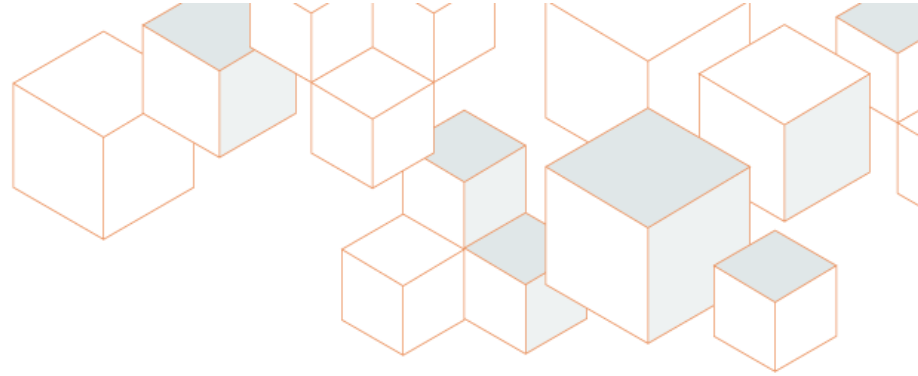


Year-End 2014 Chemical Industry Situation and Outlook

American Chemistry Builds Momentum

December 2014





American chemistry output expanded in 2014 despite weakness in key export markets and adverse winter weather. In the United States, strong gains in light vehicles and housing, two important markets for chemistry producers, drove modest economic growth. Looking ahead to 2015, recessions in Brazil, Japan and many European nations and slowdowns among other major trading partners may at first glance seem like bad news for the U.S. economic outlook but a number of other developments are likely to offset the effects of overseas developments on the U.S. economy. Faster growth in the United States compared to the rest of the world (as well as a less accommodative monetary policy) is leading to an appreciation of the U.S. dollar. Appreciation of the dollar (along with the rising supply emanating from the United States) is engendering lower prices for oil. This is reducing costs and thus stimulating production as well as restraining inflation and boosting consumer confidence, purchasing power and spending. In addition, improvement in U.S. labor markets and the manufacturing renaissance in full swing are contributing to the building momentum for the American chemical industry. We also anticipate positive supply chain impacts from unconventional oil and gas development in the U.S., through increased demand for equipment, chemicals, and services required for energy production in addition to lower fuel prices for all consumers. And eventually, a sustained global expansion will result in growing trade.

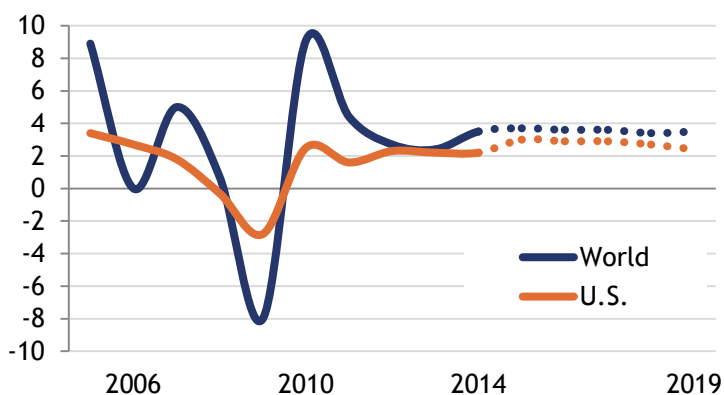
There were improved gains in chemistry production volumes in 2014 and inventories remain balanced, so growing demand in 2015 will require new production. During the past year, output gains were led by consumer chemistry and specialties. Advances in manufacturing and exports during 2015 will drive demand for basic chemicals, especially those segments in which the United States enjoys a renewed competitive advantage.

American Chemistry is building momentum as a growth industry and the wave of announcements to build new chemical capacity continues. These investments will capitalize on the profound and sustainable competitive advantage enabled by shale gas development. In addition, the industry is adding high-paying American jobs after years of trimming payrolls. Chemistry companies in the U.S. continue to innovate, focusing on improving efficiencies as well as on new leading-edge product development.

U.S. and World Macroeconomic Situation & Outlook

Strengthening fundamentals and the unconventional oil and gas advantage improve U.S. growth prospects

World GDP (market exchange basis), Real U.S. GDP
% change Y/Y



ACC's CAB signals modest growth in the U.S. into 2015.

U.S. GDP growth will be well below trend in 2014, about 2.2%. Growth is expected to accelerate to a 3.0% pace in 2015 and then moderate in the 2nd half of the decade. Long-term growth in the economy is expected to be more muted due to demographic, policy and other factors. *The U.S. chemical industry* will be a source of strength in the economic outlook as improvement in its customer industries and in emerging markets occurs and as the effects of enhanced feedstock competitiveness bolster growth.

After a promising start the global economy faltered in 2014 with heightened geo-political uncertainty, recessions in Brazil, Japan and many European nations, as well as slowdowns in China, the Euro Area and other nations. Monetary policy around the world remains accommodative and inflationary pressures are virtually non-existent.

The manufacturing sector, which represents the primary customer base for chemistry, entered a soft period in 2014 with particular weakness in Europe and East Asia. The global industrial cycle, however, is beginning to turn upwards, led by the United States the United Kingdom and other nations.

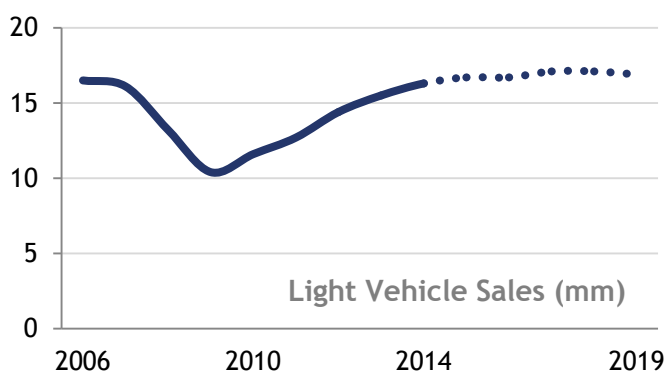
In the United States the economy is in below-potential growth as high taxes, debt and regulatory burdens still take a toll on both business and consumer confidence. As a result, businesses have been cautious and will slow capital spending in 2015. Furthermore, overseas weakness and a higher dollar dampen U.S. exports. With household deleveraging over, further improvements in the employment situation, lower oil prices fostering discretionary incomes, asset prices moving higher, consumers are starting to spend again.

