

REACTION

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KPMG GLOBAL CHEMICALS INSTITUTE

The US chemicals industry in 2015

kpmg.com/reaction



cutting through complexity



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Introduction

Welcome to the latest edition of Reaction Magazine. With reporting season in full swing, it's hard to believe that we're already past the first half of the year. Overall activity in the industry remains broadly robust, although everyone is keeping a close eye on the continuing rebalancing of the Chinese economy and what that means for future growth prospects. Despite some skepticism in western media, our analysis suggests that the official Chinese growth figures, in the chemical industry at least, are broadly accurate, albeit with huge variations between various sub-sectors of the industry.

In this edition, we bring you a focus on the US chemical industry, including what the recent fall in the oil price means for the shale boom, as well as how activist investor pressure is affecting business strategy in many companies across the industry. We also take a look at talent management, an item which seems to be one of the top three issues for many executives in the industry.

As always, we continue to be active in the industry, with members of our Chemicals and Performance Technologies leadership team recently visiting Saudi Arabia and Qatar as part of a Middle East tour. In October, we'll again be hosting our annual Chemicals Executive Dinner in Shanghai and hope to see as many of you there as possible.

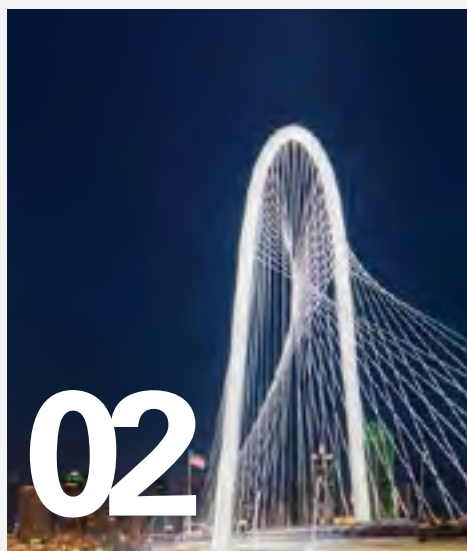
We'll be back with our next edition in December, which will focus on the chemicals industry in South Korea and how chemical companies are utilizing the latest data & analytics tools to optimize performance. If there are any other topics you would like us to cover in future editions of Reaction, please don't hesitate to contact us.



Mike Shannon

Global Chair
Chemicals and
Performance Technologies

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Gas-powered growth continues for US chemical companies

By **Mike Shannon**

Backed by low feedstock prices from shale gas, US chemical companies are maintaining steady growth in 2015. Overcapacity might become an issue within the next few years as a new generation of plants comes online. Companies are also challenged by regulatory restraints and investor activism. Nevertheless, expanding markets, both at home and abroad, relatively cheap energy costs, a strong infrastructure and competitive product prices all suggest that the US chemical industry will continue to enjoy the competitive advantages of the 'shale gale' for at least the rest of the decade.





Overall, the US economy is on track for its best year since 2005.² Projected growth for 2015 is currently 3.9 percent.³ The country has an unemployment rate of 5.7 percent, one of the lowest among developed economies. Companies added more than 1 million new jobs in 4Q 2014, the best showing since 1997.⁴

The rising tide of the US economy is helping a variety of industries, not the least of which is chemical manufacturing. In 2014, the US chemical industry expanded at a solid growth rate of 2.0 percent, with expected gains of 3.2 percent in 2015 and 3.0 percent in

