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TRACKING
CRITICAL MINERALS
ACROSS THE
GLOBAL SUPPLY CHAIN





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Tracking Critical Minerals Across the Global Supply Chain

Electronics buyers need reliable sourcing information, but fragmented tracking systems and inconsistent data still make end-to-end tracking difficult.

Being able to track and trace extracted minerals from mine sites all the way through to processing and final production hasn't gotten much easier in the last decade. Even with the rapid advancements in technology and software, the level of visibility in the electronics supply chain remains opaque at best and in some cases, non-existent.

"Amid rising risks linked to the high concentration of critical mineral supply chains, the ability to track where minerals originate, how they move through supply chains, who has custody of them and how they are transformed is increasingly important for policymakers seeking to create diversified and responsible supply chains," the International Energy Agency (IEA) points out in [Critical Mineral Traceability for Energy and Economic Security](#).

In that report, IEA focuses on six key minerals: copper, lithium, nickel, cobalt, graphite and rare earth elements. These minerals play an important role in energy and strategic industrial applications, it says, and traceability system adoption remains "relatively high," but depth and end-to-end coverage are both limited.

"Nearly all companies with traceability systems report collecting country of origin data, while more detailed provenance information is less widely covered," the IEA says, "while corporate transparency or environmental data [being] collected at around half [that] rate. End-to-end traceability nevertheless remains limited, with coverage typically dropping sharply beyond companies' direct suppliers."

High Demand, Low Visibility

With demand for critical minerals at record-high levels right now, the Organisation for Economic Co-operation and Development (OECD) just released [new guidance](#) focused on boosting mineral supply chain credibility. Traceability should be a core focus, it says, and that traceability needs to be rooted in reliable supply chain data.

"Price floors and similar trade-related measures need verified information on origin and production conditions to direct support toward trusted and responsible producers," OECD points out in its [report](#). "Stockpiling programs need provenance, grade and ownership data for acquired commodities. Finally, preferential procurement initiatives require chain of custody data to exclude entities of concern."

Put simply, you have to know where the material came from, how it was produced and who touched it along the way. Otherwise, you won't know who should qualify for support, what belongs in a government or industry stockpile (i.e., a reserve kept on hand for shortages or disruptions) or which suppliers should be excluded.

In electronics, for example, procurement teams need to know where materials came from, who handled them and which suppliers may fall outside government or procurement requirements. The problem is that this information isn't always readily accessible. And even if it is, that data may be spread across different systems, platforms and even spreadsheets.

Managing Global Traceability

The global nature of the electronics supply chain makes traceability especially difficult and complicated. A mineral that's mined in one country may be processed in another and then turned into a component in a completely different area of the world. Every handoff adds another way for sourcing data to get lost, delayed or disconnected from the material itself.

"There are substantial barriers to the uptake of traceability," says the OECD, whose research shows that over 50% of companies point to costs and lack of interoperability as the key barriers to setting up traceability systems. Confidentiality concerns, supplier leverage and data quality concerns also factor in here. "Half of [our] survey respondents rank regulatory consistency as the top priority for scaling traceability," it says, "with a similar share citing shared data infrastructure."

Despite these challenges, OECD says industry adoption of traceability is increasing and that nearly 75% of organizations plan to increase investment in traceability, but most of them say it's still too early to identify any tangible benefits. "Cost, interoperability and fragmented regulation are the principal barriers," it notes. "This represents a window for policy action, in which targeted intervention can shape how traceability systems develop before they consolidate around incompatible standards."

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August Supply Chain Roundup: Tariffs, Chip Shortages and Zero Waste

A renewed U.S.-Canada trade fight, worsening component shortages and major moves from UPS and Best Buy shaped last month's supply chain news.

The month of August brought a new crop of supply chain news and events, some of which were global in nature (e.g., the reignited U.S.-Canadian trade war) and others were focused on individual companies, including UPS' supply chain business investment and retailer Best Buy hitting its zero waste goals.



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U.S. Logistics Sector Expands at a Slower Pace in August

Latest Logistics Manager’s Index points to slower overall growth plus rising transportation prices, inventory costs and warehouse expenses.

As we head into the fourth quarter, transportation capacity is contracting, warehouse utilization is dropping and transportation costs are going up. These are some of the key findings from the latest Logistics Manager’s Index (LMI), which reveals a national logistics sector that’s expanding in some areas and contracting in others.

A survey of director-level and above supply chain executives, the LMI measures logistics industry activity based on eight different components: inventory levels, inventory costs, warehousing capacity, transportation utilization, warehousing utilization, warehousing prices, transportation capacity and transportation prices.

“Essentially, this month’s report paints a picture of logistics costs that seem to be rapidly increasing no matter what the underlying situation is,” Analyst Zac Rogers, Ph.D.,

points out in the report. “The major difference between August and readings from earlier this summer is that expansion in inventories has slowed, but logistics cost expansion remains high.”

Key Report Findings

Researchers at Arizona State University, Colorado State University, Rutgers University, the University of Nevada, Reno and Florida Atlantic University use a diffusion index to calculate the number. The August LMI came in at 66.6, down by 2.2 from July’s reading of 68.9 and 4.4 points lower than the recent four-year peak of 71.1 recorded in June. A reading above 50 signals expansion; below 50 signals contraction.

