CHALLENGES PLAGUE THE MARKET

Chemical and plastic companies are facing a number of complex and interconnected issues.

OIL PRICES CONTINUE TO CLIMB

Supply issues and Russia’s invasion of Ukraine spurred oil prices to the highest level in recent history.

PLASTIC PRICES ON THE RISE

Higher feedstock costs, strong demand, and tight supplies contributed to an increase in plastic pricing.

UNCERTAIN CONDITIONS PERSIST
Deals are a moving target. A constantly shifting mix of people, numbers and timing. We’re here to simplify this process for you. Our experts are dedicated to tracking down and flushing out the values you need even on the most complex deals, so you can leverage our hard-won knowledge to close the deal.
NOLVs
- **Chemicals**: NOLVs increased two to five percentage points in recent appraisals due to strong sales and turnover, with some companies also benefiting from increases in gross margin.
- **Plastics**: NOLVs decreased up to four percentage points due to lower gross margins as companies have struggled to pass along higher acquisition costs.

SALES TRENDS
- **Chemicals**: Sales increased 10% to 40% due to stronger demand and higher selling prices, as well as comparisons to weaker periods early in the pandemic.
- **Plastics**: Sales volumes increased approximately 5% due to healthy demand for much of 2021, while sales dollars have increased up to 25% due to increases in selling prices to mitigate higher costs.

GROSS MARGINS
- **Chemicals**: While most companies increased their selling prices, not all of them were able to keep up with the significant increase in acquisition costs, resulting in gross margins increasing or decreasing up to three percentage points.
- **Plastics**: Gross margins decreased by two to seven percentage points as most companies were unable to fully pass along higher acquisition costs.

INVENTORY
- **Chemicals**: Inventory levels increased up to 40% due to higher material costs, strong demand, and increased stocking to offset supply chain issues. Rising inventories have been offset in some cases by healthy turnover rates and supply constraints.
- **Plastics**: Inventory levels were mixed, increasing or decreasing up to 15%, based on higher acquisition costs, supply chain disruptions, and the varying approaches that companies took to deal with those factors.

SELLING AND MARKET PRICES
- **Chemicals and plastics**: Last year was characterized by rising market prices for nearly all categories. Market prices for crude oil and natural gas - the key inputs for many industry products - rose through most of the year, driving up the costs of chemicals and plastics. While prices appeared poised to decline in early 2022, Russia's invasion of Ukraine caused newfound uncertainty and drove further price escalation. While most companies have implemented price increases, the degree of success in offsetting the higher costs has been mixed.
Trend Tracker - Machinery and Equipment

<table>
<thead>
<tr>
<th>Trend</th>
<th>Plastics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Used Pricing</td>
<td>Increasing ▲</td>
</tr>
<tr>
<td>Used Trade Movement</td>
<td>Increasing ▲</td>
</tr>
<tr>
<td>Technology Advancement</td>
<td>Increasing ▲</td>
</tr>
<tr>
<td>Auction Activity</td>
<td>Decreasing ▼</td>
</tr>
</tbody>
</table>

**USED PRICING**

Disruptions to OEM supply chains, coupled with a limited supply of late model used plastics machinery, caused an increase in pricing for used equipment. The higher prices were supported by long lead times and difficulty in sourcing parts. This has been particularly true for medical production, housewares, recycling, pipe, and profile equipment.

**USED TRADE MOVEMENT**

Used plastics equipment traded well in recent history due to increased lead times from OEMs, particularly medical production, housewares, packaging, pipe, and profile equipment. However, equipment for automotive and consumer sheet production has not performed as well, as manufacturers in those industries have had difficulties sourcing production materials.

**OEM PRICING**

As the economy recovers, OEMs are seeing longer lead times and increased backlogs, as well as ongoing tightness in import availability, allowing them to reduce discounts as they recover from production lost during the pandemic.

Pricing has also increased to offset higher freight costs. Shipments of new plastic injection molding machines reached an all-time high in 2021.

