



SPECIAL SUPPLY CHAIN REPORT | August 2023

Disruptions Impacting US Supply Chain Growth

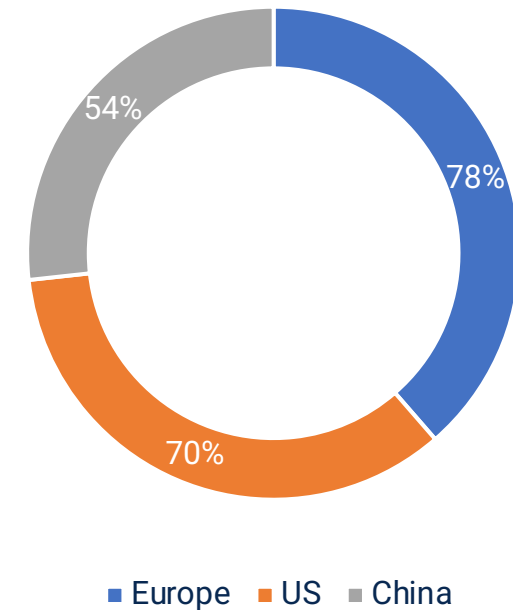
Industrial Manufacturing

Event Background

As a result of non-stop supply chain disruptions over the last three years, companies and governments have increasingly looked to bring industrial manufacturing back home. Mentions of reshoring rose 128% in Q1 2023 compared to Q1 2022, according to Bank of America's analysis of S&P 500 earnings call transcripts.

- Due to weakened global demand, factory output in China declined in April and May. The manufacturing industry employs roughly 18% of China's workforce.
- China plans to reshore/nearshore roughly 54% of commodities in an effort to fill the gap in production that will be left behind by the US and EU's own reshoring efforts. China will aim in the long run to use domestic production to provide for increasing domestic demand, rather than imports.

% Companies Looking to Reshore/Nearshore by Region



Source

Initiatives Driving US Industrial Manufacturing

US Infrastructure Package

The goal of the \$550Bn US Infrastructure Package, enacted in 2021, is to aid in repairing roads, tunnels, highways, and more across the country for five years. The package also provides additional funding for repairs and larger projects.

- So far 32,000 projects have been announced across 4,500 communities, totaling \$220Bn in planned spending ([USAToday](#)).
- Critical commodities needed for the plan: concrete/cement, steel, lumber/wood, and aluminum.
- Top states for budget allocation are California ([\\$44.5Bn](#)), Texas ([\\$35.4Bn](#)), New York ([\\$26.9Bn](#)), Florida ([\\$19.1Bn](#)) and Illinois ([\\$17.8Bn](#)).

Impacts to Construction Spending

As a result of increased infrastructure and reshoring, construction spending is expected to rise by [\\$1Tn](#) across the next five to 10 years driven by industries: semiconductor, aerospace and defense, high-tech, and automotive ([Mckinsey & Co.](#)).

- Proposed construction projects from these industries across the US is expected to reach [\\$400Bn](#) by 2028.
- Roughly \$223Bn to over \$260Bn is expected to go towards the semiconductor industry ([Mckinsey & Co.](#)).