At the current 66.6 reading, logistics activity is still growing, but just at a slower pace than it did in June and July. Here are some of the other key August trends tracked on the LMI:

- Despite the slowdown in inventory levels, expansion in inventory costs were up (+1.6) to 78.6, which is their second-fastest rate of expansion in 12 months.
- Inventory cost expansion is now outstripping the growth rate in inventory levels by 25.8 points, which is nearly double the average delta of 13.1 points between these two metrics.
- Warehousing capacity moved up (+7.2) into expansion at 53.5 and warehousing prices continue to expand at 75.0, “which represents a very robust rate of growth,” Rogers points out.
- Transportation capacity is contracting at 40.0, but at a slower rate (+11.6) than July’s 28.4 (the second-lowest reading ever for any LMI metric).
- Transportation price expansion is up (+3.1) to 90.0, making it four out of the last five months that this metric has expanded at 90.0 or above, “which is quite rare for a scale that only goes up to 100.0,” Rogers adds.

Drilling down on inventory, transportation and warehousing costs, which run on a 0-300 scale (with 150 being breakeven level), average cost expansion from January 2024 to March 2025 was 193.8. Rogers says aggregate costs rose after the start of the conflict between the U.S. and Iran in late-February, and that aggregate logistics costs from March to August averaged 241.9.

“Generally, aggregate costs exceeding 240.0 have led to increased levels of supply-driven inflation,” Rogers explains, noting that the San Francisco Federal Reserve’s breakout of the sources of inflation points to increased supply-driven inflation (outstripping inflation from demand) in July. These higher costs are putting significant pressure on supply chains and end consumers, who are particularly concerned about issues like the price of gas, future business conditions and inflation.

What’s Coming Next?

Essentially, Rogers says inventories have continually gotten more expensive on a relative basis over the last year and a half. This has increased the cost load throughout supply chains and seems to be impacting consumers (consumer spending dropped 0.6% in July). “Beyond the slowdown in spending, it seems that the composition of that spending has shifted as well with some cheaper goods showing growth, and more expensive items slowing down,” Rogers notes.

Looking ahead, survey respondents also predicted movement in the overall LMI and individual metrics 12 months from now. The overall index prediction came in at 69.6 in August, down slightly (–0.9) from July’s future prediction of 70.5 and only a point lower than June’s future prediction of 70.6, according to Rogers, who says this “marks a notable run of consistency in predictions.”

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Moving Beyond Risk: Agility as a Growth Lever - Wired to Procure

This video covers the four main disciplines of agile procurement: measuring launch enablement, building flexibility, removing quote-to-order friction, and choosing NPI-focused partners like Mouser. Better agility helps teams design smarter, launch faster, and grow revenue.



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Using Geothermal Energy To Support Data Center Growth

A new Fervo-Google deal puts geothermal energy in the spotlight as it promises to power energy-hungry data centers without adding more strain to the national electric grid.

As the argument over whether or not to continue the massive buildout of data centers in the U.S. continues, some organizations are finding alternative means of powering up these facilities without as much negative impact on the nation's energy grid. Geothermal energy is one area of interest because it can provide a steady source of power for facilities that operate around the clock.

What is Geothermal Energy?

We're all used to flicking a switch to turn on the lights using electricity generated from the grid, solar panels or a combination of the two. Geothermal energy is different. It's literally the heat from Earth and it's generated by reservoirs of hot water (either natural or manmade) at varying temperatures and depths below the earth's surface.

According to the [U.S. Department of Energy](#), wells ranging from a few feet to several miles deep can be drilled into underground reservoirs to tap steam and very hot water that can be brought to the surface for use in applications like:

Electricity generation. Deep underground, the presence of hot rocks, fluid and permeability (the ability for that fluid to move among the rocks) offer conditions from which electricity can be generated.

Heating and cooling. Naturally occurring underground reservoirs of hot water or the stable temperature of the subsurface can be used to heat and cool buildings. Geothermal heat pumps provide heating and cooling using the ground as a heat sink, absorbing excess heat when the above-ground temperatures are warmer, and as a heat source when above-ground temperatures are cooler.

Direct use. Deep wells draw hot water from the subsurface to directly provide hot water to buildings, space heating or heat for industrial processes ranging from fish farming and greenhouses to drying pulp, paper, lumber and other materials.

Citing a GeoVision analysis, the DOE says there's potential for up to 60 gigawatts of electricity-generating geothermal capacity (more than 17,000 district heating systems and up to 28 million geothermal heat pumps) by 2050. It says another analysis confirmed the potential for even more geothermal electricity-generating capacity (90 gigawatts by 2050), "if we can achieve aggressive cost reductions in enhanced geothermal systems."

Working Behind the Scenes

Geothermal energy has been around since the dawn of time, but it's now being viewed as a potential power source for data centers, which can consume as much electricity as tens of thousands of homes. For example, a 100-megawatt facility uses roughly as much power as 84,000 average U.S. homes. This is one reason data center developers are looking beyond traditional grid power and toward alternatives like geothermal energy.

Google is the latest hyperscaler (i.e., operators of very large networks of data centers and cloud computing infrastructure) to throw its hat into the geothermal ring. Fervo Energy recently announced a 396-megawatt (MW) power purchase agreement (PPA) with Google to enable the continued development of the Cape Station enhanced geothermal systems (EGS) GeoCluster.