**TECHNOLOGY ADVANCEMENT**

The lack of skilled workers in the marketplace has driven a demand for technological innovation, particularly in regards to automation. Electric drive injection molding machines continue to make headway into the marketplace for their efficiency and reduced maintenance needs.

**AUCTION ACTIVITY**

B. Riley observed less plastics industry auction activity over the past year as business slowed during the pandemic. If the economy continues to rebound, this trend may continue. However, there has been a slight uptick in the number of plastics-related auctions in recent months.
Overview

The tumultuous market conditions that first arose in 2020 with the COVID-19 pandemic have persisted into 2022, challenging the chemicals and plastics sectors with dramatic fluctuations in market pricing, fragmented supply chains, a tense geopolitical environment, and numerous other challenges.

Recent headlines have been dominated by news of skyrocketing commodity prices, particularly crude oil. Commodity prices appeared to be easing toward the end of 2021 following a year and a half of steady gains. The reprieve was brief, however, as tight crude oil stocks and healthy demand forced prices higher to begin 2022. The situation was exacerbated by Russia’s invasion of Ukraine. Russia is one of the leading global producers of crude oil, and Europe is heavily dependent on Russian oil and gas. Sanctions imposed on Russia by both the European Union and the United States pushed crude oil prices even higher. According to data from the U.S. Energy Information Administration (“EIA”), market prices for West Texas Intermediate (“WTI”) crude oil averaged $108.50 per barrel in March 2022, the highest monthly average since 2008.

As many chemical and plastic products are derived from crude oil, material costs have risen for manufacturers. At the same time, many companies are facing dramatically higher freight and labor costs due to a shortage of truck drivers and workers. Further complicating matters is the ongoing bottleneck in the global supply chain, which has resulted in delayed shipments and extended lead times, especially for imported products.

Many industry participants have made an effort to stock up on inventory to offset disruptions to their supply chains and to continue supplying customers in a timely manner. However, such a move comes with the risk of holding higher-cost material in an uncertain market. While many chemical and plastic companies have increased their selling prices over the past year, not all of them have been successful in fully offsetting the significantly higher costs, resulting in some gross margin erosion.

While the state of the market continues to be turbulent, downstream demand appears to be healthy, lending some stability to the situation. Although conditions could change rapidly, consumer demand for automobiles, houses, building materials, durable goods, and other products was strong throughout 2021 and into 2022, often exceeding supply. Many industry participants have seen their sales increase on both a volume and dollar basis over the past year, especially when compared against the weaker demand that occurred in the early months of the pandemic.

The complex and multifaceted nature of the issues facing chemical and plastic producers make the coming months increasingly unpredictable.
Feedstocks

FEEDSTOCKS OVERVIEW
A majority of chemicals and plastics are derived from petroleum or natural gas. Any fluctuations in the prices of these commodities impact the downstream chemicals and plastics sectors.

PETROLEUM
According to the EIA, average spot prices for WTI crude oil hovered in the $60 per barrel range in the spring of 2021. Oil prices then began to climb, with the price escalation accelerating in recent months. WTI crude oil prices averaged $108.50 per barrel in March 2022.

Prices were initially driven higher by a combination of returning demand as global economies reopened coupled with low supply. More recently, the invasion of Ukraine by Russia rattled global markets and impacted the supply of crude oil globally.

![Crude Oil Cushing, Oklahoma WTI Spot Price March 2021 through March 2022 (\$ per barrel)](image1)

According to the EIA, U.S. commercial crude oil inventory for the week ended April 1, 2022 totaled 412.4 million barrels, an increase of 2.4 million barrels from the previous week. The EIA notes that inventory levels are about 14% below the five-year average for this time of year.