Overall, growth in the U.S. economy will continue into 2015 and we can see this by examining the trends in **ACC's Chemical Activity Barometer (CAB)**. The CAB is a composite index of economic indicators that track the activity of the chemical industry. Due to its early position in the supply chain, chemical industry activity leads that in the overall economy and thus, the CAB can be used to anticipate potential turning points in the overall economy. The CAB is currently signaling slow economic growth into 2015. Indeed, the consensus forecast for U.S. GDP is for continued but modest growth, about trend in 2015, around 3.0%. This will likely ease slightly in 2016 and beyond but will be a pace stronger than that experienced in the recovery/expansion thus far. In addition, the United States is in the midst of an unconventional oil and gas boom which is supportive of economic growth and industrial activity. Long-term growth in the economy, however, will be more muted due to demographic, policy and other factors.

End-Use Markets

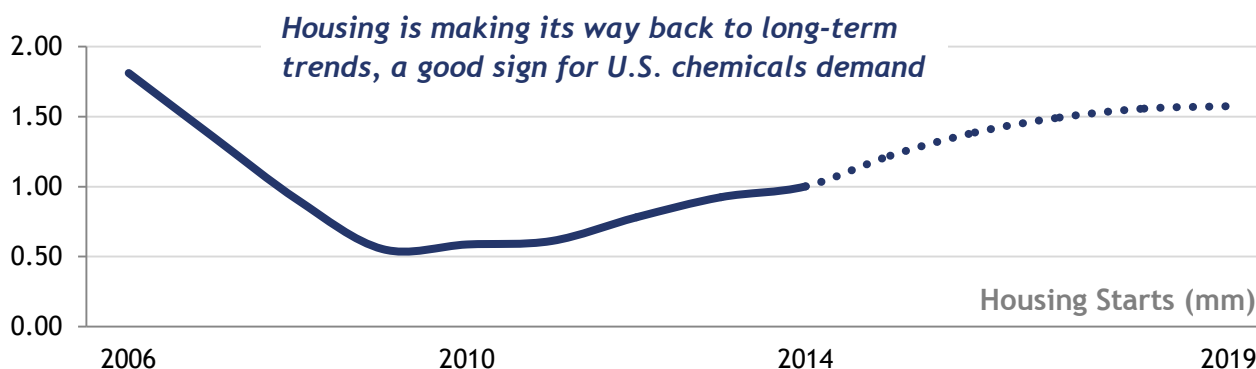
Gains in key end-use markets driven by vehicles and housing. The outlook is buoyed by improvements in export markets and supply chain impacts from unconventional oil and gas development.

Most key end-use markets for chemistry have recovered; however, several segments remain below their pre-recession peaks. During 2014, manufacturing growth improved. Leaders included light vehicles, appliances, construction materials, and some industries involved with business investment. Elsewhere, however, several manufacturing industries have yet to regain traction (textiles, paper, printing, etc.). Forward momentum for these segments depends upon demand for consumer goods, which ultimately drives factory output. In addition, the surge in unconventional oil and gas development is creating both demand side (e.g., pipe mills, oilfield machinery) and supply-side (e.g., chemicals, fertilizers, direct iron reduction) opportunities.



Light vehicles represent an important market for chemistry (nearly \$3,500 in chemistry per vehicle) and production continues to improve. U.S. light vehicle sales are expected to rise further in 2015 as pent-up demand, improving employment (and income) prospects, and better availability of credit foster growth.

Housing is the other large consumer of chemistry (about \$15,000 in chemistry per start) and the outlook is still cautious. Inventories are low as are interest rates, and better job growth will eventually lead to improved household formations, the prime long-term driver for housing. That said, housing price gains have stalled, demographic headwinds remain in place, there are shifting preferences for types of housing, and finances remain weak among many potential first-time buyers. A gain in housing starts is expected in 2015 and 2016. Activity will remain well below the previous peak of 2.07 million units in 2005 but by the second half of the decade, activity will approach the long-term underlying demand of 1.5 million units per year as suggested by demographics and replacement needs.



Housing is making its way back to long-term trends, a good sign for U.S. chemicals demand

U.S. and World Chemistry Situation & Outlook

Gathering Momentum

Despite the slowdown in global manufacturing, U.S. chemistry volume gains have improved. With an improvement in customer industries and eventually in emerging markets the effects of an enhanced competitive position with regard to feedstock costs will support U.S. chemical industry production going forward.

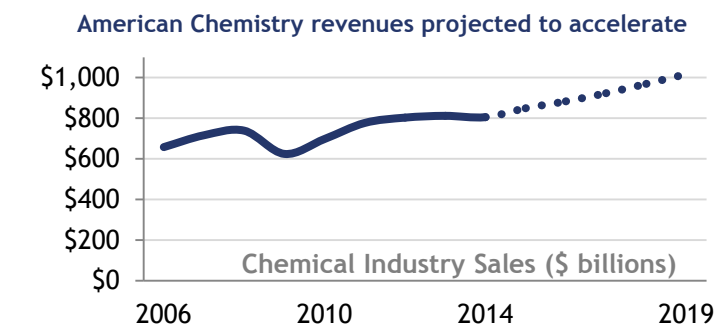
Basic chemicals (inorganic chemicals, petrochemicals, plastic resins, synthetic rubber, and man-made fibers) were the hardest hit from the recession in Japan, Brazil, etc. and the economic slowdown in other nations, despite improving demand from important customer markets such as light vehicles and housing. Downstream customers still remain cautious about building inventories but improvements in final demand could necessitate replenishing.

The consensus is that U.S. chemical output will improve during 2015 and into the second half of the decade. As a result, for chemistry, following the 0.1% gain in volumes during in 2012 and 1.3% gain in 2013, production rose at an improved 2.0% pace in 2014 and will improve to a 3.7% gain in 2015. Strong growth is expected in inorganic chemicals, organic chemistry, plastic resins and synthetic rubber as export markets revive and domestic end-use markets further improve. Production of specialty chemicals will be driven by strong demand from end-use markets; most notably light vehicles and housing. Strong 2014 gains in consumer products will moderate in 2015 and 2016. Demand for agricultural chemicals (and their supply from the U.S.) will revive. During the second half of the decade, U.S. chemistry growth is expected to expand at a pace (over 4% per year on average) exceeding that of the overall U.S. economy. Aided by an aging population, pharmaceuticals will eventually emerge as a growth segment in towards the end of the decade.