The GeoCluster is expected to come online in 2028. Under the agreement, Google will purchase carbon-free energy designed to serve as a foundational building block for a potential data center in Utah. Through the PPA, Fervo will offer Google an option to expand its offtake by approximately 600 MW, for a total of nearly 1 GW, by June 2030.

Fervo says this deal unlocks new, around-the-clock electricity capacity at no cost to existing ratepayers. "This agreement reinforces that EGS is ready to power the next generation of computing infrastructure," said Fervo CEO Tim Latimer in a [press release](#). "As demand for reliable electricity grows, customers like Google need energy resources that can be deployed at scale, operate around the clock, and deliver where power is needed."

More to Come

The Fervo-Google partnership began with Project Red, Fervo's commercial pilot project in Nevada that came online in 2023. That pilot delivers power to the local grid, including Google's data centers in the state. Fervo then signed a 115 MW PPA with Google and NV Energy in June 2024 that helped pioneer the Clean Transition Tariff.

"The next chapter of advanced power generation technology is being written in Utah," said Google's Lucia Tian. "This project will drive meaningful economic benefit to the local community and help catalyze long-term energy cost reductions by making enhanced geothermal more affordable and accessible."

Expect to see more announcements like this one as companies look for new ways to power their massive data centers. The [DOE](#) says geothermal technologies offer two solutions to the challenges of meeting and managing data centers' power and cooling demands: power generation and direct cooling.

"As a steady power generator, geothermal electricity is ideal for supporting the energy load generated by constant data center operations," it explains, "such as that required by some AI data computing, as well as flexible computing loads like those of bitcoin mining, which can fluctuate between periods of high uptime (or regular operation) and reductions in response to market price sensitivities."

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The Podcast Channel for Supply Chain Professionals

Supply Chain Connect provides supply chain and purchasing professionals with essential news, information and analysis about the technology and business trends that impact the global supply chain industry.



Democratizing Advanced Analytics: The New Era of Supply Chain Planning

Jan Sigmund, CEO of Log-hub, discusses democratizing advanced analytics, the real-world impact of AI and agentic systems on supply chain planning and why human judgment will remain central as automation accelerates.

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September Supply Chain Roundup: Rising Costs, Tariffs & Chip Shortages

A look at September's biggest supply chain developments, from surging diesel prices and new tariffs to semiconductor workforce gaps and persistent memory chip shortages.

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U.S.-Canadian Trade Battle Moves to the Next Level

A new round of tariffs and threats to ban certain products is sending up red flags on both sides of the U.S.-Canada border.

North American supply chain operators are bracing themselves for new challenges as the trade war between the U.S. and Canada drags on. Unlike some of the past levies, which were quickly repealed or reduced, this new round is showing more permanence and even deepening in certain trade areas.

The situation remains fluid, but at least for now the tariffs imposed by the U.S. government on Canadian goods were met with a tit-for-tat response on goods flowing in the opposite direction. The U.S. imposed 50% tariffs on roughly \$20 billion in Canadian goods, and Canada responded with retaliatory tariffs on the same dollar amount of U.S. goods. The tariffs range from 15% to 50%, depending on the specific product category.

Things escalated last week when the U.S. banned some Canadian dairy products and motorcycles, plus most alcoholic

beverages. The latest round of tariffs will go into effect later this month.

“U.S. President Donald Trump also moved to shut Canadian products out of large, long-term U.S. government contracts,” [AP](#) reports, “broadening the confrontation beyond tariffs as relations between the longtime allies deteriorate further.”

The Reciprocal Blame Game

The U.S. and Canada have continued to blame one another for the failure to reach a trade deal in August, with the former stating that the latter has engaged in unfair practices that harm domestic workers. For example, [CNBC](#) says Trump has “accused Canada of disadvantaging U.S. exports through its policies in the auto, alcohol and dairy sectors, highlighting the U.S. trade deficit in goods, and threatening to hit cars, trucks and auto parts with a 50% tariff from Jan. 1, 2027.”

The network says the tariffs apply to a “relatively small portion” of the \$715.5 billion trade in goods between the countries, but says economists are concerned about an “immediate blow to small- and medium-sized businesses and of the risks to growth from further escalation.”

There are also supply chain implications to consider, with one recent report detailing airplane maker Bombardier’s tariff and trade war exposure. The company is caught in the crosshairs of the escalating war after Trump demanded that it [no longer be allowed](#) to sell aircraft in the U.S. unless it moves production here.

According to [AP](#), Bombardier’s supply chain includes about 2,800 U.S. companies in 47 states. “Among other things, wings for its business jets are made in Texas and flight control components are produced near Los Angeles,” it reports.

“Honeywell, a major U.S. aerospace manufacturer, makes engines for Bombardier’s Challenger jets in Phoenix, and Collins Aerospace makes avionics and communications equipment in Cedar Rapids, Iowa,” [AP](#) says, adding that Bombardier has “significant operations” in Kansas. Between Bombardier’s vast supply chain and its U.S. locations, the manufacturer could face substantial negative impacts from an extended trade war between the two countries.

What’s Next?

Amid the current uncertainty, companies are assessing their cross-border sales and supply chain positioning and considering their options in a world where there’s no such thing as “fast” reshoring, onshoring or nearshoring pivots. These things take time, and when they’re implemented the companies themselves could be dealing with a very different trade environment.

Take Ford’s automotive factory in Windsor, Canada, for example. The facility produces specialized engines for some of the American manufacturer’s biggest trucks, and that production can’t just be packed up and moved elsewhere overnight.