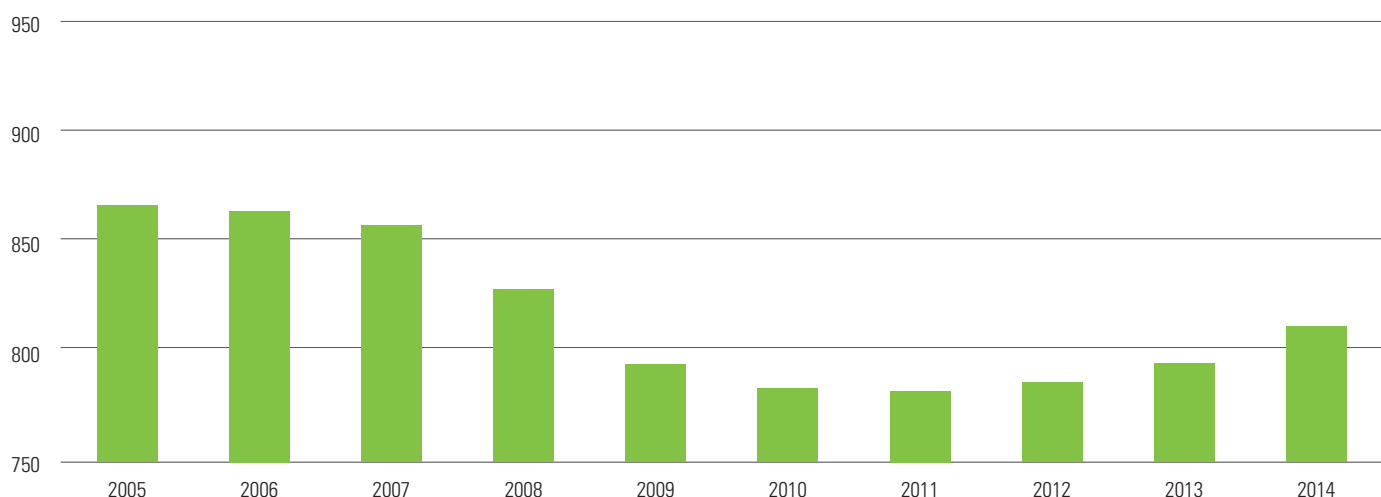
2016, all above the average growth rate for US manufacturing.⁵

The industry has directly created almost 800,000 jobs.⁶ In the plastics sector alone, manufacturers will add 127,500 direct jobs over the next decade, a figure based on US\$135 billion in investments that companies have announced since 2010.⁷ Revenues in 2014 reached US\$812 billion and the industry accounted for 15 percent of the world's chemicals.⁸ By 2019, American chemistry sales will most likely exceed US\$1 trillion.⁹

“During the second half of the decade, US chemistry growth is expected to expand at a pace of more than 4 percent per year on average, exceeding that of the overall US economy.”

Kevin Swift
Chief Economist,
American Chemistry Council

US chemical industry employment (in thousands)



Note: Please note that future data was not available

Source: United States Department of Labor, Bureau of Labor and Statistics

¹ Lower Oil Prices; Recovery of End Use Markets Puts Wind Back In The Sails Of American Chemistry, press release, American Chemistry Council, 11 December 2014

² CNNMoney.com, <http://money.cnn.com/2015/04/14/news/economy/economy-growth-imf/>

³ United States and Canada: a Solid Recovery, IMF, April 2015

⁴ At last, a proper recovery, The Economist, 14 February 2015

⁵ Economic Outlook for U.S. Chemical Industry Strong; Long-Term Growth to Accelerate and Outpace Overall U.S. Economy, press release, American Chemistry Council, 2 June 2015