Initiatives Driving Reshoring

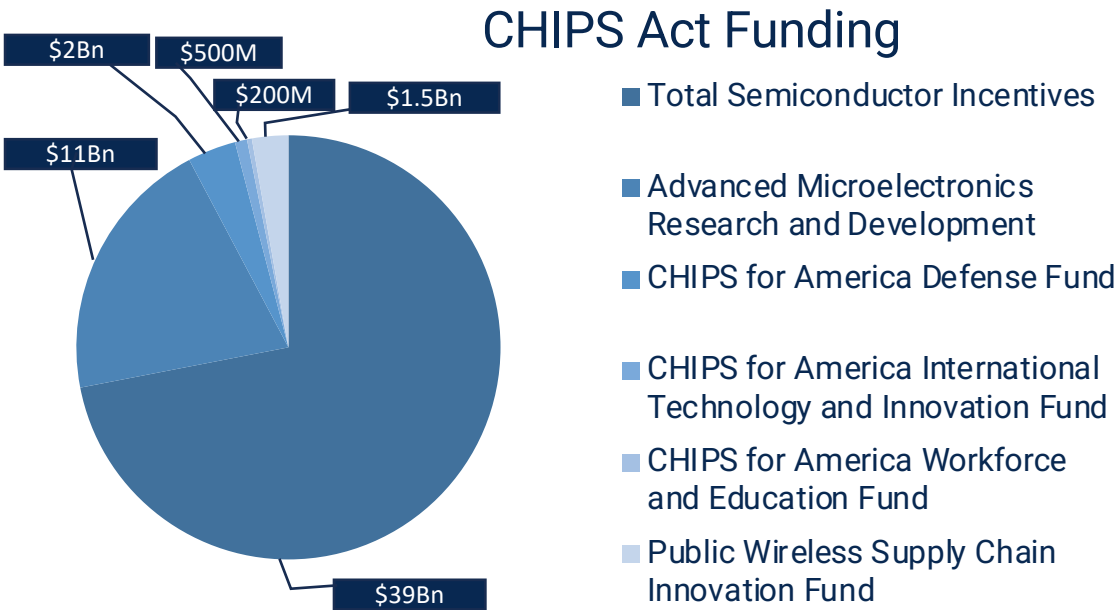
Reducing Reliance on Single Sourcing

After a turbulent few years of supply chain disruptions stemming from Covid-19, the Russia-Ukraine war, and the CHIPS Act, companies are looking to reduce reliance on single sources.

- E.g., semiconductor reshoring in the US, automotive nearshoring in Mexico, and countries in Africa bringing mining and processing back home.

Both the US and EU have enacted measures to bring manufacturing home, for example the US’ \$52Bn CHIPS Act and the EU’s \$47Bn European Chips Act.

- Major chipmaking companies GlobalFoundries, Intel, Samsung Foundry, TSMC, and Texas Instruments are building new semiconductor production facilities in the US.
- Intel plans to build a \$19Bn semiconductor fabrication plant in Germany. STMicroelectronics and GlobalFoundries are set to build a \$6Bn fab in France.
- See Resilinc Special Report [“Global Semiconductor Review and What to Expect in 2023”](#) for more information regarding the CHIPS Act.



[Source](#)

02 | Skilled Labor Shortages

Skilled Labor Shortages

Background

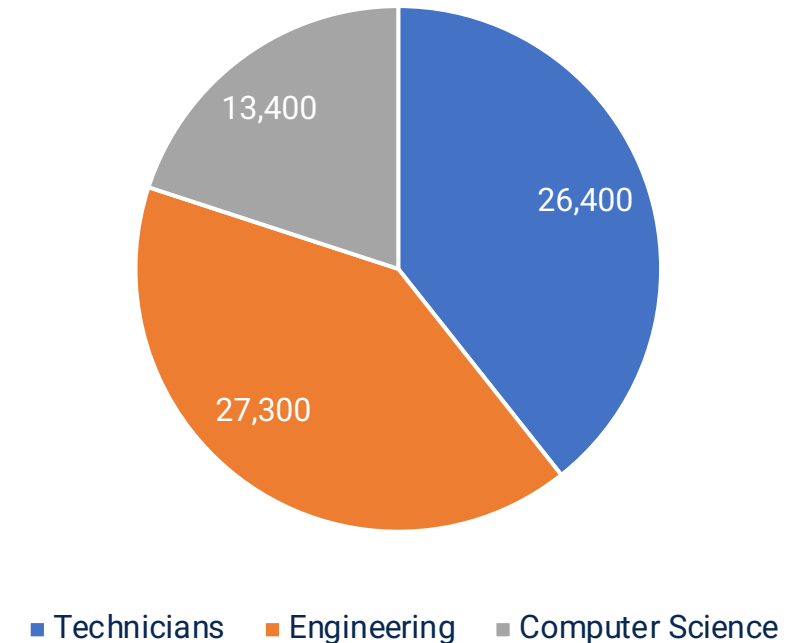
Shortages of skilled labor pose a large risk to the development and growth of the industrial manufacturing industry in the US. Companies looking to reshore are already facing disruptions from a lack of available labor. Estimates show that by 2030, 2.1M manufacturing jobs could be left vacant.