“It’s difficult for Ford to say, ‘Ah, no problem. We’re going to import it now from Mexico,’” Ari Van Assche of HEC Montréal told [CNN](#), “because the components made in Mexico are very different.”

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An advertisement for Top Asia Pacific Distributors. It features a large circular logo with the text "TOP ASIA PACIFIC" at the top, "DISTRIBUTORS" at the bottom, and "2026" in the center. A banner across the middle of the logo says "SUPPLYCHAIN connect | partsdirect". Below the logo, it says "2026 Platinum Sponsor" and "WINSOURCE ELECTRONICS". A green button at the bottom left says "CLICK HERE TO LEARN MORE". The background is a light gray with faint images of industrial equipment and a globe.

Overcoming SKU Proliferation and Matrix Complexity in Modern Apparel Supply Chains

Learn how apparel-specific technology solutions address common supply chain challenges such as SKU proliferation, manual data entry errors and inventory inaccuracies, enabling brands to adapt swiftly to market trends and disruptions.

Apparel supply chains operate under pressures that standard retail environments rarely encounter. Unlike traditional product lines, apparel catalogs expand exponentially when compressed product life cycles collide with rapid trend shifts.

Consider a single base garment. Once manufacturers apply size and color matrices, it splits into dozens of distinct stock-keeping units (SKUs). This level of complexity demands specialized infrastructure capable of tracking detailed attributes across multiple channels while maintaining real-time visibility. Apparel technology providers have developed solutions specifically designed to handle this dimensional challenge.

The Challenges of Managing Matrix Inventory

Matrix inventory is the framework that apparel companies use to manage variants of a single base product across multiple dimensions. Organizations face significantly more complex inventory control issues than standard retail operations.

Product variations multiply at rates that generic tracking systems cannot handle. Seasonal drops compound this challenge by requiring parallel inventory streams across different life cycle points.

Managing Style and Size Variations

A variant explosion occurs when each additional attribute applied to a base product exponentially increases complexity. A single shirt style offered in six sizes and eight colors generates 48 distinct SKUs requiring individual tracking. Introducing fit variations pushes that number to 144 variants, appearing as a single product line.

These matrices require specialized data structures that preserve hierarchical relationships between parent styles and child variants. Technology platforms can demonstrate how native matrix support enables procurement teams to analyze performance at the style level or identify whether stockouts stem from low inventory or poor distribution across size curves.

Identifying Multilocation Shortages

SKU proliferation across multiple warehouses creates operational consequences that directly impact revenue. When companies mismanage matrix inventory, they build excess stock of low-demand combinations while experiencing chronic shortages of high-velocity variants.

Stockouts of popular sizes result in immediate lost sales because consumers typically will not wait for restocks. Balancing depth versus breadth across fulfillment channels intensifies the difficulty. Without unified visibility, organizations cannot make strategic allocation decisions. These issues highlight the need for [more intelligent, data-driven approaches](#) that use sales data alongside other features and available information.

Why Standard Systems Fail in the Apparel Industry

Industries with relatively stable product catalogs inspired the design of generic business tools. Legacy spreadsheets and basic point-of-sale systems lack the dimensional modeling capabilities needed to accurately represent matrix relationships. These tools collapse under high-volume matrix inventories because they cannot efficiently process the thousands of SKU-level transactions that operations generate daily.

Hidden Costs of Manual Data Entry

Manual order entry creates procurement bottlenecks that limit operational workflow. Typing purchase orders line by line for each combination forces teams to spend hours on repetitive tasks. Automated apparel ERP order management systems could complete the same work in minutes.

Human errors compound when manual intervention slows fulfillment. As transposition mistakes flow through downstream processes, they create discrepancies requiring time-consuming investigation. Incorrect quantity entries multiply the problem, while repetitive maintenance tasks consume skilled personnel who could otherwise focus on strategic activities.

Inaccurate Inventory Levels Lead to Overselling

Organizations that rely on legacy software face a critical pain point when systems cannot maintain real-time inventory accuracy. Delayed updates mean that available-to-promise calculations reflect outdated information, allowing the system to accept orders for items that are already committed or out of stock.

Peak periods intensify these issues when transaction volumes surge. A single oversold order damages customer trust by forcing the business to delay shipment or cancel the transaction. The cumulative effect erodes loyalty and pushes purchases toward competitors with reliable availability.

Disconnected Supply Chain Data Silos

Siloed data between procurement, warehousing and sales channels prevents decision-makers from developing accurate operational views. When each department maintains separate systems, inventory positions are split across disconnected databases. Teams lack visibility into current stock levels, leading to redundant orders or insufficient replenishment.

Without integrated data, organizations cannot address inbound disruptions in advance. Finding and fixing discrepancies becomes a manual task when reconciling records across multiple sources.

Core Features of an Apparel-Specific ERP

Technology providers have developed apparel-specific enterprise resource planning (ERP) software that provides purpose-built solutions for managing grid-based workflows that generic tools cannot handle. Organizing inventory around style, color and size hierarchies using native matrix support, these solutions connect isolated departments into a single source of truth and eliminate data fragmentation.

Industry-Specific Attribute Tracking

Apparel ERP software organizes products using native style, color and size matrices that preserve parent-child relationships. An approach to product style, color and size handling demonstrates how such a structure can group variants into product families, allowing users to manage inventory at multiple detail levels.