NATURAL GAS
According to estimates from the EIA, working gas in underground storage totaled 1,382 billion cubic feet ("Bcf") for the week ended April 1, 2022, which represents a 22.4% decrease from the previous year. The following table illustrates working gas in underground storage in the lower 48 states (units in Bcf):

<table>
<thead>
<tr>
<th>Region</th>
<th>4/1/22</th>
<th>4/1/21</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>East</td>
<td>241</td>
<td>305</td>
<td>(21.0%)</td>
</tr>
<tr>
<td>Midwest</td>
<td>296</td>
<td>398</td>
<td>(25.6%)</td>
</tr>
<tr>
<td>Mountain</td>
<td>91</td>
<td>115</td>
<td>(20.9%)</td>
</tr>
<tr>
<td>Pacific</td>
<td>165</td>
<td>197</td>
<td>(16.2%)</td>
</tr>
<tr>
<td>South Central</td>
<td>589</td>
<td>765</td>
<td>(23.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>1,382</td>
<td>1,781</td>
<td>(22.4%)</td>
</tr>
</tbody>
</table>

Henry Hub natural gas prices stood at $2.62 per million BTUs ("MBTU") in March 2021. Following that low point, prices began a steady ascent that continued into the fall of 2021. Prices declined somewhat after peaking in October but have shown renewed upward momentum in recent months, averaging $4.90 per MBTU in March 2022, according to the EIA. Gas prices have climbed due to low production levels coupled with strong demand.

![Henry Hub Gulf Coast Natural Gas Spot Price March 2021 through March 2022 (\$ per MBTU)](image2)
Chemicals

**PROPYLENE**

Propylene in the U.S. is derived from the processing of naphtha in ethylene steam crackers, as well as the refinement of petroleum into gasoline. Growth in demand for propylene has also resulted in some purposeful propylene manufacturing operations, as opposed to sourcing the material as a byproduct.

Propylene supplies were constricted in 2021 due to a number of factors, including production stoppages that occurred during the height of the pandemic in 2020 and inclement weather that caused temporary production outages. Supplies were also impacted by weak demand for gasoline, which resulted in less propylene production. At the same time, demand for downstream polypropylene was strong, causing a spike in propylene pricing. The tight market conditions have continued into 2022, with no relief in sight in the short term.

**ETHYLENE**

Ethylene is produced in the steam cracking of ethane, as well as the cracking of naphtha. One of the largest downstream uses is the production of polyethylene resin, which is one of the most commonly used plastics across the globe.

Ethylene prices climbed in the first half of 2021 due to tightness in availability that was caused by strong downstream demand and some unplanned outages stemming from storm activity. Prices were also buoyed by a spike in natural gas pricing. As supplies began to catch up with demand in the second half of the year, ethylene prices began to weaken, which was exacerbated by an easing of natural gas prices in the fourth quarter, as well as a slowdown in customer restocking. Pricing was fairly stable to begin 2022, but the Ukraine crisis has caused upward movement in commodity pricing in recent months.
Plastic Resins and Polymers

**POLYPROPYLENE**

<table>
<thead>
<tr>
<th>Three-month</th>
<th>Polypropylene Price Trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consistent</td>
<td></td>
</tr>
<tr>
<td>Increasing</td>
<td></td>
</tr>
</tbody>
</table>

Polypropylene, a polymer which is derived from propylene, is one of the world’s most commonly-used plastics.

Polypropylene prices began a long climb in the summer of 2020. With the exception of a few months of decline in the spring of 2021, prices increased through September, reaching record highs. The gains were driven by a mix of factors, including tight supplies caused by the pandemic, production outages, and storm activity; higher costs of feedstock propylene; and stronger than anticipated demand following the softness at the start of the pandemic.

After reaching those record highs, prices reversed course and dropped consistently from October 2021 through January 2022, effectively erasing the increases from earlier in 2021. The decrease was caused by some normalization of the market as supply finally began to catch up to demand. However, the downward trend was short-lived, as prices began to climb once more in the early months of 2022, driven by higher feedstock costs and the Ukraine crisis.

**POLYETHYLENE**

<table>
<thead>
<tr>
<th>Three-month</th>
<th>Polyethylene Price Trend</th>
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</table>

Polyethylene, a plastic derived from ethylene feedstock, is another of the world’s most widely used plastic materials.