⁶ US Bureau of Labor Statistics, <http://www.bls.gov/iag/tgs/iag325.htm>

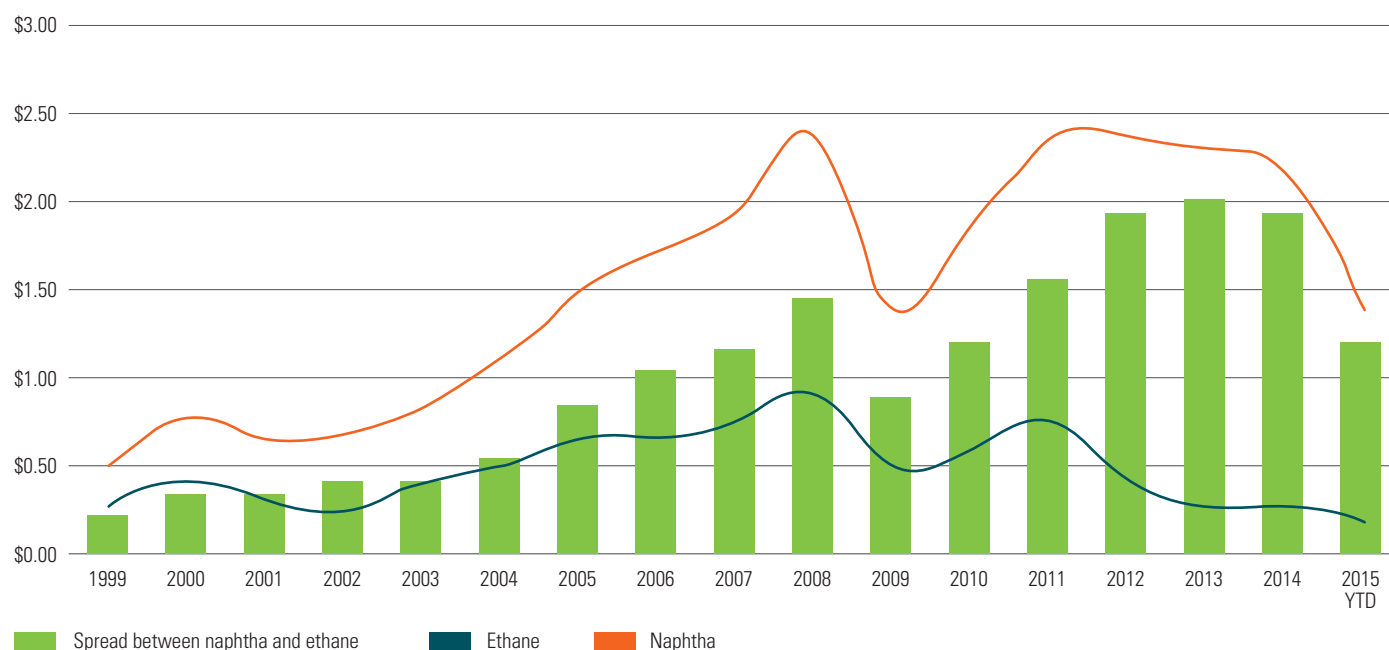
⁷ Shale Gas Creating Renaissance in U.S. Plastics Manufacturing, press release, ACC, 13 May 2015

⁸ Ibid.

⁹ Ibid.