The structure drastically reduces data complexity. Procurement teams create purchase orders at the product-family level and let the system automatically generate line items for each combination. New seasonal collections move faster because users can apply templates at the parent level and push settings across all variants.

Real-Time Inventory Visibility

Centralized dashboards provide immediate visibility into stock positions across all warehouse and retail facilities. Reflecting movements the moment transactions occur, these tools prevent shortages by alerting procurement teams when SKU levels approach reorder points.

Immediate visibility optimizes warehouse picking by directing workers to exact bin positions. Dynamic allocation rules enable order fulfillment from the nearest facility, reducing costs and transit times.

Multichannel Order Integration

Apparel ERP solutions synchronize data across wholesale, direct-to-consumer and retail operations through unified inventory pools that update in real time. When a sale occurs anywhere, counts adjust automatically across all customer-facing channels.

Preventing allocation conflicts where multiple channels sell the same unit, automated updates improve customer experience by enabling capabilities such as buy-online-pickup-in-store and ship-from-store fulfillment.

Future-Proofing the Apparel Supply Chain

Upgrading to an apparel ERP prepares organizations for long-term growth by building operational resilience into core processes. Scalable systems help businesses adapt quickly when market conditions shift, whether from demand spikes, supplier disruptions or regulatory changes.

Preparing for Unpredictable Disruptions

Real-time data enables apparel brands to pivot quickly during supply chain shocks such as supplier delays or tariff changes. Viewing current inventory positions and customer demand simultaneously enables decision-makers to evaluate alternative sourcing strategies using accurate, current information.

Automation tools minimize manual intervention, speed up order processing and reduce processing time for procurement activities that require multiple approval cycles. Standardizing workflows lets organizations maintain operational continuity even when disruptions affect staffing or create workload spikes.

Managing High Merchandise Return Rates

The apparel industry faces uniquely high rates compared to other retail sectors. Integrated solutions are essential for processing merchandise efficiently and restocking items quickly, so organizations can resell them before they become obsolete.

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5 Things to Know About the EU Packaging Waste Regulation

New EU packaging rules went into effect last month, and apply to any company shipping goods in the market regardless of origin.

Even companies that aren't located in the European Union (EU) could be impacted by the new packaging waste and recycling regulations that went into effect in August. The far-reaching regulations cover all packaging placed on the EU market, regardless of origin. A U.S. electronics manufacturer or component supplier, for example, has to use packaging that's compliant with the new rules or risk fines and other enforcement action.

According to the European Commission, the Packaging and Packaging Waste Regulation 2025/40 (PPWR) went into effect last year. As of August 12, it now generally applies across the EU. The regulation covers all packaging and packaging waste; sets requirements for manufacturing, composition, and the reusable or recoverable nature of all packaging placed on the EU market; and includes numerous packaging waste management and prevention measures.

"The rules aim to minimize the quantities of packaging and waste generated while lowering the use of primary raw materials," the EC says, "and fostering the transition to a circular, sustainable and competitive economy."

5 Things to Know About the PPWR

Here are five things that any company shipping and selling goods to the EU should know about this new regulation:

1. The goal is to make all packaging on the EU market recyclable in an "economically viable way" by 2030, according to the EC. It also wants to safely increase the use of recycled plastics in packaging and decrease the use of virgin materials in packaging, with the end goal of sector climate neutrality by 2050.

2. The PPWR establishes a new set of requirements that align with Europe's waste rules that cover the entire packaging lifecycle, from product design to waste handling, including restrictions on certain single-use plastics and minimizing substances of concern—for instance, restrictions on per- and polyfluoroalkyl substances (PFAS) in packaging that comes in contact with food.

3. To determine their obligations under the PPWR, [Packaging Law](#) says companies should know that the regulation applies to all packaging, but "the requirements may vary depending on the type of packaging (e.g., sales packaging that is intended to be in direct contact with the packaged product vs. transport packaging) and the end use application (e.g., packaging for food or medicinal products or dangerous goods)."

4. Packaging Law also says there may be ambiguity over which company is ultimately responsible for compliance. The manufacturer is responsible for many of the fundamental requirements, for example, but if the packaging (or a packaged product) carries a certain name or trademark, "it can be assumed that the owner of that name or trademark is the manufacturer for the purposes of the PPWR (rather than the business operator that physically produces the packaging)." If packaging isn't marked, however, then the publication says the manufacturer "could be either the packaging supplier or the person who places packaged products on the EU market."

5. The PPWR applies across the EU and establishes a harmonized framework for packaging and packaging waste in the single market. [The EC says](#) the new rules "mark a major step towards reducing packaging waste and lowering compliance costs for the packaging industry." They will also make the waste value chain more sustainable, it adds, and help reduce the EU's dependence on imports of virgin packaging materials.

"By promoting a more circular economy, the PPWR will help keep valuable materials in use for longer and increase the recovery and use of secondary raw materials within the EU," the EC explains. "This will reduce pressures linked to resource extraction and waste generation, while strengthening the resilience and competitiveness of European industry through a more secure and sustainable supply of materials." ■

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[Overcoming SKU Proliferation and Matrix Complexity in Modern Apparel Supply Chains](#) (Continued from page 15)

The retail industry projects [total returns will reach \\$890 billion](#) in 2024. Processing costs, depreciation and waste extend the financial impact beyond lost revenue. ERP software with reverse logistics capabilities tracks reasons and identifies quality issues.