- The monetary loss vacant jobs could reach \$1Tn by 2030.

Cause

- Lack of specialized skills: industries like semiconductor require specialized skills in computer science, software engineering, and applied physics.
- Skilled trade shortage: many with skilled labor skills are retiring, and younger generations are not pursuing skilled trade jobs.
 - **Roles struggling to be filled include:** CNC machinists, welders, maintenance technicians, industrial electricians, pipe fitters, carpenters, and engineers.
 - Under the CHIPS Act, investments of \$200Bn have been made to fund the creation of approximately 40,000 jobs in the US semiconductor supply chain, and over 50 new semiconductor ecosystem projects have been announced across the US.

Semiconductor Workforce Gap
by 2030: US



[Source](#)

Skilled Labor Shortages: Supply Chain Impact

Overview

According to a study by Oxford Economics and the Semiconductor Industry Association (SIA) by 2030 a shortage of 67,000 workers in the US, including: technicians, computer scientists, and engineers, is expected across the semiconductor industry ([semiconductors.org](https://www.semiconductors.org)).

- From now until 2030, jobs in the US semiconductor industry are expected to grow by 115,000.

Impacts to the Broader Semiconductor Industry

Semiconductor manufacturers onshoring and reshoring in the US are facing a lack of workers that can erect semiconductor factories ([WSJ](https://www.wsj.com)). Because of this, the world's largest semiconductor producer TSMC is expected to lose 10% in sales across 2023 due to delays in starting production at its Arizona factory. The company has already invested \$40Bn for the US project.

The company reports that it may need to bring in technicians from Taiwan temporarily to train local workers ([CNN](https://www.cnn.com)).

- **Mass production of 4-nanometer chips will be delayed until 2025**, originally expected to go into production in 2024.

Quick Facts: Supply Chain Impact

- Inability to meet production demand
- Reduced output
- Longer lead times
- Delays in opening new factories
- Lost revenue
- Inability to invest in new technologies

Outlook: Skilled Labor Shortages

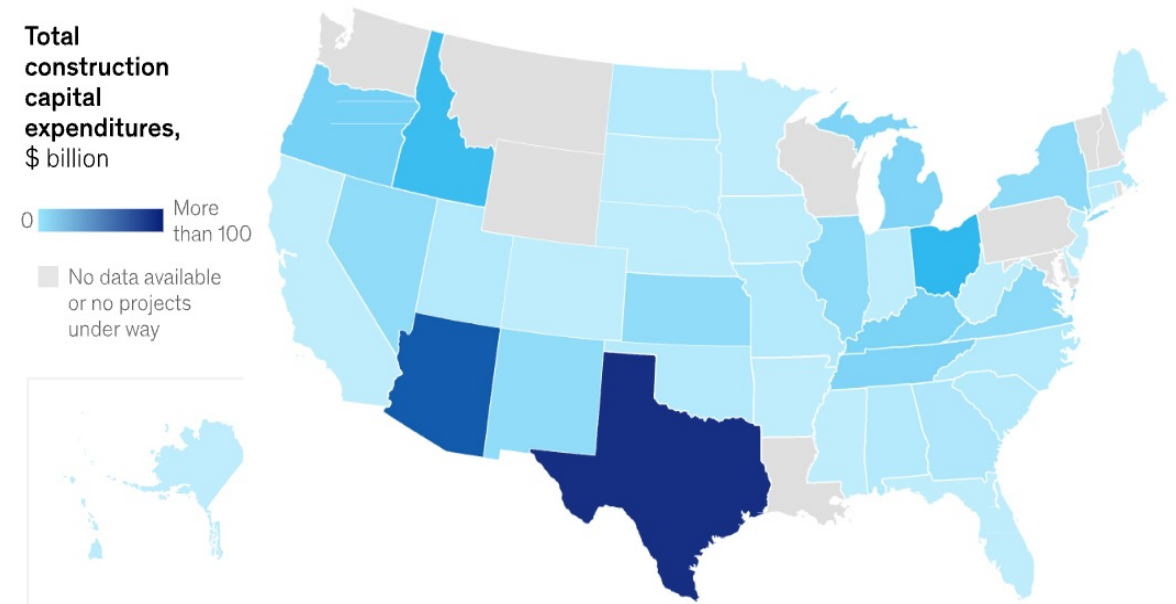
Demand is high for new employees across various industries and the outlook for hiring is more positive than it was in 2022. That said, in Q2 2023, [78%](#) of employers in the technology industry reported challenges in hiring due to a lack of workers equipped with the skills needed to fill open roles.