Although projected year-over-year growth rates for most segments appear strong over the next few years, they must be considered in the context of the exceptionally sharp declines seen in 2008 that continued into 2009.

Looking forward, the expected modest gains in chemical industry production volumes and stable capacity suggests improving operating rates in 2015, and with strengthening production volumes, capacity utilization could improve even further in 2016 and beyond.

In the U.S., chemical production continued to grow across all regions during 2014. The highest growth was seen in the Ohio Valley and Northeast regions, reflecting gains in specialties and consumer chemistry produced in that region. Production will expand in 2015 and into 2016. As the surge of shale-driven chemical capacity starts to come online in 2017 and beyond, growth will accelerate, especially along the Gulf Coast. By 2019, American chemistry revenues will exceed \$1.0 trillion.

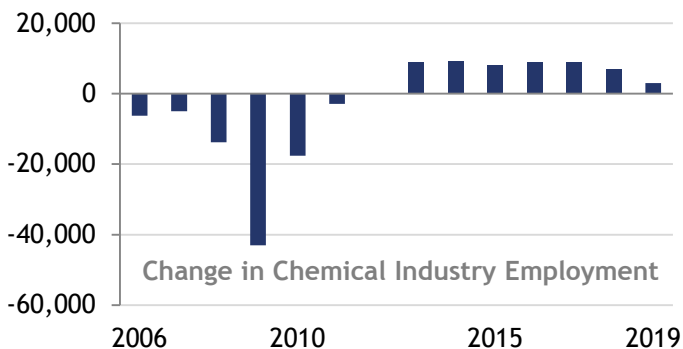


\$1 TRILLION
In U.S. chemical industry sales by 2019

U.S. chemical output is expected to rise 3.7% in 2015 and 3.9% in 2016.

IN THE LONG-TERM,
the U.S. chemical industry will grow faster than the overall U.S. economy.

Job Growth Continues



Chemical industry adding jobs

The industry's expansion has also reversed a falling trend in employment. Employment in the chemical industry is expected to have grown by 1.2% in 2014, with new jobs added through 2019. This trend is in contrast to a continuous decline in employment from 1999-2011. Because chemical industry workers are among the highest paid in the manufacturing sector, growing payrolls will strengthen local economies.

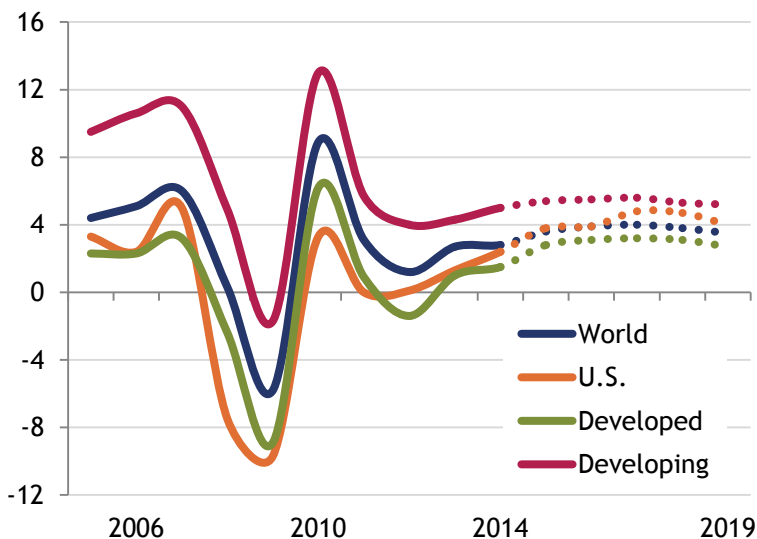
Inventories are well-balanced

Effective inventory management since the end of the Great Recession has resulted in fairly well-balanced inventories relative to shipments. For chemical manufacturers, inventories-to-shipments have ranged between 1.01 and 1.07. Since March the ratio has been trending lower and is well within historical norms.

Along the value chain downstream, businesses are reluctant to add to inventories and, as a result, levels are low. Downstream customers have been optimizing inventories. Inventories among chemical wholesalers have been mixed in recent months.

Global chemistry set to expand - largest gains in developing nations

In global chemistry, a possible tertiary recession in Europe and the slowdown in China and other emerging nations clearly affected global chemistry volumes. After much promise at the start of the year, overall global production likely advanced only 2.8% in 2014, about the same as in 2013. With improving economic prospects headline growth will improve to 3.6% in 2015 and 3.9% in 2016. The most dynamic achievements will be found in the developing nations of Asia-Pacific and Africa & the Middle East. But due to competitive advantages from shale gas, growth will be strong in North America as well. With long-term structural and competitiveness challenges, Western Europe and Japan will lag as will Latin America in the short-term. With strengthening production volumes, global capacity utilization will improve in the years to come.



Global Business of Chemistry Output
% change Y/Y

Strong Y/Y gains in chemicals output growth in the developing nations of Asia-Pacific and Africa & the Middle East but the United States captures global market share in the long-term.

Capital/Infrastructure

The U.S. is the venue for chemical investment

We need tax policies that will drive innovation, increase productivity and promote manufacturing competitiveness in the U.S.

Over 215 new chemical production projects (valued at over \$135 billion altogether) have been announced and the dynamics for sustained capital investment are in place.

Average annual gains of over 9% per year in U.S. capital spending are expected through 2017 with only a minor slowdown in growth after that.

A new capital spending cycle began in 2010 as chemical manufacturers recovered from the Great Recession. Initially in this cycle, it was sustaining capital that drove investment in the U.S. with expenditures allocated towards equipment upgrades and other efficiency investments. However, access to vast, new supplies of natural gas has created an enormous competitive advantage for American chemistry - petrochemical manufacturers in particular - and the trend in capital investment has rapidly accelerated and changed as significant expansion of existing petrochemical capacity has become the driver. As a result, capital spending surged 11.8% to \$33.3 billion. Despite the hindrance of slow global growth, uncertainty and U.S. tax policies that discourage business investment, these strong gains in capital spending for American chemistry are expected to continue. Capital spending is expected to increase more than 9% per year on average through 2017 with only a minor slowdown in growth after that. Expansions will continue and investments to improve operating efficiencies will play a role as well. By 2019, U.S. capital spending by the chemical industry will reach \$48.6 billion - more than double the level of spending at the start of this prolonged cycle in 2009.