Frequently Asked Questions on Modern Apparel Supply Chains

These are some questions apparel supply chain professionals may ask regarding their operations.

What is SKU proliferation in the apparel industry?
SKU proliferation describes the rapid expansion of item variants. This occurs when manufacturers produce a single base style in multiple sizes, colors and fits. The expansion complicates inventory control because each variant requires separate demand forecasting and replenishment planning. The challenge intensifies as brands introduce new collections while maintaining existing lines, creating thousands of active SKUs that organizations must track simultaneously.

What's the difference between a standard ERP and one designed for apparel?

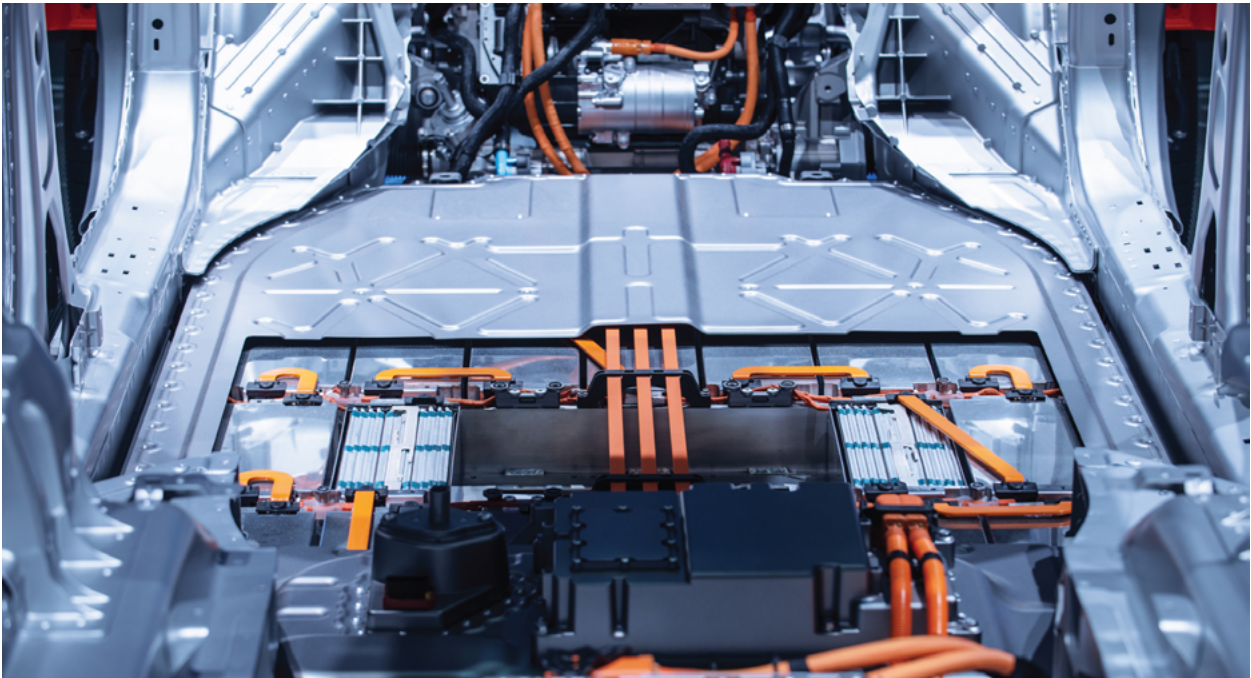
Standard ERP systems manage basic inventory and financial functions but fail when confronted with matrix inventory structures that define apparel operations. Apparel-specific solutions natively support style, color and size hierarchies, letting procurement teams work with product families that group thousands of individual SKUs.

How does real-time inventory tracking impact returns?

Real-time tracking helps identify and process merchandise more quickly by providing immediate visibility when items arrive at processing facilities. Supply chain technology optimizes reverse logistics so staff can inspect and restock products faster, reducing the window during which they lose value.

[Analytical models for pricing optimization](#) provide frameworks for evaluating how merchandise flowing backward impacts profitability. Automated inventory systems become essential for managing operational costs by streamlining workflows that require extensive manual intervention.

Building a More Resilient Operations Framework
Managing matrix inventory in the apparel sector requires specialized, automated tools designed for the dimensional challenges that define this industry. Generic systems designed for stable catalogs cannot handle the variant explosion that occurs when style, color and size attributes interact. Adopting an apparel ERP represents a strategic investment in operational infrastructure that directly impacts accuracy, cost control and customer satisfaction. ■



A New Infusion for Domestic Mineral and Battery Supply Chains

The latest round of Battery Materials Processing and Battery Manufacturing and Recycling grants will award \$500 million to a range of domestic projects.

With the goal of curbing the U.S.’ reliance on China and other mineral-producing countries, the U.S. Department of Energy (DOE) recently rolled out \$500 million in new grants. The infusion will be allocated to seven different projects and focuses on expanding critical mineral and material processing, battery manufacturing and recycling capacity in the U.S., according to the DOE.

“For too long, America has depended on foreign actors for critical materials essential to modern life that underpin our economy, energy security, and national security,” said U.S. Secretary of Energy Chris Wright, in a statement. The ultimate goal is to bring “critical materials production and processing back to the United States.”

This new round of grants marks the third round of funding from DOE’s Battery Materials Processing and Battery Manufacturing and Recycling programs, which support

battery materials processing, recycling, and manufacturing projects. The programs support demonstration projects, construction of commercial-scale facilities and retrofitting or retooling existing facilities.