Impacts to the Broader Semiconductor Industry

Current semiconductor plant builds in the US may still require chips being sent back to Asia to be put together and tested. Of the almost 500 assembly and test facilities globally, only 65 are in the Americas. This suggests that to be fully self-sufficient, they will need to grow the assembly, testing, and packaging (ATP) workforce at an even faster rate than the manufacturing workforce.

- Global governments are spending over \$100Bn to shift towards local manufacturing. By 2030, the US aspires to have a market share of 30% of chip making capabilities, an increase from the current 10% ([Deloitte](#)).

Many fab construction projects in advanced industries are planned across the country, but more craft laborers are needed to complete them.



[Source](#)

Outlook: Skilled Labor Shortages Impacting Reshoring

Skilled labor shortages in the US merge into capacity shortages across the country. The lack of ATP sites in the Americas mentioned in the previous slide only highlight the crisis of skilled labor shortages and further long-term issues with reshoring initiatives. US ATP capacity only makes up 3% of global capacity ([Georgetown](#)).

Impacts to the Broader Semiconductor Industry

Chips manufactured in the US will require being exported to Asia for ATP, resulting in longer lead times for finished products and higher costs for shipping to and from Asia.

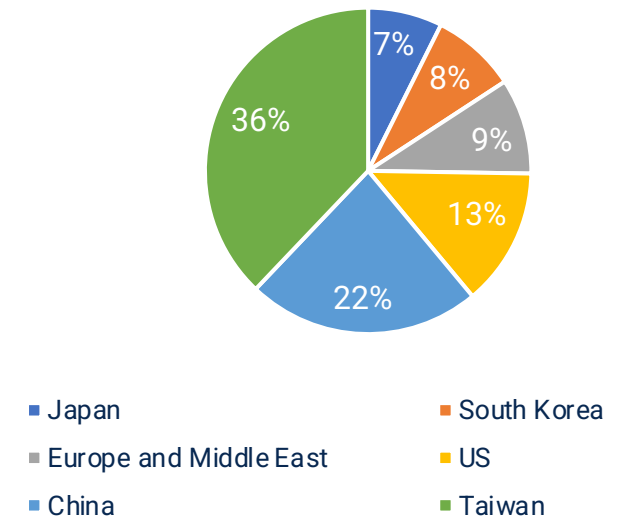
ATP facilities are concentrated in China, South Korea, Japan, and some countries in Southeast Asia ([Carnegie](#)). Over 90% of ATP is done in East Asia or countries near East Asia, which caused issues during the semiconductor supply chain crisis.

- The CHIPS Act currently does not have any specific requirements dedicated to ATP in the US – although the Act mentions investments to all steps of chipmaking

Because of the back and forth between the US and Asia for chipmaking after reshoring efforts, global logistics chains will need to adjust and adapt to shipping from the West to the East.

- Lead times for chips could increase as chipmakers in the US import supplies from the East, ship chips back to the East for ATP, and then back to the West for sale.