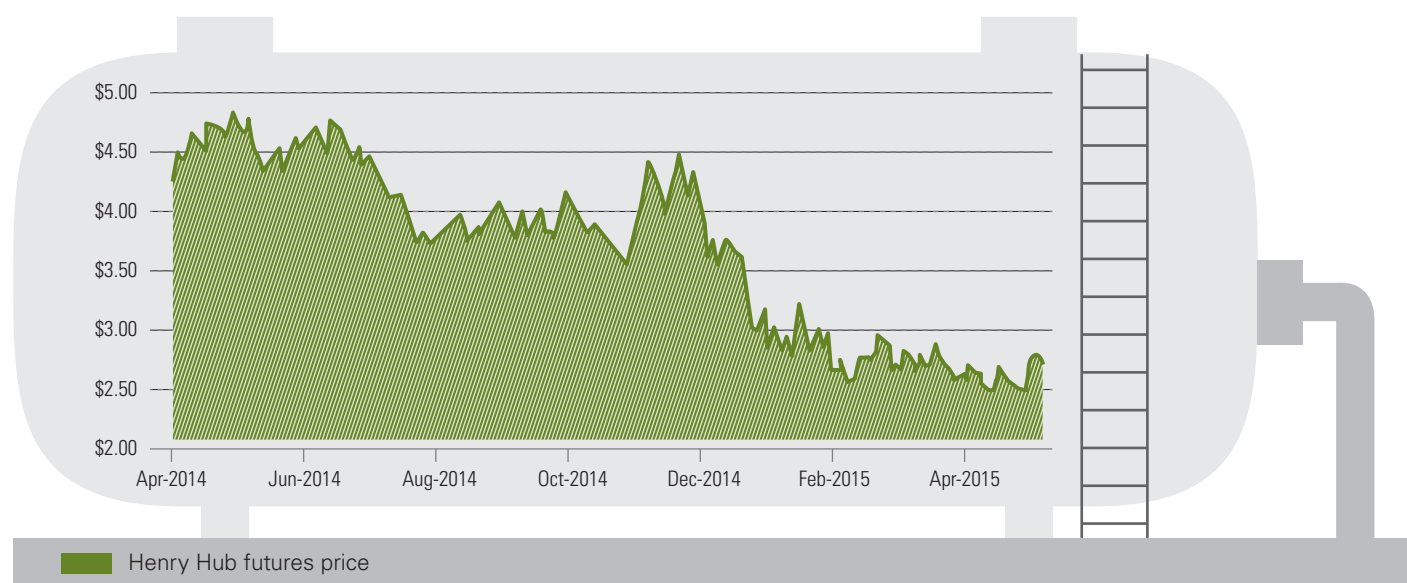
Riding the shale gale

Divergence between naphtha and ethane prices (US dollars per gallon)



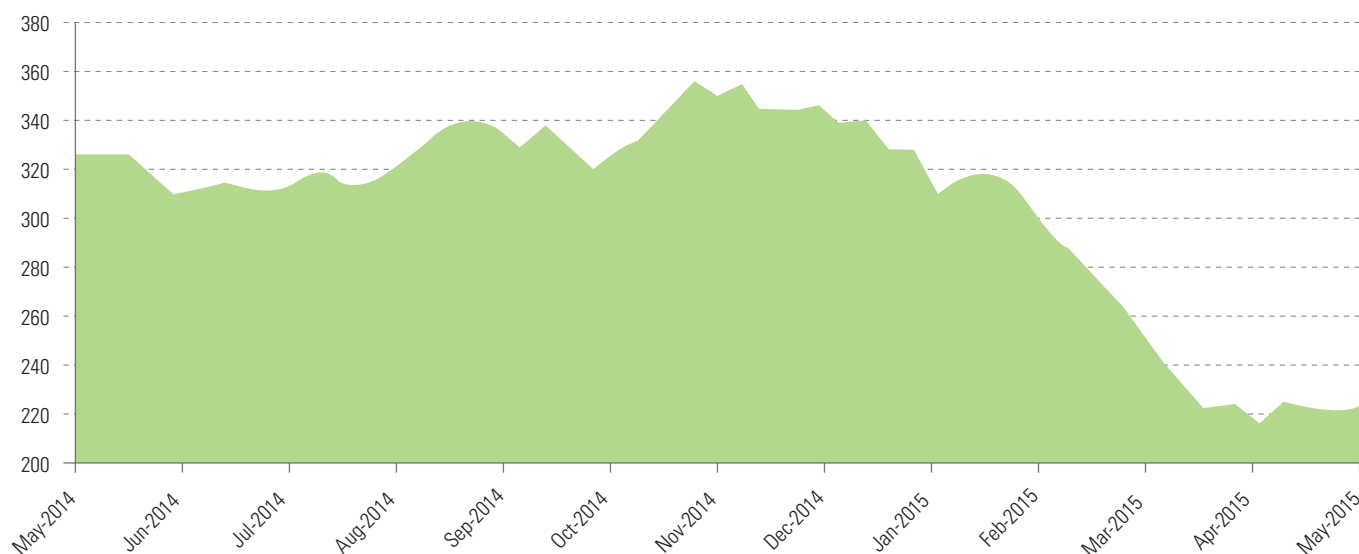
Source: US Energy Information Administration, Chemical Week, ICIS

Historical front month US natural gas futures prices (US dollars per MMBtu)



Source: Short-term Energy Outlook, 9 June 2015

Natural gas rig count (1 year)



Source: Baker Hughes, May 2015

Along with positive trends for the US economy in general, the single-biggest growth driver for today's US chemical industry is the domestic availability of cheap feedstocks and lower prices for electricity based on natural gas-fired generation. Although China, India, Australia and South Africa enjoy lower electricity prices, the US enjoys significantly lower rates than Europe.¹⁰

With the widespread extraction of shale gas and a surge in liquefied natural gas (LNG) supply, the US has moved from being a high-cost producer of key petrochemicals and resins to being the world's second-lowest cost producer after the Middle East.¹¹

