

GLOBAL SUPPLY CHAIN REPORT



OVERVIEW

Throughout 2021, the global supply chain has undergone a stress test unparalleled in modern history. In 2020, the pandemic closed factories, displaced workers, and crippled production worldwide, slowing shipments and disrupting the supplies of certain goods and materials. The result of the ongoing turmoil is what many experts refer to as The Big Crunch of 2021.

The buckling of the supply chain didn't start overnight, and neither is it likely to abate overnight. When the World Health Organization

first declared COVID-19 a global pandemic on March 11, 2020, people and businesses were quickly forced to restrict their activity. Around the world, manufacturing facilities, offices, and stores ground to a halt, depressing production rates and forcing companies to lay off workers. Adding to the tumult was a sudden and urgent need to realign global shipping priorities. As ports around the world went into lockdown, empty shipping containers piled up despite the entire planet suddenly being in desperate need of surgical masks, medical gowns, and other personal protective equipment — half of which was produced in China. As

government lockdowns and self-imposed quarantines continued, consumer spending rapidly shifted away from food and services to goods and materials, wreaking further havoc on already deeply contorted international supply lines.

The Big Crunch of 2021 is expected to improve over the year ahead, but material scarcity, logistical bottlenecks, and increased costs will nevertheless extend well into 2022. As 2021 comes to a close and the new year begins, companies around the world are asking two questions; is the worst over, and what comes next?

PRODUCTION DEFICITS

WHAT HAPPENED

Understanding the root causes of upheaval in the supply chain's current state is essential in determining whether the worst is already behind us and what comes next. While the global production of goods and materials began ramping back up in 2021, key shortfalls have persisted. In the United States and most other countries, a foreign dependence on key minerals in a cornered market, combined with weak production of those minerals relative to international demand, has resulted in shortages and knock-on effects that continue to depress production rates in secondary and tertiary markets.

The key minerals in question are commonly referred to as Rare Earth Elements (REEs)—a group of 17 minerals crucial in the manufacturing of many high-tech products and associated goods. REEs fall into two categories, “light” and “heavy.”

LIGHT RARE EARTH ELEMENTS	HEAVY RARE EARTH ELEMENTS
Lanthanum	Terbium
Cerium	Dysprosium
Praseodymium	Holmium
Neodymium	Erbium
Promethium	Thulium
Samarium	Ytterbium
Europium	Lutetium
Gadolinium	Yttrium
Scandium	

Currently, the majority of REE production is concentrated in just two countries; China and Australia. China, by far the greatest producer, accounts for approximately 80-85% of total worldwide REE production and Australia around 10%. Production in the United States, Burma (Myanmar), and India make up the remainder. Global efforts to bring new resources to the marketplace continue, but among the highly-valued heavy REEs, China remains virtually the only producer.

The unique magnetic, electrochemical, and luminescent properties of REEs are put to work in all manner of products and applications, including smartphones, computers, automobiles, military defense systems, medical equipment, televisions, electric vehicles, wind turbines, jet aircraft, and more. Exacerbated by 2021's global logistics crisis, the shortfall in REE production continues to cause issues for an array of products and consumer goods at numerous points in the manufacturing chain.

One needs only to look at BMW's decision in Q4 of 2021 to temporarily stop building touchscreens into several of its models, including the 3 Series sedan; 4 Series coupe, Gran Coupe, and convertible; and the popular X5, X6, and X7 SUVs. The REE shortage has hampered the production of computer chips and other technologies previously included in automobiles from the German luxury brand. This has forced the automaker to not only cut high-tech features but also slash production of the vehicles it's able to make. In turn, BMW has sent a ripple effect further down the production chain, depressing output among the company's various manufacturing partners and aftermarket suppliers.

IS THE WORST OVER?

Probably, but not by much. China hiked its annual rare earth element output quotas by 20%, its highest levels on record, at the end of September 2021. The new 168,000 Tonne quota was increased specifically to help ease the tight supply of REEs for manufacturers. However, emerging energy issues in China, including power rationing and price controls, may impact the country's ability to meet its targets and should be watched closely. Additionally, semiconductors and other technologies which use REEs remain under a heavy bind and in high demand.

WHAT COMES NEXT?

The United States will begin reducing its dependence on foreign suppliers to avoid a repeat of current REE deficits in the future. Companies like MP Materials, a rare earth mining company now operating in California's Mojave desert, are already taking up the mantle. However, success will be dependent on whether the U.S. can quickly scale up the mining, processing, and refining of REEs while competing on cost in a market that's heavily dominated by China.

LOGISTICS TURMOIL

WHAT HAPPENED

As countries closed borders and went into lockdown at the start of the pandemic, unloaded vessels and empty shipping containers began piling up in ports scattered across the globe. The result was a shortage of shipping containers in the one country that needed them the most: China.

Before the onset of the COVID-19 crisis, China had already produced 50% of the world's protective face masks. When the pandemic hit, demand for masks and other forms of personal protective equipment (PPE) surged in countries around the world. Chinese factories went into overdrive with many retasking existing production lines to meet the new demand. Worldwide, cargo vessels were rerouted to deliver protective gear produced in Chinese factories to regions that historically traded relatively little with China, such as West Africa and parts of Latin and South America. The urgent need for a specific type of good, PPE, produced predominantly in a single country resulted in a hasty and unprecedented realignment of global shipping channels.