All Semiconductor Logic Capacity by Country/Region (2021)



[Source](#)

03 | Critical Commodity Health

Critical Commodity Health

Commodity	Price	Producers	Notes
Lumber	\$539.50/thousand board ft (Aug 22, 2023)	Top companies: West Fraser, Canfor, Weyerhaeuser, and Interfor Top regions: The US, with 298.7M cubic meters (m³), Russia with 214.8M m³, and China with 212. 4M m³	Use Case: Lumber is used primarily in housing and is an important material for the production of a wide variety of industrial chemicals. Majority of North American houses are constructed with two-by-fours and wooden panels. Lumber is also used in industrial manufacturing to build crates, pallets, buildings, box cribbing, equipment saddles, and more. Demand: Now, in 2023, with an increase in home building and rebounded mortgage rates, lumber demand is set to increase. Mortgage rates rose from 3.2% in early 2022 to 7.12% now. Market News and Supply Factors: Wildfires across Canada are predicted to heavily impact the lumber market in the coming months. Roughly 3% of the country's forests have been affected by wildfires (approximately 29,700,000 acres), this will negatively impact supply (Bloomberg). Price: Lumber prices dropped 60% in 2022 due to decreased mortgage rates. Following this, companies decreased production. Lumber prices and demand are directly impacted by home building, mortgage rates, and purchasing power. So far in 2023, lumber prices are up 14%.
Coal	137.95/T (Aug 2023)	Top companies: BHP limited group, Rio Tinto, China Shenhua Energy, and Anglo American plc Top regions: Australia with 443.4mT, China with 4.07Bn mT, and India with 893.08 mT	Use Cases: Coal is used in the concrete industry to produce heat. It is also used in the steel industry as coal coke to turn into iron to create steel. Demand: Coal demand grew by about 1.5% in the first half of 2023 to a total of about 4.67Bn Mt, backed by both an increase of 1% in power generation and 2% in non-power. However, total coal demand in 2023 is expected to fall to 357M Mt due to major country's (the US and EU) making the switch to cleaner energy sources (MiningWeekly). Market News and Supply Factors: Global coal production is expected to further increase in 2023, following an 8% increase in global production in 2022 driven by India, Indonesia, and China. These countries are expected to drive production in 2023 as well. China's coal production is expected to increase by 3.3% across 2023. Price: The global anthracite coal market is expected to increase at a CAGR of 2.6% driven by industries: steel, chemical, energy, and cement.

Critical Commodity Health

Commodity	Price	Producers	Notes
Cement and Concrete	\$234.18/mT (2023)	Top companies: Ameron International Corporation, Continental Materials Corporation, RDC Concrete (India) Pvt Ltd, and Vulcan Materials Co Top regions: The US, producing 95M mT annually and India, producing 381M mT annually	Use Case: Cement and concrete are used primarily in various types of construction (industrial, residential, commercial, etc.).
			Demand: Cement is facing a global shortage due to increased demand and high raw material costs (coal, petroleum coke, etc.).
			Market News and Supply Factors: Intel's new build in Ohio is expected to use up half of the state's concrete supply. Labor shortages are the largest contributor to the concrete shortage.
			Price: The global cement market is expected to increase to \$481.73Bn by 2029, with a CAGR of 5.1%. The US concrete industry is expected to have a revenue of \$76.4Bn in 2023.
Crude oil	\$84.67/barrel (Aug 2023)	Top companies: Saudi Arabian Oil Co. (Saudi Aramco), China Petroleum & Chemical Corp. (SNPMF), and PetroChina Co. Ltd. (PCCYF) Top regions: Saudi Arabia at 10,591,782 barrels/day (b/d), Iraq at 4,743,680 b/d, Canada at 2M b/d, and the US at an estimated 11.28M b/d	Use Cases: Crude oil is necessary in manufacturing to provide electricity, heating, and is even used as a raw material in the petrochemical industry.
			Demand: Global oil demand is expected to increase by 2.2% in 2024, according to the Organization of the Petroleum Exporting Countries (OPEC).
			Market News and Supply Factors: Oil production also faces issues due to labor shortages, as well as equipment shortages (pipes and specialized sand). On top of this, supply is expected to face constraints from increased demand in China and OPEC+ supply cuts.
			Price: Brent crude oil prices rose to over \$81/barrel in mid-July for the first time since April.

