industry Association. “You’re in a lobby, trying to be the tallest person while waiting to get called on.”

IN THIS SECTION:

3PLs

3PLs

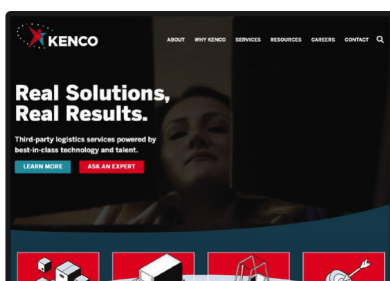
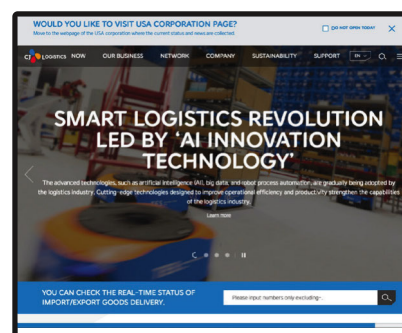


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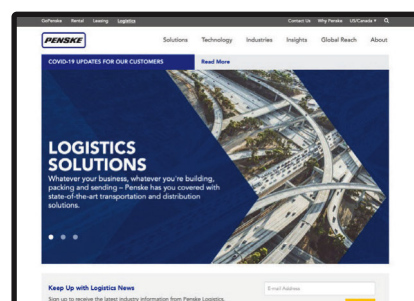


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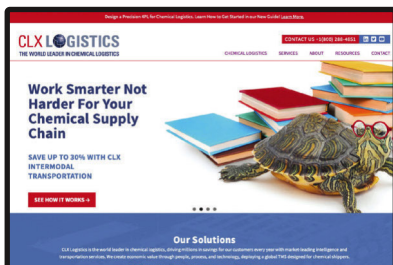
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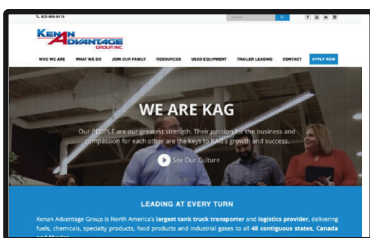
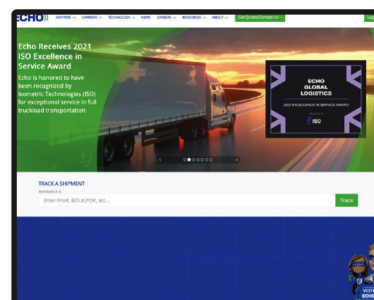
CHEMICAL LOGISTICS

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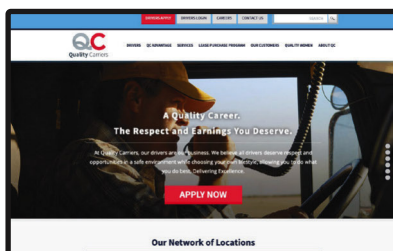
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Odyssey Logistics & Technology Corporation (Odyssey) combines deep industry expertise with leading technology to provide multimodal logistics management services to the chemical industry and other process manufacturers. Odyssey enables clients to outsource any part of their logistics processes to achieve savings through reduced transportation and infrastructure costs, measurable customer service and process improvements, and improved data quality and management. Odyssey is a leader in intermodal with expertise in liquid food, chemicals, and metals transport.



IN THIS SECTION: Chemical Logistics

CHEMICAL LOGISTICS

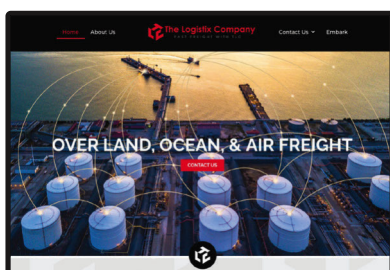
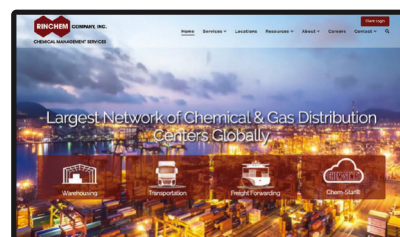


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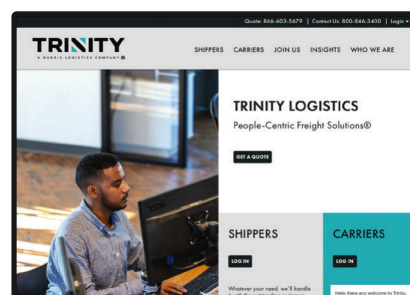


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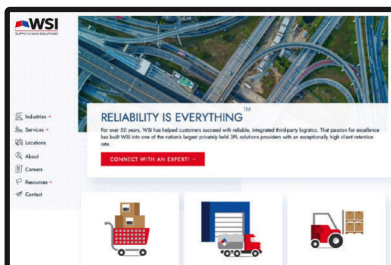
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IN THIS SECTION:

Chemical Logistics

CHEMICAL LOGISTICS

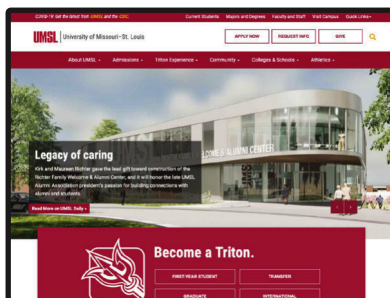
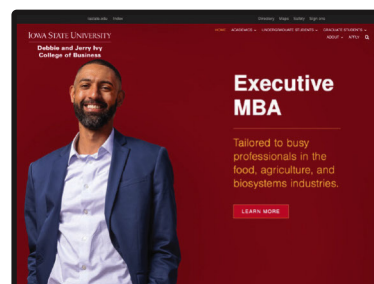
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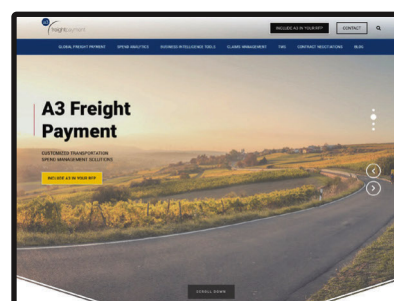
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The Master of Science in Supply Chain Analytics program at the University of Missouri-St. Louis is designed to meet the current and future demand for professionals in the broad fields of supply chain management and business analytics. Bridge the gap between a pure data scientist and a supply chain domain expert to become an advanced data analytics professional or data professional who wants to implement machine learning technology.

FREIGHT PAYMENT/AUDIT SERVICES

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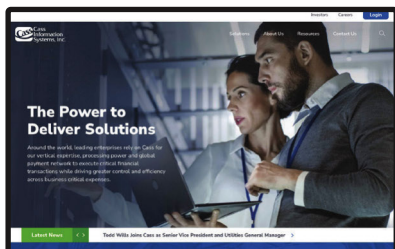
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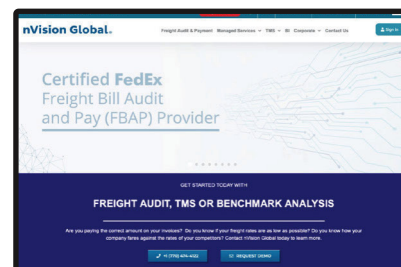


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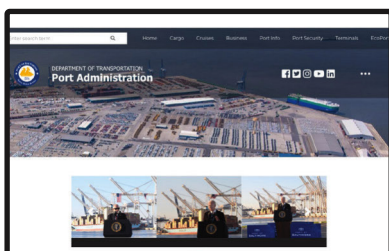
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PORTS



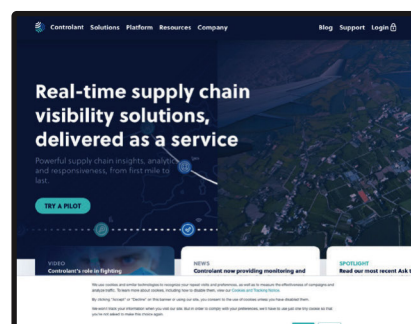
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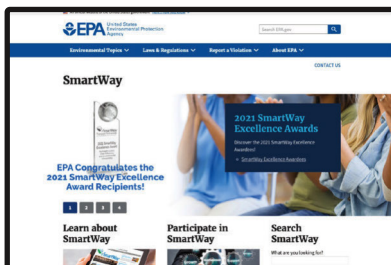
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Sustainability - White Glove

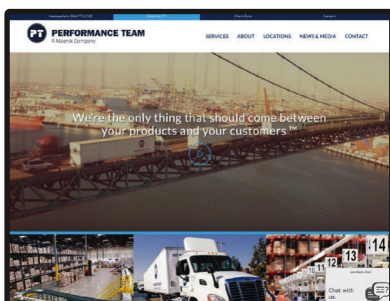
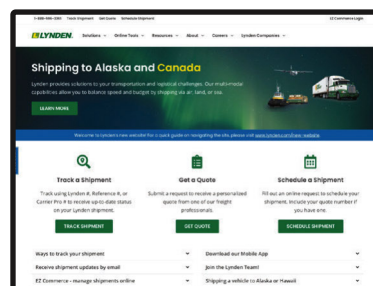
SUSTAINABILITY