The abundance of natural gas, boosted by the widespread use of hydrofracking to extract previously unavailable reserves, has helped the chemical industry across all sectors. Fossil fuels are a source for both the energy needed in manufacturing and the feedstock for

the products themselves. In Europe and China, feedstock largely comes from naphtha refined from crude oil. In the US, manufacturing is predominantly fed by ethane derived from natural gas. Even with the recent drop in oil prices, the US still enjoys a significant 'ethane advantage', with an oil-to-natural gas ratio of approximately 18:1,¹² providing US chemical producers with a huge advantage over much of the global competition.¹³

The US Energy Information Administration (EIA) expects current levels of domestic natural gas production to continue, with the country becoming a net exporter of ethane by 2017.¹⁴ According to RBN Energy, ethane exports will reach 150,000 to 200,000 barrels per day within 6 years.¹⁵ These and other forecasts have prompted a flurry of construction for LNG exports and US exporters have announced the construction of 20 LNG plants with a

total capacity of up to 200 million tons per year.¹⁶

Two-thirds of all US liquefied petroleum gas (LPG) exports currently go to Latin America.¹⁷ Occidental Petroleum Corp. expects regional demand to continue and the company plans to build a fractionator and propane export terminal at its Oxy Ingleside Energy Center near Corpus Christi, Texas. The facility has a capacity of 110,000 barrels a day, a ship loading rate of 2,500 barrels per hour and 80,000 barrels of propane storage.

Enterprise Products Partners will expand its LPG export terminal on the Houston Ship Channel, increasing its ability to load fully refrigerated, low-ethane propane by 1.5-million barrels per month.¹⁸ Sunoco will continue development of the Mariner South LPG export-import terminal, with Shell as an anchor customer.

¹⁰ The Statista Portal, Average electricity prices around the world: \$/kWh, Shenzhen Government Online, Tariff & duty of electricity supply in India, CEA, Government of India, March 2014

¹¹ Unconventional Oil & Gas Leading to Manufacturing Renaissance, presentation, ACC, 11 December 2014

¹² Fueling Export Growth (Part 1 of 2): U.S. chemical exports linked to natural gas could double by 2030; plastics products leading the surge, ACC, 25 February 2015

¹³ European chemical industry importing U.S. shale gas, FuelFix, 10 October 2014

¹⁴ Annual Energy Outlook 2015, US EIA, April 2015

¹⁵ Changes in Longitudes – More Barriers to Ethane Exports, RBN Energy LLC, 9 April 2014

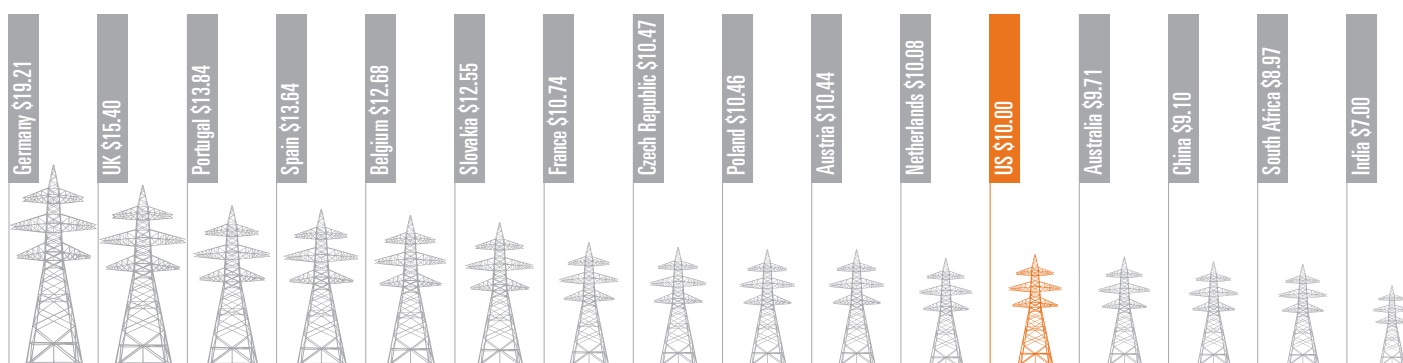
¹⁶ US to launch LNG exports by end of 2015, RT.com, 9 January 2015

¹⁷ Surging ethane supplies prompt export plans, Oil & Gas Journal, 2 June 2014

¹⁸ Ibid.