Critical Commodity Health

Commodity	Price	Producers	Notes
Steel	\$1,873/mT (Q1 2023)	Top companies: China Baowu Steel Group, ArcelorMittal, and Ansteel Group are some of the largest producers Top regions: China is the primary country for steel production generating 1.336Bn tons of steel annually	Use Case: Steel is used primarily in buildings and infrastructure which accounts for 50% of global steel consumption. It is also used in mechanical equipment and automotive vehicles.
			Demand: The construction and transportation sector, including both automobiles and railways, consume two thirds of global steel production. Rising activity within the construction and automobile industries during the last year are driving current steel demand (MarketRealist).
			Market News and Supply Factors: - Steel supplies have continued to be constrained since its peak in 2021 from Covid-19, and now combined with the Russia-Ukraine war. - Japan has extended commodity export bans on Russia in January of 2023, including steel. - Malaysia has extended the anti-dumping duty on cold-rolled stainless steel imported from China, South Korea, Taiwan, and Thailand. Measures will be in effect until July 26, 2028. - Brazil has extended its anti-dumping duty on carbon steel line pipes imported from China and Romania. - Thailand has also extended its anti-dumping duty on certain iron and steel pipes imported from China and South Korea.
			New Production Developments: As of August 3, 2023, JSW Steel and JFE Steel have agreed to a Joint Venture Partnership.
			Price: Steel costs are expected to increase as a result of Myanmar's tin mining ban. Tin is used as a coating material for steel to prevent corrosion, making it essential for the manufacturing of cans, containers, and other packaging materials (Resilinc EventWatch ^{AI}).

Critical Commodity Health

Commodity	Price	Producers	Notes
Aluminum	\$2,199.5/mT (August 2023) *Resilinc CommodityWatch^{AI}*	Top companies: Chalco, Hongqiao, Rusal, and Xinfu Top regions: China with 40.21M mT and Russia with 3.93M mT	Use Case: Aluminum is a versatile material used in construction, transportation (packaging), electrical equipment, and various types of industrial machinery. Demand: Aluminum is the fastest growing material used by automakers and is expected to grow to 514 lb per vehicle by 2026, up more than 25% in just 10 years. Market News and Supply Factors: - China's primary aluminum production rose by 2.9% in June YoY due to resumed production in the Yunnan province. Output rose to 3.46M mT. - The EU has added aluminum, bauxite, and alumina to its list of strategic raw materials as part of its Critical Raw Materials Act New Production Developments: The DOD and Arconic Corporation entered a \$45.5M agreement to increase production of high purity aluminum at Arconic's facility in Iowa under the Defense Production Act. Price: Aluminum costs are expected to rise to \$2,222.21/mT within 30 days, \$2,2254.8/mT in 60 days, and \$2,315.91/mT in 90 days, according to Resilinc's CommodityWatch^{AI}.
PVC	\$1,115/mT (Q4 2022)	Top companies: China Lesso Group Holdings Limited Establishmen, Hebei Bosoar Pipe Corporation, and Fujian Aton Advanced Materials Top regions: China is the top region, producing 17.9M tons annually	Use Case: PVC is used to make window frames, pipes, vinyl sliding, flooring, and more. Demand: Continuous interest rate hikes in the US impacts housing demand as mortgage rates increase, resulting in lower PVC demand (S&P Global). Market News and Supply Factors: - Shintech has reduced PVC production at its plant in Freeport, Texas, as reported on July 19 (Argus Media). - Hongda Xingye Co. Ltd. informed in early August that its subsidiaries, Inner Mongolia Wuhai Chemical Co. Ltd. and Inner Mongolia Zhonggu Mining Co. Ltd., have suspended operations in China. The closure is expected to impact PVC production (NBD). Price: PVC prices dropped significantly across Asia and the US in 2022 due to reduced housing demand and struggling real estate marketing in both China and the US. PVC prices have faced a slow rebound in 2023, with higher export prices compared to 2022 (S&P Global).

04 | Resilinc Solutions

Commodity Disruptions: Risk Mitigation & Best Practices



Part and Sub-Tier Visibility

MULTI-TIER MAPPING

Map your suppliers down to the raw material level

A small disruption in one far-off location can ripple through the supply chain for months

Capturing indirectly impacted sites by mapping material flow **puts weeks of lead time in the hands of practitioners to avoid the worst impact.**



Real-time disruption alerts

EVENTWATCH^{AI}

Monitor your supply chain 24/7 for disruptions across: legal action, regulatory change, geopolitical, compliance, supply shortage, mine shutdown

Collaborate with your suppliers and team through web and mobile app

Proactive scenario planning capability



Supplier Scorecards and Indices

RISKSHIELD

Risk scores for suppliers, sites and parts

Collaborate with your suppliers to reduce risk and learn about supply shortages, increased lead times, backlogs, etc.