In the latter half of 2020 and for most of 2021, the polyethylene market was characterized by tightness in supply and a steady escalation of market prices. While demand for polyethylene proved to be very strong following the early stages of the pandemic, producers struggled to right-size supplies. The industry contended with storm activity that disrupted production, global supply chain issues, and an inflationary market environment that further lifted pricing. These factors contributed to significantly elevated prices by the end of summer 2021.

In the fall of 2021, prices began to ease as market conditions started to stabilize. Polyethylene prices fell through the remainder of the year and into 2022. However, pricing for the material was not immune to the commodity price inflation that took hold of the market, and polyethylene prices have shown some upward momentum in recent months.
Plastics processors are reliant on demand from assorted downstream markets, ranging from the food packaging industry to automotive equipment manufacturers. Over the last year or so, the type and mix of consumer products that were in demand shifted. Companies serving those in-demand markets have generally performed well.

Values for injection molding machines have increased due to short supplies of late model machines and increased costs and lead times for new equipment. Fluctuations in resin prices are of a concern for many processors as the war in the Ukraine affects gas and oil prices. As the primary input in plastics operations, resin prices have a significant effect on plastics processors’ profitability and capital expenditures.

The secondary market for plastics equipment has tightened. OEMs have seen increases in orders and longer lead times. Equipment vintages of five years or less are the most desirable and are trading well for injection molding equipment (10 years or less for extrusion equipment). Demand for plastics equipment from the late 1990s to mid-2000s previously had fallen sharply due both to its age and the surplus of older equipment in the secondary marketplace. Long OEM lead times and a need for equipment has shown equipment from the mid-2000s to be temporarily in demand.

The auto market, which recovered far better and more quickly than originally predicted, is now facing chip shortages, resin price increases, and a lack of skilled workers. As the residential housing, remodeling, and construction markets level off, we may see a shift in the desired plastics products industries. Thus far in 2022, the production of PVC trim, pipe, conduit, composite decking, roof tiles, and appliance components has caused demand for mid-range injection molding machines and extrusion machines to remain stable.

Injection molding machines manufactured in China continue to have an impact on the plastics machinery resale market. The lower cost of this machinery as compared to counterparts built in the U.S., Europe, or Japan had some manufacturers reconsidering their equipment supply chain, especially since the onset of the COVID-19 pandemic. Additional disruptions to shipments and the high costs of overseas containers have put additional pressure on equipment from China. Accessing machinery and parts from China, as well as the volatility of trade relations with China, are concerns at the forefront of plastics processors’ minds. New machines produced in China are still available at a price point of a four- to six-year-old tier-one brand (i.e. Milacron (US), Krauss Maffei (Germany), Engel (Austria), or Nissei (Japan)). The machines produced in China come equipped with energy saving servo pump technology, name brand controls, and better warranties. However, manufacturers in China are currently battling tariffs and steeply increased shipping costs have reduced their profitability.

The U.S. Plastics Pact’s announcement that its member companies will phase out problematic plastics like polystyrene and vinyl in packaging by 2025 is noteworthy as plastics processors try to regulate themselves. This comes in the form of an overall push to make plastics more recyclable and/or compostable on the worldwide stage.

To remain competitive, U.S. manufacturers need to monitor interest rates and inflation and their effect on the housing and construction industries. Additional areas to watch will be supply-chain disruptions, labor shortages, repatriation of critical supply chain elements, plastic and chemical legislation, bans on specific plastics products, chemical recycling, inflation, and adoption of bio-resins.
Monitor Information

The *Chemicals and Plastics Monitor* relates information covering many chemicals and plastics, including industry trends, market pricing, and their relation to our valuation process. Due to the commodity nature of certain chemicals and plastic resins, timely reporting is necessary to understand an ever-changing marketplace. In addition, pricing trends are impacted by a number of macroeconomic indicators that should be monitored, and B. Riley Advisory Services strives to contextualize these indicators in order to provide a more in-depth perspective of the market as a whole. Please feel free to utilize our contact information shown in this and all *Chemicals & Plastics Monitor* issues.