Electricity prices in selected countries in 2014

(US dollars and cents per kilowatt hour)



Source: The Statista Portal, Average electricity prices around the world: \$/kWh, Shenzhen Government Online, Tariff & duty of electricity supply in India, CEA, Government of India, March 2014

Phillips 66 plans to develop a 4.4 million barrels per month LPG export terminal in Freeport, Texas at the site of its existing marine terminal and using its midstream, transportation and storage infrastructure. The terminal would be supplied with LPG from both Mont Belvieu and Phillips 66's Sweeny complex. Phillips expects the terminal to enter service by mid-2016.

Keeping pace with this infrastructure development are new deals being made by multinational chemical companies to import US gas for crackers in Europe and Asia.

INEOS plans to import US ethane to their crackers at Rafnes in Norway and Grangemouth in Scotland.¹⁹ Likewise, Saudi Arabia Basic Industries Corporation (SABIC) plans to export LNG from the US to the UK.²⁰ The company has won approvals in Britain and some government funding to convert a cracker in England to be

able to handle US shale gas. In India, Reliance is relying more on US ethane instead of domestic supplies.²¹ In 2014, the company announced plans to ship 1.5 million tons per year (mt/year) of ethane from its joint venture partners to a chemical complex in the Indian state of Gujarat.²²

How long will US chemical companies enjoy low natural gas prices? According to the Energy Information Administration (EIA), shale gas reserves are expected to support demand for almost a century.²³ That being said, chemical companies recognize the cyclical and dynamic nature of petroleum markets. With prices hovering around three dollars per million BTU for natural gas, investors who moved aggressively into exploration and production a few years ago are now struggling to make money on current wells and have cancelled or postponed many plans for new drilling. As of May

2015, total rig count in the US has declined 59 percent to 660, compared to a peak of 1,609 in October 2014.²⁴ However, continuing advances in drilling technology are driving down the costs and efficiency of extraction, such that the fall in production has not been as severe.

As a result, the cost of gas in the US remains low, such that natural gas consumption is expected to steadily increase until 2028,²⁵ helping to cost-justify upstream development and other planned investments. At the same time, many KPMG member firm clients in both the chemicals and oil and gas sectors anticipate that crude prices will move back toward US\$80 per barrel in the medium term. This will maintain the 'ethane advantage' for US chemical manufacturing as compared to naphtha-based production in Europe and Asia.

¹⁹ Ineos expands its contract with Evergas to six vessels for the transportation of US LNG to its European cracker complexes, company press release, Ineos, 7 May 2014

²⁰ Sabic gets green light to import LNG from US to UK, The National Business, 24 November 2014

²¹ Reliance Sees Payoff in U.S. Gas as India Output Slumps: Energy, Bloomberg, 3 June 2013

²² Reliance Energy plans to begin shipping US ethane to India in 2016, Platts, 20 August 2014

²³ How much natural gas does the United States have and how long will it last?, EIA, <http://www.eia.gov/tools/faqs/faq.cfm?id=58&t=8Ho>

²⁴ Baker Hughes Rig Count, 15 May 2015, <http://www.bakerhughes.com/rig-count>

²⁵ Industrial and electric power sectors drive growth in U.S. natural gas consumption, EIA Annual Report 2015, www.eia.gov/forecasts/aeo/mt_naturalgas.cfm