With high profit margins, a low cost of capital and the opportunities afforded by shale gas, prodigious increases in new plant and equipment investment in the U.S. are forthcoming. The United States is being favorably re-evaluated as an investment location and petrochemical producers are announcing significant expansions of capacity in the U.S., reversing a decade-long decline. It's estimated that the gains to basic olefins capacity range from 35% to 40%. Indeed, over 215 new chemical production projects (valued at over \$135 billion altogether) have been announced through early-December and the dynamics for sustained capital investment are in place.

Access to plentiful and affordable natural gas supplies is allowing the United States to capture an increasing share of global chemical industry investment. This trend will continue as **the United States has become the location for investment.** By 2019, global chemical industry capital investment will reach \$592 billion, a level more than two times higher than it was in 2009.

\$49 BILLION

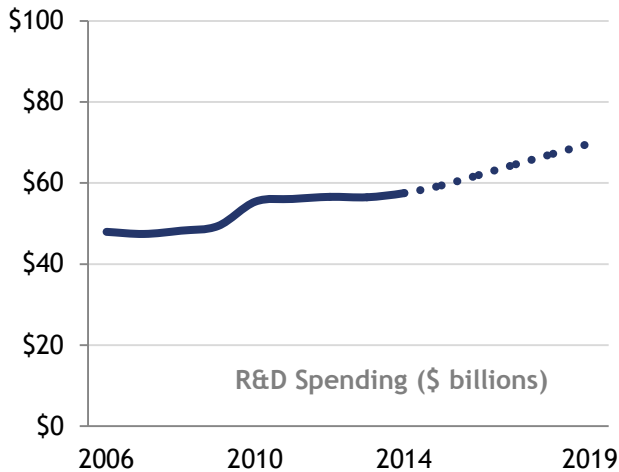
In U.S. Chemical Industry
Capital Spending by 2019

\$592 BILLION

In Global Chemical Industry
Capital Spending by 2019

Innovation

The chemical industry is one of the top private investors in R&D



Chemistry is a science and technology, knowledge-based endeavor. In 2013, the business of chemistry invested \$56.5 billion in research and development (R&D). With improved margins and prospects it is likely that R&D spending increased 1.8% to \$57.5 billion in 2014.

Companies continue to focus on improving efficiencies as well as on new leading-edge product innovations and are strengthening R&D activities. Looking forward, R&D spending is expected to increase 3.3% to \$59.4 billion in 2015. Improving gains are expected thereafter and by 2019, R&D spending will reach \$69.8 billion.

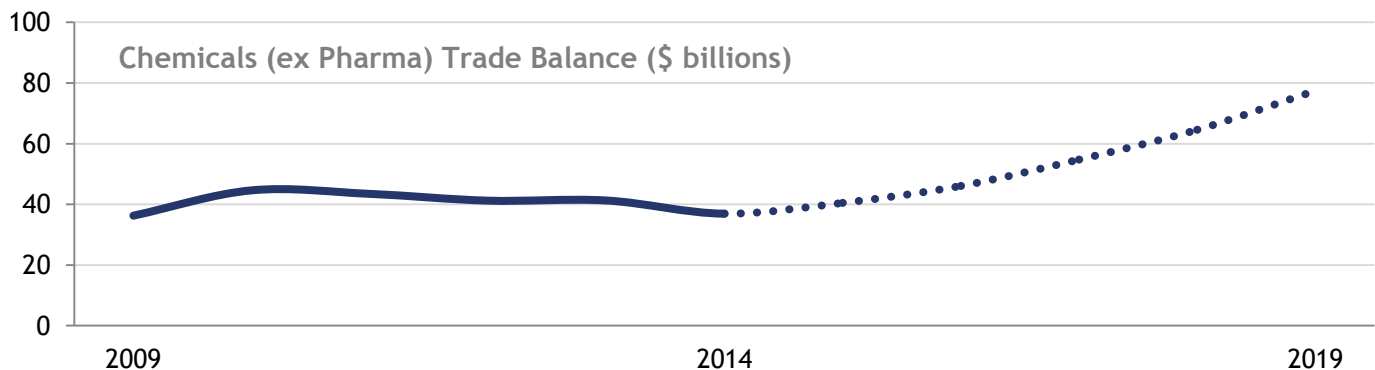
Pharmaceutical R&D spending gains will continue to outpace non-pharmaceutical segments although the latter will enjoy new buoyancy. Computational advances and other innovations are resulting in improved R&D effectiveness.

Trade

Renewed competitiveness from shale gas will boost U.S. chemicals exports

While strength in American manufacturing, improvement in labor markets and growth in key end-use markets have translated to solid domestic demand for chemicals, weakness in external markets have limited U.S. chemical export sales. Despite the competitive position American chemistry owes to a comparably favorable oil-to-gas price ratio, trouble in the economies of major trading partners means that the industry likely will not post a trade surplus until 2017. This trend is expected to reverse in 2017 with the industry positioned as a net exporter over the longer-term.

Considering chemicals trade excluding pharmaceuticals, the U.S. is a net exporter. By this measure, the industry will post a trade surplus of \$37 billion this year reflecting a \$32 billion surplus in basic chemicals. As new investments in the chemical industry come online, basic chemicals export growth will accelerate. **Excluding pharmaceuticals, the surplus in chemicals trade will grow to \$77.4 billion by 2019.**



Conclusion

As 2014 comes to a close, the business of chemistry is building momentum. Continued recovery in end-use markets, a shift in competitiveness and the eventual return of global economic growth will lift demand for American chemistry over the next several years. Inventories remain balanced, so increasing demand for chemistry will come from new production rather than stock drawdowns. ACC expects to see above-trend growth in basic chemicals over the forecast horizon, in addition to solid demand in other segments.

Innovation will also continue to drive American chemistry, with growing investments in research and development in new molecules, new applications, and new more efficient processing techniques. Research into the safety of chemical products also continues to be a significant part of companies' research programs.