The Need is Real

The production of advanced batteries depends heavily on critical minerals like lithium, cobalt, nickel, copper, manganese and graphite, “whose extraction and processing are predominantly under Chinese control,” Battery Technology reports. Citing recent data, it says China holds approximately 94% of the market share for LFP (lithium iron phosphate) battery production capacity and provides 70% of global processed lithium production.

All told, the U.S. imports nearly three-quarters of its lithium-ion batteries from China, which holds a “commanding position in the global battery supply chain,” the Council on

Strategic Risks adds, “[and controls] a substantial share of the entire value chain from upstream mineral extraction and refinement to downstream anode, cathode, and finished battery production.”

This dominance has become increasingly problematic with the 2024 National Defense Authorization Act prohibiting the Defense Department from “procuring batteries containing Chinese-sourced materials beginning in October 2027,” Battery Technology adds, “creating urgency for domestic supply chain development.”

Who Gets the Funding?

According to Reuters, the DOE received hundreds of applications for this third round of funding from its Battery Materials Processing and Battery Manufacturing and Recycling programs. Those chosen “were most promising and had the highest return for Americans in the most-needed areas of the battery ecosystem,” said Audrey Robertson, the department’s assistant secretary.

Among the recipients:

- Lilac Solutions will receive \$100 million for a direct lithium extraction processing facility on Utah’s Great Salt Lake. The company expects to open the facility by 2028 and produce 5,000 metric tons per year of the metal, Reuters reports.
- Jervois, which controls a large cobalt deposit in Idaho, will also receive \$100 million to build the country’s only refinery for that metal, used to make batteries, electronics and a range of weapons.

- Nth Cycle, a battery recycler backed by Trafigura, is receiving \$100 million for a facility to process battery metal scrap known as black mass.

Reuters says DOE is also giving \$50 million each to Princeton NuEnergy, which reprocesses cathode battery parts; Arcanum Ventures, which makes chemicals for battery electrolytes; and Coreshell Technologies, which is developing battery anodes made with silicon.

“Coreshell Technologies will receive \$50 million to establish U.S. manufacturing capacity for silicon-anode Li-ion electrodes and cells, replacing imported graphite with domestically sourced metallurgical silicon,” Mining Technology reports, noting that the project combines Coreshell’s silicon-anode technology with dry-coating cathode technology, and is focused on establishing the first U.S. gigafactory dedicated to silicon-anode battery production.

The latest awards add to around \$40 billion in provisional U.S. government funding for mineral projects since 2022, with the funding spanning grants, loans, equity investments and other forms of support. “The DOE said the first two funding rounds had already awarded \$1.82 billion to 14 projects,” Mining Technology adds, “covering lithium, graphite, battery components and recycled materials.”

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Sustainability As a Resilience Discipline: Wired to Procure

Watch this episode and see how sustainability is becoming a growth driver and how organizations are meeting green compliance goals.



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The Latest Round of Tariffs Brings Fresh Supply Chain Concerns

The latest U.S.-Canada trade fight is raising costs, complicating cross-border supply chains and putting new pressure on the USMCA.

Trying to keep up with which tariffs are being imposed, which ones stick and which ones are quickly repealed has become a full-time job as new ones are continually being introduced. The most recent round involves one of the U.S.’ largest trading partners and is already driving a fresh round of supply chain concerns.

In August, the U.S. imposed tariffs of up to 50% on about \$27.6 billion (Canadian) worth of Canadian goods, hitting products already caught up in disputes over steel, aluminum, autos and other sectors, Reuters reports. Canada answered back with matching tariffs of 15%, 25% and 50% on the same value of U.S. imports, with the new Canadian duties set to take effect Sept. 8.

This still-developing situation could have profound impacts on business and supply chains in both countries. According to the [Office of the United States Trade Representative](#) (USTR), U.S. goods trade (exports + imports) with Canada totaled an estimated \$716 billion in 2025, and U.S. services

trade (exports plus imports) totaled about \$157 billion in 2025.

The new tariffs could also strain the United States-Mexico-Canada Agreement. The USMCA has been in place since 2020, having replaced the North American Free Trade Agreement. According to USTR, the agreement “undergirds the nearly \$2 trillion in U.S. goods and services trade within the region.”

Bracing for the Impact

The verdict is still out on exactly how this new trade war will impact organizations and their supply chains, but some experts are already speaking up about the implications. In [“U.S.–Canada Tariff Escalation Becomes a North American Logistics Problem,”](#) Logistics Viewpoints says the situation is already becoming an operating issue for companies on both sides of the border.

“U.S. companies importing Canadian products now face higher landed costs. American companies exporting to Canada will face retaliatory tariffs,” it points out. “Manufacturers operating integrated North American supply chains may be exposed on both sides.”

There are also industries that could benefit from this latest development. “Domestic steel and aluminum producers, for example, may become more competitive when imported material carries a substantial tariff,” Logistics Viewpoints notes, and U.S. suppliers capable of replacing Canadian imports may gain orders.

“For U.S. and Canadian companies alike, the immediate challenge is managing higher costs and greater uncertainty,” it concludes. “The longer-term challenge is determining whether a supply chain designed around decades of increasingly integrated North American trade still has the right architecture for what comes next.”