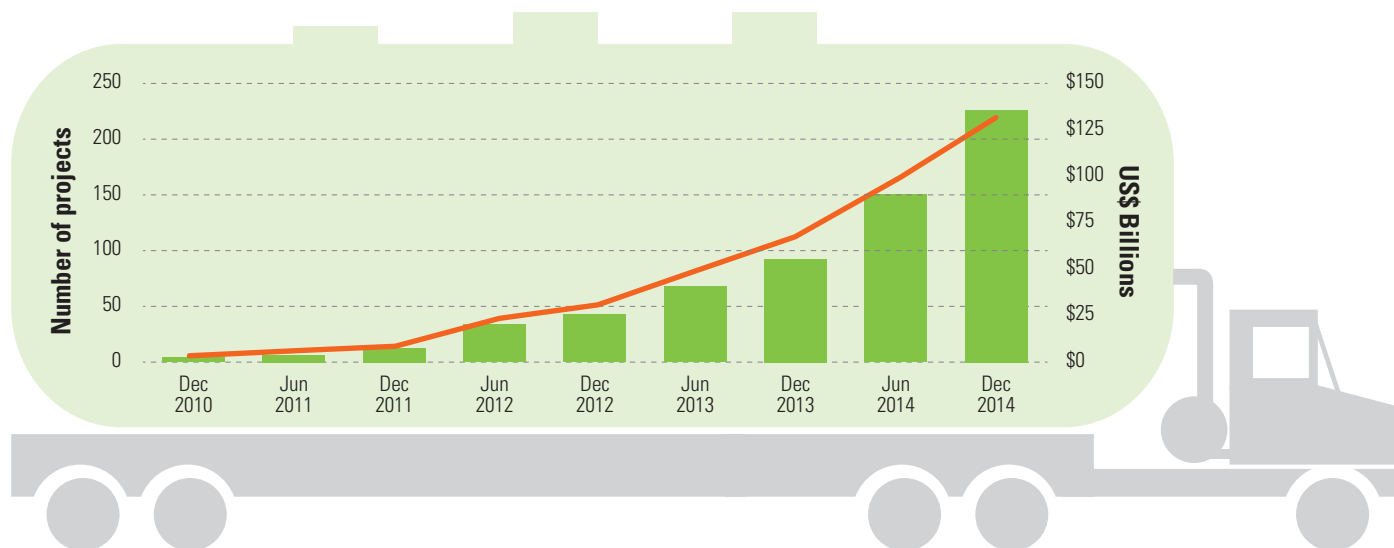
A surge in capital investments

Shale gas has made the US an attractive location for capital investment by both domestic and foreign chemical companies, reversing a decade-long decline. Analysts estimate that the gains to basic olefins capacity range from 35 to 40 percent²⁶ and the dynamics for sustained capital investment and development are in place. Capital spending is expected to increase more than 9 percent per year through 2017.²⁷ By 2019, annual capital spending by the US chemical industry will reach US\$48.6 billion and global chemical industry capital investment will reach US\$592 billion, more than twice the levels seen in 2009.²⁸

Along with this increase in investment and plant construction comes the risk of overcapacity. China's slowing rate of GDP growth, the uneven economic recovery in the Eurozone, ongoing capacity expansion in Asia and unforeseen reversals in a global economy still marked by the Great Recession could create serious problems for even a robust US chemical industry. There is, therefore, an ongoing risk of new capacity not being absorbed by continued growth in domestic and export markets.

Shale gas has made the US an attractive location for capital investment by both domestic and foreign chemical companies, reversing a decade-long decline.

Announced chemical industry investments due to shale gas



Source: Fuelling Export Growth (Part 1 of 2): US chemical exports linked to natural gas could double by 2030; plastics products leading the surge, ACC, 25 February 2015

²⁶ Op. cit., Year-End 2014 Chemical Industry Situation and Outlook

²⁷ Ibid.

²⁸ Ibid.

New US chemical production projects due to shale gas

Over 215 new chemical production projects valued at more than US\$135 billion have been announced for development through 2015 due to shale gas:²⁹

- BASF is planning its most expensive plant ever, a propylene facility on the Gulf Coast.³⁰ In addition to the Gulf Coast propylene plant, BASF expanded a Texas ethylene facility it owns with France's Total SA.
- Chevron Phillips Chemical has announced the construction of a petrochemical facility in Baytown, Texas.³¹ The US Gulf Coast (USGC) project includes a 1.5 million metric tons (MMT)/year ethane cracker and two 500,000 mt/year capacity polyethylene facilities.
- Exxon Mobil is planning an ethane cracker in Baytown, 25 miles east of Houston. The facility will have an annual capacity to make up to 1.5 million tons of ethylene feedstock from ethane.³² Its two polyethylene processing units, now under construction near Houston, are capable of producing 650,000 tons a year of the plastics components. This is the chemical company's largest US investment.
- Formosa Plastics is developing a 1.2 million metric tons (mmt)/year ethylene plant at Point Comfort, TX.³³ The facility is expected to cost US\$3 billion and include units producing 1.2 mmt/year of ethylene, 600,000 mt/year of propylene and 400,000 mt/year of high-density polyethylene and is estimated to become fully functional in 2017.
- Sasol, the South African fuels maker, approved construction of an US\$8.1 billion plant in the US that will convert natural gas into plastics and other products from shale gas.³⁴ The plant converts ethane into ethylene, which is used to make chemicals such as glycol and ethylene oxide. The cracker will have a capacity of 1.5 mmt/year.
- Total Petrochemicals & Refining USA has filed environmental permit applications to build an ethane cracker on the US Gulf Coast.³⁵ The plant will have a maximum capacity of 1 mmt/year of ethylene.