Best option is to collaborate rather than find a new supplier. Focus on suppliers with the most value or whose loss would harm the company the most severely. This should include suppliers below Tier 1

If dependent on one supplier for supplies, begin looking for alternate suppliers to mitigate the impact of lost supply ahead of time



Operational Resilience and Action

PREDICTIVE ANALYTICS, CommodityWatch^{AI}

Track supplier lead time and inventory, see PO delivery delays

Track commodities for risk, opportunity, and market news

Utilize 10 quant price predictions with neural network analysis

Predict Price fluctuation and Supply Constraints

EventWatch^{AI}: Add and Monitor Your Commodities

Life Sciences

- Fluoridyne
- Fluorine
- Folic Acid
- Formic Acid
- Fumaric Acid
- Glycerol
- Guanidine Hydrochloride
- Hexamethylene-Bis hydrochloric acid
- Hydrogen Peroxide
- Hydroxyapatite
- Hypromellose Methocel
- Iron Citrate
- Isopropyl Alcohol
- Ketocaproyl
- Kerosene oil
- Pyridine
- Toluene
- +Many more

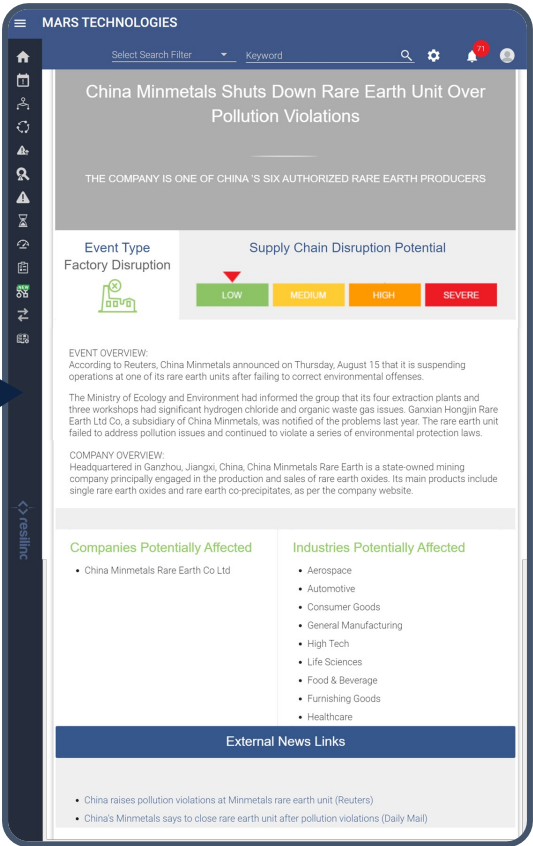
High Tech

- Gallium
- Silicon
- Gold
- Silver
- Platinum
- Palladium
- Aluminum
- Copper
- Nickel
- Tantalum
- Tungsten
- Helium
- Tungsten Hexaflouride (WF6)
- Tungsten
- Neon
- Nitrogen Trifluoride (NF3)
- Fluorspar
- Phosphate
- +Many more

Food & Beverage

- Sesame seed
- Chickpeas
- Soybean (Non-GMO)
- Garlic
- Red pepper
- Pine nuts
- Avocado
- Tomatoes
- Mango
- Cumin
- Packaging
- Vaccines
- Feed
- Fertilizer
- Perfumery
- Insecticides
- Paints
- Varnishes
- +Many more

And many more industries and categories covered



Do you need help navigating the risk?

1. Contact your Resilinc representative or fill out the [Contact Us form](#)
2. Once contacted, someone from Resilinc will assist you within 24-hours
3. Resilinc Experts will set up a 30-minute discovery call to help you navigate the risk



Thank You!

Got feedback? We want to hear it at specialreports@resilinc.com