With the development of shale gas and the surge in natural gas liquids supply, the United States has moved from being a high-cost producer of key petrochemicals and resins to among the lowest-cost producers globally. This shift in competitiveness is boosting export demand and driving significant flows of new capital investment toward the United States. We anticipate that recently announced new capacity for chemicals will significantly expand production when those investments come online beginning in 2015. As a result, employment in the business of chemistry will pick up. The industry is expected to add high-paying jobs through the end of the decade. We'll also see U.S. chemical exports grow and as external demand becomes more robust, we'll see the recent pattern of trade deficits shift to one of net surplus. By 2019, American chemistry will post record trade surpluses.

TABLE 1
Macroeconomic Outlook

% Change Year-over-Year unless otherwise noted	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Global Macroeconomic Indicators										
GDP (Market Exchange Rate basis)	2.9	2.4	2.5	2.6	3.0	3.2	3.3	3.2	3.3	3.4
GDP (PPP basis)	4.1	3.4	3.3	3.2	3.7	3.9	4.0	3.9	4.0	4.3
World Trade	6.7	2.9	3.0	3.6	4.9	5.5	5.4	5.3	5.3	5.6
Industrial Production	4.4	2.7	2.4	3.4	3.6	3.6	3.6	3.4	3.5	3.5
Consumer Prices	5.2	4.2	3.9	3.1	3.1	3.3	3.2	3.2	3.1	2.9
U.S. Macroeconomic Indicators										
GDP	1.6	2.3	2.2	2.2	3.0	2.9	2.9	2.7	2.4	2.5
Consumer Spending	2.3	1.8	2.4	2.2	2.8	2.8	2.7	2.5	2.1	2.4
Business Investment	7.7	7.2	3.0	6.0	5.5	5.6	5.7	5.1	4.5	3.2
Industrial Production	3.3	3.8	2.9	4.0	3.5	3.6	3.3	3.0	2.8	2.4
Light Vehicle Sales (mm)	12.7	14.4	15.5	16.3	16.7	16.7	17.1	17.1	16.9	16.8
Housing Starts (mm)	0.612	0.781	0.925	1.002	1.221	1.368	1.494	1.558	1.575	1.573
Consumer Prices	3.1	2.1	1.5	1.8	1.7	2.1	2.1	2.2	2.1	2.1
10-Year Treasury Notes (%)	2.79	1.80	2.35	2.71	2.98	3.55	4.11	4.46	4.43	4.69
Unemployment Rate (%)	9.0	8.1	7.4	6.2	5.7	5.6	5.4	5.3	5.4	5.1
Exchange Rate (\$U.S./euro)	1.39	1.29	1.33	1.33	1.27	1.22	1.22	1.22	1.28	1.25
U.S. End-Use Market Output										
Construction	3.0	4.6	4.2	3.5	6.7	6.1	4.3	3.2	3.1	2.2
Food, Beverages & Tobacco	0.1	3.6	1.2	1.7	1.8	1.9	2.2	2.2	1.9	1.4
Textile Mill Products	0.9	0.4	-0.9	0.8	0.0	-0.9	-1.8	-2.1	-2.3	-2.2
Apparel	-5.9	-3.7	2.8	0.0	-1.6	-1.7	-2.0	-2.4	-2.7	-2.9
Structural Panels	1.8	4.9	9.9	4.2	6.2	5.9	2.6	1.8	2.2	2.0
Paper	0.1	-2.2	-0.5	-2.1	2.0	1.6	1.5	1.4	1.2	1.0
Printing	-1.0	-2.4	-0.6	1.4	0.1	-0.3	0.0	0.3	0.4	0.8
Petroleum Refining	1.7	0.4	2.6	2.7	2.4	2.1	1.3	1.4	1.1	0.7
Rubber & Plastic Products	1.8	3.5	4.6	6.5	4.7	3.6	3.6	3.5	2.8	2.5
Iron & Steel	9.1	3.7	-1.0	2.4	6.4	5.0	3.9	2.8	2.9	2.6
Fabricated Metal Products	8.0	7.2	3.5	4.2	4.5	4.6	3.6	2.9	2.5	2.7
Computers Semiconductors & Electronic Components	9.6	10.6	6.9	2.7	7.3	7.1	6.2	5.7	4.9	3.7
Components	23.8	18.0	11.7	8.6	9.8	10.0	8.8	8.4	8.1	8.0
Appliances	-2.4	-0.8	7.8	4.5	5.3	4.7	3.6	2.6	2.4	2.3
Motor Vehicles & Parts	9.0	14.8	7.8	7.6	4.6	3.3	2.0	2.0	1.3	2.1
Aerospace	0.4	7.7	1.3	2.3	7.8	7.8	6.4	5.4	4.6	5.0
Furniture	2.8	2.8	3.3	6.6	4.2	2.1	1.1	0.5	0.3	1.8