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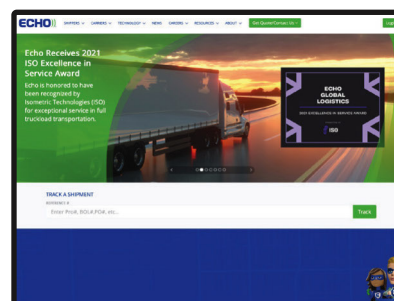
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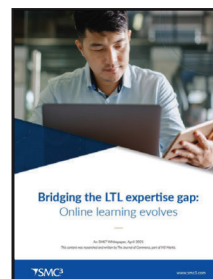


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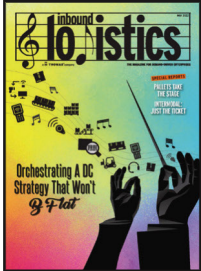
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In *Inbound Logistics*' latest digital edition, you'll get the distribution center strategies you need to sharpen your supply chain and discover seven automation and materials handling innovations addressing e-commerce growth and labor challenges. Also check out TMS must-haves, and more industry news to advance your business goals.

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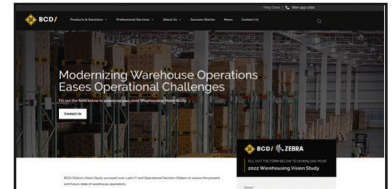


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Automation technology has come a long way in recent years, and is now more effective, accessible, and scalable than ever before. Automation is the only viable option for companies looking to address labor shortages and optimize their operations. See how leasing robots can reduce costs, improve staff retention, and increase efficiency by downloading this whitepaper by Vecna Robotics.

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MODERNIZING WAREHOUSE OPERATIONS EASES OPERATIONAL CHALLENGES

Offered by Bar Code Direct

Bar Code Direct asked 1,403 IT and operational decision makers from manufacturing, transportation, logistics, retail, post and parcel delivery, and wholesale distribution industries for their insights on strategies for modernizing their warehouses, distribution centers and fulfillment centers from 2019-2024. See this extensive report on the best way to adapt and succeed in this new reality of global supply chain disruptions.

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PODCAST



David Ross

INDUSTRY OUTLOOK: DRAWING COLLABORATION FROM CHAOS

Businesses continue to look for the right mix of strategies and investments to keep their supply chains on track—but how can they better focus their efforts? Technology that works for one company won't necessarily work for another, so is it as simple as finding the right partners to work toward a common goal? David Ross, Chief Strategy Officer for Ascent, paints a picture of where the industry is headed.

bit.ly/asnt522PD

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INBRIEF

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>TRANSPORTATION



> The **Lufthansa Group** is expanding the capacity of Lufthansa Cargo's freighter fleet. The airline has ordered a total of 10 freighters, including three Boeing 777F freighters and seven 777-8F freighters (*pictured*). Boeing's next-generation aircraft lowers fuel consumption and has 17% more cargo volume compared to the 777F.

> **Air France-KLM Group** and the **CMA CGM Group** will combine their air cargo networks, freighter capacity, and dedicated services. The agreement has an initial duration of 10 years and encompasses the full-freighter aircraft capacity of the airlines consisting initially of a fleet of 10 full-freighter aircraft, and an additional combined 12 aircraft on order. The partnership also covers Air France-KLM's belly aircraft capacity, including more than 160 long-haul aircraft.

> **Samskip** increased rail freight capacity between Duisburg in Germany and Katrineholm in Sweden by 33%, following an agreement with TX Logistik to launch

> **UWL**, an NVOCC and 3PL, contracted with Swire Shipping, a multipurpose liner service, to launch a Vietnam-to-U.S. express service, departing from Ho Chi Minh City and arriving at the Port of Seattle (*pictured*) in 18 days. The bi-weekly service offers priority berthing at both origin and destination, and a dedicated equipment pool.



a new multimodal service connecting Germany's Ruhr region and the greater Stockholm area. The launch also increases overall service frequency between Samskip's Duisburg rail hub and Katrineholm, south-west of Stockholm, to eight trains weekly.

>SERVICES

> **a2b Fulfillment** opened a 260,000+-square-foot facility in northeastern Pennsylvania in Hanover Township near Wilkes-Barre. The new site utilizes a very-narrow-aisle racking configuration with wire-guided materials handling equipment. The facility offers a capacity of approximately 15,000 pallet positions and 25,000 forward-pick locations.

> **Woodland Group** expanded its warehouse and fulfillment center in Chicago to provide transloading and omnichannel supply chain solutions.

> **Saddle Creek Logistics Services** built a distribution center in Las Vegas, Nevada. Set to open in August 2022, the facility will meet new and current clients' needs. Located west of Interstate 15, the building has 36-foot clear heights and can be built out to suit client specifications.



> **APM Terminals Mobile** signed an agreement with the Alabama State Port Authority to add 32 acres to the current 134-acre container terminal yard. The added space creates one million TEUs of throughput capacity that is approved to handle 14,000-TEU ships.

