TOPIC: SUPPLY CHAIN, STRATEGY AND FINANCE

CO_2 IN THE SKY, BUT NOT IN YOUR BEER? CO_2 SUPPLY CHAIN CHALLENGES

7 min read

Carbon dioxide (CO_2) is a topic that gets much attention in the news. Related to climate change, CO_2 emissions released into the atmosphere are a significant concern. Still, since 2021, there's been another concern for consumers related to carbonation availability for beer, soft drinks, ice, and necessary procedures in healthcare, to name a few. The threat of a CO_2 shortage has exacerbated existing problems in the beer and soft drink industries, already facing enormous supply chain pressures and inflation headwinds, especially during the summer when sales potential is the strongest. The good news is that companies can use strategies to stabilize their supply chains to avoid pricing shocks and outages by better understanding the CO_2 sector.

CO_2 isn't produced, per se, but rather a by-product from other manufacturing processes. For example, the gas or liquid can be sourced from a natural well but is also a by-product of various industrial production processes, such as petroleum, ethanol, and ammonia, to make fertilizer and, of course, in the beer manufacturing process. Since the COVID-19 pandemic, these industrial manufacturing sectors have encountered turbulence, starting with a significant drop in energy demand due to lockdowns, supply chain volatilities, contaminations of supply, such as the large Jackson Dome reserve in Mississippi, and more recently, the fallout from Russia's invasion of Ukraine in 2022. In addition, higher natural gas prices led to the use of CO_2 for enhanced oil recovery (EOR), resulting in more significant supply challenges from higher demand. Before 2020, the supply chain of producers, distributors, and customers (e.g., beer and soft drink manufacturers) paid little attention to supply strategies because CO_2 is a commodity by-product available in large quantities across different industries. As a result, the days of relatively inexpensive and highly available local CO_2 supply are over, at least in the next five years.

Beer and soft drink manufacturers can no longer manage their CO_2 supplies as they have done so in the past, effectively as a utility service within the manufacturing process. Typically, manufacturers receive their CO_2 supply from a provider as a utility, with the supplier reading telemetry meters and replenishing accordingly, with no involvement from the customer. Even beer manufacturers who produce a CO_2 by-product themselves through the fermentation process have relied on these CO_2 suppliers to manage the process, not having to give it much thought. While beer and soft drink supply chains develop strategies and detailed planning routines to ensure their cans, malt, sugar, and other materials are available for production, no such controls exist for CO_2 gas. As a result, when gas levels began to fall in their tanks and the supply didn't come in on time, these manufacturers were forced to slow down their packaging lines or, even worse, shut them down, losing sales in the process. Since 2021, many beer and soft drink manufacturers have been reacting to these events rather than addressing the root causes of the problem.

Developing a CO_2 strategy requires a company to improve its sourcing, supply planning and logistics within its network. No longer is it sufficient only to source your CO_2 supply from a local supplier without an adequate backup or network strategy. The source of your gas is linked to a specific CO_2 production process. Therefore, your CO_2 supply is based on these market forces you and your suppliers cannot directly control. For example, in the US, CO_2 sourced from the East is often from natural wells and ammonia/fertilizer production, in the Midwest from grain ethanol, in the Gulf region in natural wells and petroleum processing, and in the West from bio-ethanol and petroleum. Supply and demand fluctuations in the CO_2 sector are impacted not just by regional or national factors but global factors, as we learned in 2022. And not just in the gas supply but also in the transportation and logistics of CO_2, including storage, truck and rail transportation, and even a shortage of licensed specialized truck drivers. Beer and soft drink manufacturers need to understand that reacting to these market conditions can lead to a loss in production capacity, operational efficiency, higher cost of goods sold, and lost sales.

Beer, soft drink manufacturers, and CO_2 suppliers should now understand that they need to consider CO_2 as a strategic material within an effective supply chain system rather than a "there when you need it," always available by-product material. To transition from managing CO_2 reactively to strategically, there are some critical steps that a beer or soft drink manufacturer should undertake. First, the manufacturer should develop a strategic sourcing approach for CO_2 rather than simply finding a local supplier as a standalone model. Likewise, CO_2 suppliers must evolve their business model away from simply distributing the gas or liquid from the industrial source to commercial customers through strategic partnerships and providing value-add to the supply chain. Rather than managing supply only by reading telemetry meters and then sending trucks, both the manufacturer and supply should undergo collaborative planning processes and discussions, especially given the seasonality of the beer and soft drink businesses. Rather than a reactive reliance between suppliers and customers, higher revenue and greater profitability can be achieved through improvements in supply chain relationships. Last-minute reactions that lead to CO_2 outages and hitting the spot market in desperation are bad for all sides of the relationship. Beyond a strategic approach to CO_2 sourcing, a more strategic approach to transportation and logistics should also be developed.

Manufacturers can improve their CO_2 strategy through improvements in the measurement and management of the materials they presently receive. For example, most beer and soft drink manufacturers use a significant percentage of their CO_2 supply for non-product purposes, such as utilities. Often, there isn't a formalized aggregate plan to manage the existing supply by disparate functions within the manufacturing plant. However, suppose there is an aggregate understanding of CO_2 use within the facility. In that case, there is an opportunity to improve use yields, prioritize needs, and even develop alternatives for existing uses, such as replacing CO_2 with nitrogen to take the pressure off a finite supply. Next, there are considerable control procedure opportunities that manufacturers can implement to manage the amount of CO_2 used according to specification, as not controlling for this can lead to poor product quality and waste. Companies can implement improved procedures for CO_2 tank use, management, and maintenance, including internal and external audits to minimize waste. Another opportunity is to measure and manage the production run strategy and the production effectiveness (OEE) in running the facility. Finally, beer manufacturers should consider the cost-benefit of a CO_2 capture system to utilize the by-product of its fermentation process. These are a few of the opportunities that beer and soft drink manufacturers should consider to run their operations better, which have benefits beyond the availability of CO_2.

There are always opportunities for improvement in the fast-moving consumer goods sector; sometimes, a heightened awareness of an acute problem can lead to solutions that drive new strategic advantages. With so much emphasis in the news about these supply shortages, such as CO_2, drawing the attention of consumers who love to drink their favorite product, the silver lining for companies is to not react to the concerns but rather, to formalize the CO_2 within the supply chain network and process rather than simply considering the gas as a local utility commodity. There have been legitimate reasons for CO_2 shortages. Still, much of the reactivity is more due to a need for formalized supply chain processes, as is the case with can supplies, transportation services, and raw product materials. On the flip side of a material shortage is the opportunity to leverage market opportunities in running a more efficient and collaborative supply chain system. Inflation, geopolitical, and supply volatilities will continue for CO_2 and other materials and processes for making beer and soft drinks, and this isn't expected to change anytime soon. Companies that embrace these challenges and turn them into future opportunities will win in the market.

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