TABLE 2
U.S. Chemistry Outlook: Production Volumes

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Total Chemicals Production Volume	0.0	0.1	1.3	2.0	3.7	3.9	4.8	4.7	4.0	3.5
Production Volume by Segment										
Pharmaceuticals	1.6	-3.3	-1.3	1.1	3.0	3.5	4.0	4.6	4.4	4.3
Chemicals, excl. Pharmaceuticals	-0.9	1.9	2.7	2.4	4.0	4.0	5.2	4.8	3.8	3.0
Agricultural Chemicals	-6.0	2.9	7.9	0.0	2.7	4.9	7.2	4.8	2.7	1.4
Fertilizers	-12.0	0.0	6.0	-2.5	2.8	6.0	9.4	6.5	3.6	1.2
Crop Protection	6.1	9.8	12.4	1.8	2.6	4.1	5.6	3.6	2.1	1.5
Consumer Products	5.1	2.1	3.8	6.5	4.6	2.4	2.4	2.4	2.4	2.4
Basic Chemicals	-2.3	0.4	-0.1	0.7	3.8	4.5	6.4	6.1	4.7	3.3
Inorganic Chemicals	-3.0	4.0	-4.8	1.9	4.4	3.8	3.9	3.6	2.7	2.4
Bulk Petrochemicals & Organics	-1.2	-1.7	1.4	0.0	3.5	4.9	7.5	7.3	5.6	3.7
Plastic Resins	-6.1	1.1	0.2	1.0	4.2	4.6	6.8	6.6	5.3	3.7
Synthetic Rubber	4.6	6.6	7.3	2.9	4.4	3.8	5.2	5.0	3.8	2.7
Man-Made Fibers	5.2	4.3	5.9	-1.7	0.0	0.5	1.8	1.9	1.3	0.1
Specialties	-1.4	7.6	8.9	3.8	4.6	4.5	4.1	3.5	3.2	3.0
Coatings	0.4	9.0	10.2	4.5	5.4	4.5	3.8	2.9	2.9	3.2
Other Specialties	-2.0	7.0	8.4	3.5	4.3	4.5	4.2	3.8	3.3	3.0
Production Volume by Region										
Gulf Coast	-2.1	0.7	0.9	1.1	3.8	4.3	5.9	5.6	4.3	3.1
Midwest	0.1	-0.2	1.2	1.9	3.6	3.8	4.6	4.6	4.0	3.5
Ohio Valley	-0.8	2.1	3.0	2.6	4.1	3.9	4.9	4.5	3.7	2.9
Mid-Atlantic	0.9	-1.0	0.6	2.0	3.5	3.6	4.3	4.4	4.0	3.7
Southeast	-0.3	0.1	1.7	1.9	3.6	3.8	4.8	4.6	3.8	3.2
Northeast	1.1	-0.4	1.4	2.4	3.6	3.6	4.0	4.2	3.8	3.6
West Coast	1.0	-1.1	0.9	1.9	3.5	3.6	4.2	4.3	4.0	3.7
Capacity	-2.5	0.4	1.2	1.3	2.3	3.3	4.0	4.3	4.3	3.3
Capacity Utilization (%)	75.6%	75.3%	75.4%	75.9%	76.9%	77.3%	77.8%	78.2%	77.9%	78.8%

TABLE 3
U.S. Chemistry Outlook: Trade

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Exports (billions)	\$187.3	\$188.3	\$189.1	\$192.9	\$201.6	\$217.2	\$236.5	\$257.7	\$281.7
Imports (billions)	\$191.1	\$187.5	\$185.7	\$197.8	\$206.3	\$218.5	\$230.0	\$242.4	\$252.8
Trade Balance (billions)	-\$3.7	\$0.8	\$3.4	-\$4.9	-\$4.7	-\$1.3	\$6.5	\$15.3	\$28.9
Pharmaceuticals	-\$47.2	-\$40.4	-\$37.9	-\$41.7	-\$45.2	-\$47.3	-\$48.2	-\$49.3	-\$48.5
Chemicals, excluding Pharma.	\$43.5	\$41.2	\$41.3	\$36.9	\$40.5	\$46.1	\$54.8	\$64.6	\$77.4
Consumer Products	\$2.4	\$2.3	\$2.1	\$1.9	\$1.7	\$1.1	\$0.3	-\$0.4	-\$1.1
Agricultural Chemicals	-\$5.0	-\$5.0	-\$4.0	-\$3.8	-\$2.8	-\$2.8	-\$2.8	-\$2.7	-\$2.5
Specialties	\$11.4	\$10.3	\$9.2	\$7.3	\$7.0	\$7.4	\$8.1	\$8.8	\$10.1
Basic Chemicals	\$34.7	\$33.5	\$34.0	\$31.6	\$34.5	\$40.4	\$49.2	\$58.8	\$70.9

TABLE 4
U.S. Chemistry Outlook: Other Indicators

	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Capacity	-2.5	0.4	1.2	1.3	2.3	3.3	4.0	4.3	4.3	3.3
Capacity Utilization (%)	75.6%	75.3%	75.4%	75.9%	76.9%	77.3%	77.8%	78.2%	77.9%	78.8%
Shipments (billions)	\$776.8	\$802.9	\$811.6	\$805.1	\$849.0	\$883.0	\$923.0	\$969.0	\$1,017.0	n/a
% Change Year-over-Year	11.3	3.4	2.4	-0.8	5.5	4.0	4.5	5.0	5.0	n/a
R&D Spending (billions)	\$56.07	\$56.59	\$56.49	\$57.51	\$59.40	\$61.96	\$64.62	\$67.21	\$69.76	n/a
% Change Year-over-Year	1.2	0.9	-0.2	1.8	3.3	4.3	4.3	4.0	3.8	n/a
Capital Spending (billions)	\$25.76	28.66	\$29.82	\$33.34	\$36.28	\$39.46	\$42.82	\$45.75	\$48.63	n/a
% Change Year-over-Year	26.6	11.27	4.0	11.8	8.8	8.8	8.5	6.8	6.3	n/a
Employment (thousands)	783.6	783.6	792.6	802.0	810.0	819.0	828.0	835.0	838.0	n/a
% Change Year-over-Year	-0.4	0.0	1.2	1.2	1.0	1.1	1.1	0.8	0.4	n/a
Hourly Wages (\$/hour)	\$21.47	\$21.43	\$21.36	\$21.52	\$22.10	\$22.70	\$23.30	\$24.00	\$24.70	n/a
% Change Year-over-Year	1.8	-0.2	-0.3	0.7	2.7	2.7	2.6	3.0	2.9	n/a