While cargo vessels detoured from normal trade routes and empty freight containers continued stacking up in locked down

ports, consumer demand was simultaneously undergoing an abrupt shift. Government lockdowns, stay-at-home health warnings, and quarantine restrictions restrained consumers from eating out, traveling, and attending events which resulted in a sudden, sizable shift away from the purchasing of services to tangibles goods. In the United States, Americans, encouraged by government stimulus payments, moved online en masse to buy everything from home office furniture and electronics to groceries and appliances.

Global shipping and logistics, having already been hastily realigned to meet worldwide demand for PPE, were left unable to keep pace with yet another abrupt and unexpected change. As a result, orders quickly outstripped the availability of shipping containers, and the cost of shipping a container from Shanghai to Los Angeles tripled before promptly skyrocketing tenfold.

Slowly, as cargo vessels began returning to regular routes and shipping containers started to become available, product orders swiftly began overwhelming U.S. ports. With too many ships arriving at once, freighters increasingly had to wait in queues of 100-vessels or more at ports around the country. Exacerbating the situation was a nationwide shortage of truck drivers.

With too few drivers to haul freight away from the docks, containers quickly piled up on docks. A national labor shortage further compounded problems as companies struggled to hire workers. With fewer individuals on-hand to unload trucks as they arrived at warehouses, unloading and stocking times rose. Throughout 2021, from the ports to the roads and warehouses, bottlenecks appeared at every point along the delivery chain.

IS THE WORST OVER?

Unlikely. Consumer and businesses facing shortages and eyeing long lead times are ordering earlier and extra, which has placed even more strain on the system. The typical Q4 supply chain stresses of meeting demand ahead of the year-end holidays, instances of corporate hoarding, an ongoing shortage of truck drivers, and continued upheaval in the labor market point toward a rocky, uncertain, and strenuous 2022.

WHAT COMES NEXT?

Product availability will continue to be difficult and the price of supplies will remain high and may even go higher. The labor shortage is set to continue in the first quarter of 2022, possibly extending throughout the first half of the year. Political policies related to mandates, inflation, and international trade will play a substantial role in determining ongoing impacts as the supply chain has become a central political issue.

DEMAND SURGES

WHAT HAPPENED

Reacting to production deficits and growing shipping delays, businesses and consumers reacted by ordering earlier and in larger quantities, especially ahead of the year-end holiday season. As consumer spending shifted to tangible goods and businesses stockpiled essential supplies, placing further strain on an already over-burdened supply chain.

What began in 2020 with a run on toilet paper led to a vicious cycle in consumer purchasing habits throughout 2021; as traditional media ran stories about supply chain woes, more images of stockpiling emerged on social media. Shoppers, having experienced shortages of the household toiletry staple the year before, appeared determined not to be caught flat-footed once again in 2021 as panic buying continued throughout the start of the year.

Panic buying slowed over the course of the year, but the seismic changes in consumer behavior had wreaked havoc on traditional supply chain forecasting. Not even the world's largest companies were immune from the consequences of such a sudden shift in consumer spending. Amazon, the world's largest online retailer, saw online orders spike but was unable to cope with the sudden demand and experienced significant delivery date slippage, with 5% of all orders placed through its marketplace arriving later than expected. That number, while an improvement over the company's 11.4% missed delivery rate in 2020, remains notable given the online retail giant ships more than 2.5 billion packages per year.

Demand planning error jumped to 59%, up 14% from the pre-pandemic error rate of 45%. Even in the best of times, traditional forecasting is based on the presumption that history repeats itself. Beginning in 2020 and continuing throughout 2021, this presumption completely failed.

Shortages of one thing rapidly turned into shortages of others during 2021. A dearth of computer chips, for example, forced major automakers to slash production, reduced the availability of consumer electronics, delayed the manufacture of medical devices, and commonly turned the act of picking up prescription drugs into a multistore scavenger hunt.

IS THE WORST OVER?

Yes, but the situation is not likely to improve quickly. For years, some experts have warned that the global economy is overreliant on lean production, just-in-time manufacturing, and distant factories. The pandemic exposed supply chains to a demand shock that seemingly validated that view. Supply chains are still adapting, and resulting product scarcities and rising inflation are expected to remain for the foreseeable future.

WHAT COMES NEXT?

Supply chain issues are likely to last for many more months — if not years. Consumer demand is trending back to pre-pandemic, but product delays and material shortages show no signs of abating and are predicted to continue into 2023 and potentially 2024.

CONCLUSIONS

The Big Crunch of 2021 was a continuance of production and logistics issues that proved to be a hallmark feature of 2020. While 2021 was repeatedly dogged by delays and shortfalls, the year did also mark the beginning of a long and tumultuous road to recovery for the global supply chain. However, production deficits will remain for months, if not years, as shipping channels and transportation routes continue to adapt and meet consumer and business demands.

Many companies, attempting to account for current shortfalls and avoid a repeat of the last two years' supply chain struggles in the future, are continuing to reshore their supply chains to mitigate or avoid costly unplanned overseas shortages, delays, and expenses. The reshoring of supply lines and increasing shift away from practices like just-in-time manufacturing, a production model pioneered by Toyota at the end of World War II, are indicators that the supply chain is slowly recovering and is likely to emerge with a noticeably different structure than it had in the pre-pandemic era. In the years and decades that lie ahead.

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THE BIG CRUNCH OF 2021 EXPOSED THE VULNERABILITIES IN GLOBAL SUPPLY CHAINS, HIGHLIGHTING THE CRITICAL NEED FOR DOMESTIC PRODUCTION TO MITIGATE FUTURE DISRUPTIONS.