The information contained herein is based on a composite of B. Riley Advisory Services’ industry expertise, contact with industry personnel, liquidation and appraisal experience, and data compiled from a variety of well-respected sources believed to be reliable. We do not guarantee the completeness of such information or make any representation as to its accuracy. B. Riley Advisory Services does not make any representation or warranty, expressed or implied, as to the accuracy or completeness of the information contained in this issue. Neither B. Riley Advisory Services nor any of its representatives shall be liable for use of any of the information in this issue or any errors therein or omissions therefrom.
Experience

B. Riley Advisory Services has worked with and appraised numerous companies within the chemicals and plastics industries. While our clients remain confidential, they include well-known and significant global, national, and regional producers and distributors of commodity and specialty chemicals, chemical intermediates, plastics, and resins for uses throughout the construction, automotive, oil and gas, food and beverage, manufacturing, and agricultural industries.

B. Riley Advisory Services has appraised companies such as the following:

- A global manufacturer of chemicals and plastics, a refiner of crude oil, and a significant manufacturer of fuel products, with annual sales of nearly $20 billion;
- One of the largest global manufacturers and distributors of high-performance polymer resins and resin-based products, with locations throughout the world and sales exceeding $3.5 billion annually;
- A manufacturer and distributor of plastic packaging such as containers, closures, tubes, and bottles, with revenue of $3.5 billion annually;
- Two of the world’s largest producers of integrated fibers and polymers, with annual sales of $1.4 billion and $3 billion, respectively;
- One of the nation’s leading specialty chemical producers, with annual revenue of over $1.5 billion;
- A distributor of crop input products to customers in the mid-southern regions of the U.S., including herbicides, various agricultural chemicals, insecticides, defoliant, surfactant, fertilizer, seed, and similar goods;
- One of Europe’s leading specialty chemical producers; and
- A producer of specialty chemicals derived from renewable resources serving the pharmaceutical, rubber production, and agricultural markets, among other industries.

B. Riley Advisory Services also maintains extensive appraisal experience with a variety of plastic bottle and plastic container manufacturers, as well as foam and foam product manufacturers. B. Riley Advisory Services has also appraised a variety of small and middle market commodity and specialty chemical manufacturers and distributors. B. Riley Advisory Services has been involved in the asset disposition and valuation of many plastics processing facilities involving injection molding, blow molding, extrusion, thermoforming, and more. Recent transactions include: Cincinnati Milacron, Collins & Aikman, Essel Propack America, Fortis Plastics, Home Products International, Hunjan Group, ILPEA Industries, Interbath, Jodee Plastics, Kamco Plastics, MedPlast, Mullinix Packages, Packaging Plus, Rantoul Products, Royal Dynamics, Thomas Plastics, and United Plastics Group.

Given our experience in both the valuation and disposition of chemicals and plastics processing equipment, B. Riley Advisory Services is uniquely qualified to not only render value opinions, but to also serve your liquidity needs through the sales of surplus and/or idle chemicals and plastics processing assets. In addition to our vast liquidation and appraisal experience, B. Riley Advisory Services maintains contacts within the chemicals/plastics industry that we utilize for insight and perspective on recovery values.
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B. Riley Financial ("B. Riley") provides collaborative solutions tailored to fit the capital raising and business advisory needs of its clients and partners. B. Riley operates through several subsidiaries that offer a diverse range of complementary end-to-end capabilities.

B. Riley recently announced the acquisition of FocalPoint Securities, LLC, a leading middle market M&A advisory investment bank. The combination of B. Riley and FocalPoint significantly enhances B. Riley’s debt capital markets and financial restructuring capabilities.

B. Riley Financial ranked No. 2 on FORTUNE 100 Fastest Growing Companies 2021 list based on revenue growth rate, EPS growth rate, and three-year annualized total return for the period ended June 30, 2021. Fortune. © 2021 Fortune Media IP Limited All rights reserved.

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