> **AxleHire**, which provides e-commerce companies with expedited, urban same-day/next-day deliveries, expanded into the Washington D.C. and Baltimore markets. The company utilizes routing algorithms to optimize delivery routes to save time, miles, fuel, and ultimately CO2 emissions.

> **Logistics Plus** opened a 542,000-square-foot warehouse in Phoenix, Arizona, located adjacent

to the Luke Air Force Base. The new site provides warehousing for West Coast imports and exports and Southwest storage needs.

> **Omni Logistics** opened facilities in San Francisco, Philadelphia, and Phoenix. The new cross-dock, warehouse, and office facilities are located near transportation gateways.

> **Performance Team-A Maersk Company** is increasing its cold chain capacity by opening a new cold storage facility in Dayton, New Jersey, in October 2022. The Dayton facility is close to the container port at Elizabeth, New Jersey, and features 167,812 square feet of space with 13,000 rack positions, 30 dock doors, refrigerated dock, 24-hour monitoring, and a back-up generator.

leverages machine learning to gain insights from internal and external data.

>PRODUCTS

> Protective packaging provider **Storopack** now offers AIRplus Void Recycle, a polyethylene air pillow film that consists of at least 50% post-consumer recycled material.

> **Sitma Machinery's** new e-commerce wrapper machine is designed to meet the e-commerce sector's packaging and documentation needs (e.g. invoices, delivery notes, and return labels). Users can integrate the E-Wrap unit into different production settings and combine it with units for labeling and weighing.



> Manual push stackers from **Presto Lifts** are designed for light industrial, warehousing, and retail back-room applications. They can be configured with manual or powered lift. M-Series units have either a foot- or hand-

actuated pump to raise and lower loads with no electrical power. B-Series models utilize onboard battery power for lifting and lowering.

>TECHNOLOGY

> Shippers can use the DockMaster scheduling tool from **IntelliTrans** to schedule pickups and deliveries by their selected carriers, routing them to a pre-assigned loading or unloading dock door. DockMaster is a SaaS-based application that provides real-time visibility to make scheduling dock appointments easier.

> **Kinaxis** offers advanced supply chain analytics with Planning.AI, part of the Kinaxis RapidResponse platform, which uses multiple analytical approaches to solve supply chain challenges. For demand planning, Planning.AI



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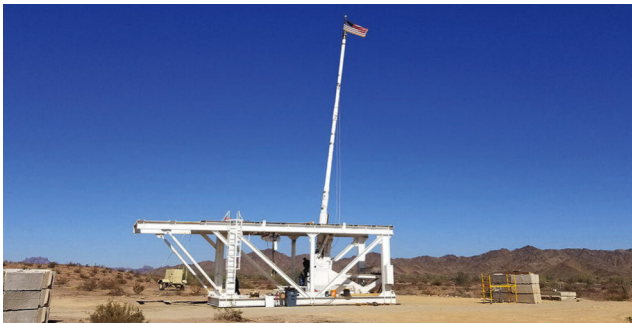
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BEYOND DRONES: AIR ODDITIES

Everyone wants their goods delivered at breakneck speed, but what happens when those goods need to reach treacherous locations quickly? Here are some innovative air supply chain breakthroughs that might fit the bill.

Vehicle name: Green Launch Light-Gas Vertical Artillery Cannon
Passengers/Crew: none
Payload capacity: unknown, but small
Top Speed: Mach 3 (2,300+ mph)
Application: Satellite payloads, small space cargo

If scaled, this explosive transport method could reduce the cost and carbon footprint of small satellite launches.



Vehicle name: Boeing 747-8 Freighter
Passengers/Crew: 2 minimum
Payload capacity: 308,000 lbs.
Top Speed: 650 mph
Application: Long-haul air cargo, special cargo, general cargo

A true workhorse of the air supply chain, the fleet of Boeing 747-8 freighters across various carriers has accumulated more than 500,000 flight hours and 88,000 flight cycles to date.



Vehicle name: CH-54A Sikorsky Skycrane
Passengers/Crew: 3
Payload capacity: 20,000 lbs
Top Speed: 150 mph
Application: Firefighting, heavy air cargo, special air crane operations

This sky-crane can drop a 10-ton payload just about anywhere, allowing the supply chain to reach otherwise remote areas of industry.



Vehicle name: Aero Spacelines Super Guppy
Passengers/Crew: 4
Payload capacity: 54,500 lbs.
Top Speed: 290 mph
Application: Oversized cargo transport

The Super Guppy exclusively hauls outside cargo, such as other plane/aerospace components, significantly reducing shipping time when compared to land or sea alternatives.



Sources:

- Interesting Engineering
- NASA
- Siller Helicopters Inc.
- Aerospace Technology



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