TABLE 5
Global Business of Chemistry Production Outlook by Country and Region

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
United States	0.0	0.1	1.3	2.0	3.7	3.9	4.8	4.7	4.0	3.5
Canada	-5.7	-2.4	1.3	0.6	2.8	3.0	3.2	3.1	2.3	2.1
Mexico	0.2	-0.7	0.5	1.8	5.1	6.1	3.8	3.5	3.5	3.4
North America	-0.2	-0.3	1.4	1.9	3.7	3.9	4.6	4.5	3.9	3.4
Brazil	-3.8	0.9	3.3	-1.1	1.7	2.7	4.0	3.6	4.3	3.6
Other Latin America	3.4	-0.5	-1.9	1.3	3.8	3.8	4.2	3.9	3.5	3.3
Latin America	-0.2	0.2	0.6	0.2	2.7	3.2	4.1	3.7	3.9	3.5
France	2.5	0.9	0.8	0.1	0.8	2.3	2.4	2.4	2.1	2.0
Germany	3.5	-2.9	1.9	0.4	2.3	1.9	1.3	1.1	1.0	1.2
Italy	-0.8	-3.0	0.4	0.6	1.0	1.5	1.5	1.2	1.0	0.9
United Kingdom	-3.4	-4.1	-1.5	1.1	1.8	1.5	1.2	1.4	1.6	1.8
Belgium	10.6	-4.8	8.9	4.5	2.5	2.9	2.9	2.7	2.6	2.5
Ireland	2.5	-5.8	-6.5	7.0	3.6	3.4	3.0	2.9	3.1	3.5
Netherlands	0.3	3.7	-2.8	2.3	1.4	1.3	1.2	1.3	1.4	1.6
Spain	1.8	-3.9	-1.0	1.6	1.4	2.4	2.6	2.6	2.3	1.8
Sweden	11.7	3.1	0.1	-3.7	2.2	3.6	3.1	2.8	2.6	2.4
Switzerland	-0.8	4.8	-1.2	3.4	3.7	4.0	3.6	3.4	3.2	3.0
Other	4.3	-1.3	1.1	2.0	2.4	2.1	2.0	2.1	2.0	2.1
Western Europe	2.1	-1.8	0.3	1.4	1.9	2.1	1.9	1.8	1.8	1.8
Russia	5.6	-9.5	-0.9	-2.5	1.5	3.5	4.1	4.8	5.5	4.4
Other Central/Eastern Europe	2.8	3.3	-1.2	2.5	3.6	4.4	4.3	4.0	3.7	3.6
Central/Eastern Europe	4.2	-3.4	-1.0	0.1	2.6	4.0	4.2	4.4	4.6	4.0
Africa & Middle East	3.1	2.7	3.8	4.5	4.5	4.5	5.5	4.6	4.4	4.1
Japan	-0.2	-3.2	2.0	1.4	1.5	2.2	1.9	1.4	1.1	1.0
Asia-Pacific excluding Japan	7.7	6.4	6.1	6.5	6.3	6.3	6.1	5.7	5.6	5.2
China	10.7	9.3	7.4	9.5	8.2	7.5	7.3	6.9	6.7	6.2
India	2.4	1.5	7.8	2.5	3.9	5.8	6.5	6.5	6.5	6.5
Australia	0.1	-0.7	0.7	-0.8	2.4	2.5	2.5	2.5	2.3	2.1
South Korea	3.1	3.5	3.8	2.4	3.7	4.4	4.0	3.2	3.3	2.8
Singapore	7.4	-3.3	1.4	8.7	5.8	5.7	4.0	4.3	4.0	3.5
Taiwan	-0.9	-3.1	1.2	2.7	3.2	2.9	3.9	2.8	2.9	2.3
Other Asia/Pacific	8.1	7.0	4.2	4.1	6.1	6.2	5.4	5.8	5.4	5.1
Asia/Pacific	6.1	4.6	5.4	5.3	5.2	5.3	5.1	4.7	4.6	4.2
Total World	3.1	1.2	2.7	2.8	3.6	3.9	4.0	3.8	3.5	3.3
Developed	0.9	-1.4	1.0	1.5	2.8	3.1	3.2	3.1	2.7	2.5
Developing	5.7	4.0	4.3	5.0	5.4	5.5	5.6	5.3	5.2	4.8

TABLE 6
Global Business of Chemistry Production Outlook by Segment

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Total Chemicals	3.1	1.2	2.7	2.8	3.6	3.9	4.0	3.8	3.5	3.3
Pharmaceuticals	3.0	0.6	2.3	3.3	3.5	4.0	4.2	4.6	4.5	4.2
Total, excluding Pharmaceuticals	3.2	1.5	2.8	2.7	3.6	3.8	4.0	3.5	3.3	3.0
Consumer Products	5.1	0.8	3.5	2.2	3.0	3.6	4.0	3.6	3.0	2.8
Agricultural Chemicals	2.0	6.4	2.7	3.4	3.3	3.3	3.2	3.3	3.2	2.9
Specialties	2.9	1.7	3.7	3.6	4.2	4.4	4.0	2.7	2.6	3.3
Coatings	3.2	1.9	3.4	3.0	3.3	3.6	3.4	3.2	2.9	2.5
Other Specialties	2.8	1.6	3.8	3.8	4.5	4.8	4.2	2.5	2.5	3.7
Basic Chemicals	3.1	0.9	2.4	2.3	3.6	3.7	4.1	3.8	3.5	2.9
Inorganics	3.3	2.1	1.4	2.5	3.8	3.8	3.9	3.6	3.2	2.6
Bulk Petrochemicals & Organics	3.1	-1.5	1.1	1.5	3.5	3.8	4.3	4.0	3.5	2.9
Plastic Resins	1.8	2.4	4.0	3.5	4.2	4.1	4.6	4.3	4.1	3.6
Synthetic Rubber	6.5	4.5	5.1	2.9	3.8	4.1	4.1	4.3	4.1	3.2
Man-Made Fibers	6.3	5.1	5.0	3.0	3.2	3.5	3.7	3.5	3.3	2.6

TABLE 7
Global Chemical Capital Spending

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Global Capacity	2.1	3.5	5.0	4.0	3.8	4.0	4.3	4.3	4.3	4.0
Global Capacity Utilization	87.3%	85.3%	83.4%	82.5%	82.3%	82.2%	82.0%	81.6%	81.0%	81.7%
Capital Spending (billion US\$)	\$367.4	\$401.1	\$426.7	\$447.3	\$469.2	\$496.7	\$525.7	\$557.2	\$591.7	n/a
% Change	17.9	9.2	6.4	4.8	4.9	5.9	5.8	6.0	6.2	n/a