Consumers Could Feel the Impact

The new tariffs could also push up prices on many items for American and Canadian consumers. [ABC News](#) says flowers, hockey sticks and national flags stand among an array of products that may rise in price. In all, U.S. tariffs (including recently-issued levies on Canada), will cost the typical American household \$1,077 per year, according to [The Budget Lab at Yale](#).

And new tariffs from the U.S. on Canadian goods accounted for about 30 extra dollars per household per year. “This is a classic trade-war situation: Somebody puts on a tariff, another country retaliates dollar for dollar and then more tariffs are added,” Campbell Harvey, a professor at Duke’s Fuqua School of Business, told [ABC News](#). “Then we get into this really bad equilibrium.”

The list of affected goods includes dairy products, honey, whey protein and molasses, as well as alcoholic beverages like whiskey and vodka. The news outlet says targeted products will face upward price pressure across the board “but the extent of price increases will vary for each item, depending on the extent to which companies can replace it with an import from another country or a U.S.-made alternative.”

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More Cyberattacks Take Aim at Supply Chains

More cybercriminals are targeting supply chains this year, with one compromised vendor potentially exposing hundreds or even thousands of connected organizations to security threats.

Supply chains have become a prime target for cyberattackers that are infiltrating these global networks and using them to defraud and disrupt organizations, and the number of breaches goes up every year. [According to Cyble](#), supply chain attacks nearly doubled last year. Its researchers recorded 297 supply chain attacks during that 12-month period, up 93% from 154 the prior year.



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AI Boom Is Fueling Industrial Real Estate Demand

New report from Cushman & Wakefield highlights the impacts that the AI data center boom is having on key industrial real estate markets in the U.S.

Love them or hate them, data centers are coming out of the ground like weeds right now in North America, where JLL says more than 66 gigawatts (GW) of capacity is currently being built. Nearly all (95%) of that capacity has already been claimed in an industry that's posted low vacancy rates of just 1% over the last three years. For context, 1 GW of continuous power can support about 800,000 homes.

The organizations jockeying for space in the new facilities include:

- Hyperscalers (e.g., Microsoft, Amazon, Google) account for about 59% of that capacity.
- Neoclouds (Lambda, CoreWeave, Crusoe) make up 11% of it
- Pure-play AI companies (OpenAI, Anthropic) account for about 7%

As the rising AI tide continues to “lift all boats,” so to speak, the multiplier effect is reaching other areas of the economy outside of technology and construction. Industrial real estate (i.e., warehouses, manufacturing plants, distribution centers, among other facilities) is one sector that's feeling some fresh momentum, according to a new Cushman & Wakefield report.

The Industrial Ripple Effect

In *From Megawatts to Multipliers: The Data Center Effect on Industrial Demand, Jobs and Local Revenue*, the real estate firm explores the relationship between data center development and industrial real estate demand, and how both are generating broader economic activity across the U.S.

In analyzing more than 388 million square feet of industrial leasing across six data center markets between 2022 and 2025, Cushman & Wakefield says businesses tied to the data center ecosystem accounted for 10.4% of all new industrial leasing activity during the period. And as AI investment has accelerated, that share climbed to a record 14.4% in 2025, with data center-related leasing increasing 44% year over year to 13.5 million square feet.

“Much of the conversation around data centers has focused on what happens inside the facility,” says Cameron Martin, global research manager, in a [press release](#). “Our research shows there is also a significant economic story unfolding beyond the data center itself. As new facilities come online, they create demand for an ecosystem of manufacturers, contractors, suppliers and service providers that lease industrial space, hire workers and contribute to local economies.”

Tracking Job Generation

For the new report, Cushman & Wakefield assessed industrial leasing activity in Atlanta, Austin/San Antonio, Chicago, Dallas, Phoenix and Virginia. Using its own leasing data and regional economic modeling, it evaluated the broader economic effects associated with data center-related industrial demand and found that:

- Together, these markets contain approximately 19.6 gigawatts of operational data center capacity, with another 11.8 gigawatts currently under construction.

- Across the six markets that Cushman & Wakefield studied, industrial leasing tied to the data center ecosystem supported an estimated 33,000 to 50,000 initial industrial jobs between 2022 and 2025.

- Those jobs generated an estimated 2.5 new jobs for every direct industrial job created.

- This created somewhere between 81,000 and 124,000 total jobs and approximately \$11.6 billion in annual gross economic output.

Based on the average impacts across the six markets, Cushman & Wakefield says every 100 megawatts of new data center development is associated with approximately 365,000 square feet of industrial leasing, 1,285 initial and downstream jobs, \$110 million in annual wages, \$344 million in gross economic output and approximately \$15 million in annual fiscal benefits.

“AI is driving one of the largest infrastructure expansions we’ve seen in decades,” John McWilliams, head of data center insights, says. “Understanding its economic impact means looking beyond the buildings themselves to the broader industrial ecosystem that enables them. Those multiplier effects are becoming increasingly meaningful for developers, occupiers and the communities where this investment is taking place.”

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Americans Say “NIMBY” to the AI-Driven Data Center Construction Boom

As AI usage increases, communities nationwide are pushing back against the data centers needed to power it.

Love it or hate it, artificial intelligence (AI) has become part of everyday life for most Americans. According to a recent YouGov survey, 81% of U.S. adults have used some form of AI, including chatbots, recommendation systems, voice assistants and AI agents. And nearly half (48%) are using AI at least once a week.



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