TABLE 8
Global Economic Environment: Real GDP

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Real GDP										
United States	1.8	2.8	2.2	2.2	3.0	2.9	2.9	2.7	2.4	2.5
Canada	2.5	1.7	2.0	2.3	2.5	2.5	2.3	2.2	2.2	2.2
Mexico	4.0	4.0	1.1	2.3	3.6	3.9	4.0	3.8	3.7	3.7
Brazil	2.7	1.0	2.5	0.2	1.2	2.4	3.1	3.2	3.2	3.5
United Kingdom	1.1	0.3	1.7	3.0	2.6	2.4	2.4	2.3	2.3	2.2
Eurozone	1.6	-0.7	-0.4	0.8	1.2	1.7	1.7	1.6	1.5	1.6
France	2.1	0.3	0.3	0.4	0.9	1.4	1.6	1.4	1.4	1.7
Germany	3.4	0.9	0.5	1.4	1.5	1.8	1.6	1.5	1.5	1.4
Italy	0.5	-2.4	-1.9	-0.3	0.5	1.0	1.1	1.0	1.0	1.1
Spain	0.1	-1.6	-1.2	1.2	1.7	2.0	2.1	2.1	2.1	1.9
Russia	4.3	3.4	1.3	0.2	0.4	2.2	3.0	2.9	3.0	3.1
Japan	-0.5	1.5	1.5	0.7	1.2	1.1	1.2	1.1	1.1	1.2
China	9.3	7.7	7.7	7.4	7.0	6.8	6.7	6.6	6.5	6.2
India	6.6	4.7	5.0	5.5	6.4	6.7	7.0	7.1	7.1	7.1
South Korea	3.7	2.3	3.0	3.5	3.6	3.8	3.7	3.6	3.5	3.0
World GDP (Market Exchange)	2.9	2.4	2.5	2.6	3.0	3.2	3.3	3.2	3.3	3.4
World GDP (PPP)	4.1	3.4	3.3	3.2	3.7	3.9	4.0	3.9	4.0	4.3
World Trade	6.7	2.9	3.0	3.6	4.9	5.5	5.4	5.3	5.3	5.6

TABLE 9
Global Economic Environment: Industrial Production

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Industrial Production										
United States	3.3	3.8	2.9	4.0	3.5	3.6	3.3	3.0	2.8	2.4
Canada	3.9	0.9	1.9	3.5	2.3	2.7	2.6	2.6	2.6	2.5
Mexico	4.0	3.6	-0.5	3.1	4.2	3.9	3.9	3.9	3.9	3.5
Brazil	0.3	-2.6	1.6	-2.7	1.4	2.8	3.1	3.1	3.1	3.3
United Kingdom	-0.7	-2.3	-0.3	2.5	2.1	1.9	1.7	1.6	1.5	1.4
Eurozone	3.1	-2.3	-0.9	1.0	1.7	2.0	1.9	1.7	1.6	1.4
France	2.1	-2.8	-0.6	-0.7	1.2	2.3	2.2	1.7	1.6	1.6
Germany	8.1	-0.6	0.0	1.7	2.0	1.8	1.6	1.5	1.6	1.6
Italy	-0.7	-6.2	-3.0	-0.5	0.4	1.3	1.6	1.4	1.4	1.4
Spain	-1.4	-6.1	-1.7	1.4	1.9	2.4	2.6	2.4	2.2	1.9
Russia	4.7	2.5	0.3	0.3	1.9	2.4	2.9	3.1	3.1	3.3
Japan	-2.5	-0.3	-0.7	2.4	2.5	2.0	3.0	2.3	1.8	1.1
China	9.6	10.1	9.7	8.8	8.2	7.9	7.7	7.5	7.6	7.5
India	4.8	0.8	0.2	2.8	6.3	6.7	6.9	7.2	7.3	7.8
South Korea	5.9	0.9	-0.6	2.0	4.3	5.1	4.7	4.4	4.1	3.7
World Industrial Production	4.4	2.7	2.4	3.4	3.6	3.6	3.6	3.4	3.5	3.5

TABLE 10
Global Economic Environment: Inflation (Consumer)

% Change Year-over-Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average 2020-24
Inflation (Consumer)										
United States	3.1	2.1	1.5	1.8	1.7	2.1	2.1	2.2	2.1	2.1
Canada	2.9	1.5	1.0	1.9	1.8	2.1	2.0	2.0	2.0	2.0
Mexico	3.4	4.1	3.8	3.9	3.6	3.7	3.5	3.3	3.3	3.5
Brazil	6.6	5.4	6.2	6.4	5.9	5.4	5.1	4.7	4.4	4.1
United Kingdom	4.5	2.8	2.6	1.6	1.7	2.1	2.1	2.1	2.1	2.1
Eurozone	2.7	2.5	1.3	0.6	1.0	1.4	1.7	1.7	1.8	1.8
France	2.3	2.2	1.0	0.7	0.9	1.4	1.6	1.4	1.4	1.9
Germany	2.5	2.1	1.6	1.0	1.5	1.7	1.8	1.7	1.7	1.7
Italy	2.9	3.3	1.3	0.2	0.5	1.1	1.4	1.7	1.7	1.9
Spain	3.1	2.4	1.5	0.0	0.4	1.0	1.5	1.6	1.7	2.0
Russia	8.4	5.1	6.8	7.5	7.1	5.9	5.4	5.0	4.6	4.4
Japan	-0.3	0.0	0.4	2.7	1.9	1.9	1.8	1.8	1.8	1.6
China	5.4	2.6	2.6	2.2	2.4	2.8	2.7	3.2	3.2	3.3
India	9.5	10.2	9.5	7.8	7.1	6.3	6.3	6.1	6.0	5.7
South Korea	4.0	2.2	1.3	1.5	1.9	2.5	2.7	2.7	2.8	2.7
World Inflation	5.2	4.2	3.9	3.1	3.1	3.3	3.2	3.2	3.1	2.9

Methodology

This report presents an assessment of current conditions and expectations for the global business of chemistry, with particular emphasis on the U.S. The analysis uses economic data and publicly available information through mid-November 2014.

In looking ahead, several models of global output, trade, etc. for the business of chemistry are employed. Also taken into account are the forecasts made by economists at the national chemical associations in Europe (whose expertise ACC gratefully acknowledges) and from economic forecasting consultants and other institutions. Also gratefully acknowledged is the macroeconomic and chemical industry expertise of IHS Global Insight and Oxford Economics, leading providers of economic advice and consultancy services. The macroeconomic forecasts of the Economist Intelligence Unit (EIU) were also important to our thinking as was the U.S. Industrial Outlook of the Manufacturers Alliance/MAPI. These were supplemented by forecasts provided by the Asian Development Bank, IMF, OECD, the WTO, and various banks.

For More Information

More details, historical data (back to 1994) and annual projections (to 2019 and beyond) for the tables in the report are available in spreadsheet format. For more information or to access the detailed data, contact ACC's Economics Department: ACC_EconomicsDepartment@americanchemistry.com

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