²⁹ Ibid.

³⁰ German chemical giant to build another Freeport plant, Houston Business Journal, 19 May 2015

³¹ Chevron Phillips Chemical Celebrates USGC Petrochemicals Project Groundbreaking at its Cedar Bayou Plant in Baytown, Texas, company press release, 2 April 2014

³² Exxon Mobil touts chemical plant expansion, FuelFix, 27 August 2014

³³ Formosa Plastics plans to build ethylene plant in Louisiana, ChemWeek, 16 January 2014

³⁴ Sasol makes \$8.1 billion shale bet on US chemical plant, Bloomberg, 27 October 2014

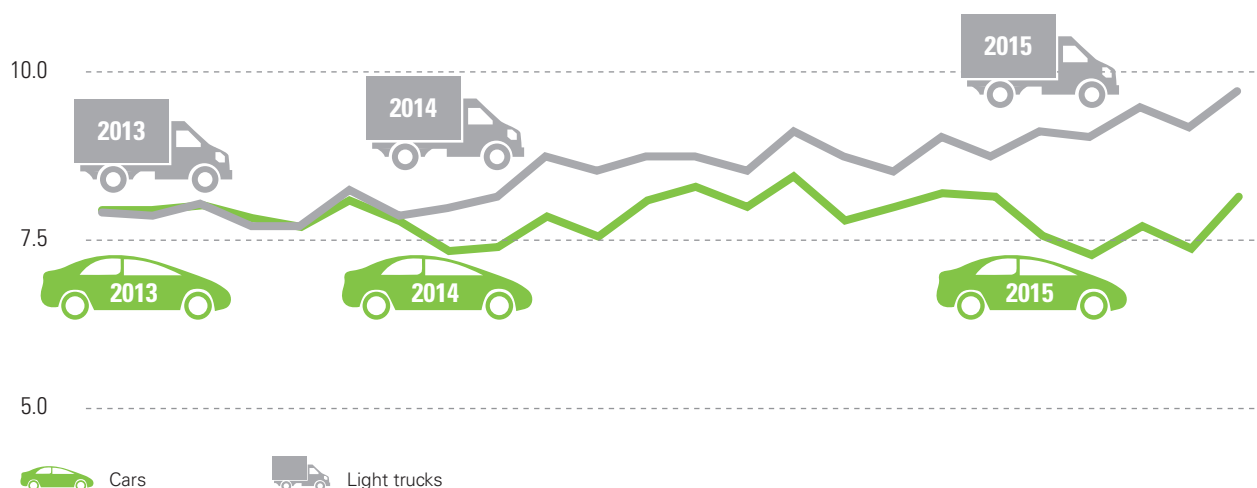
³⁵ Total Petrochemicals files for permits to build ethane cracker on US Gulf Coast, ChemWeek, 10 April 2015

Strong growth for end-user markets

The combination of cheap gas and oil has helped reduce US manufacturing costs, stimulate production, limit inflation and improve consumer spending. Especially important is the continued strong growth in domestic end-user markets that are key to the chemical industry.

Overall, US automotive manufacturers have returned to pre-recession sales levels. From May 2014 to May 2015, sales of passenger cars dropped 1.3 percent but sales of light trucks increased 10.0 percent. Continued demand is expected from more employment and increased availability of credit.

Sales of cars and light trucks in the US retail market (in millions of units at seasonally adjusted annual rate)



Source: Wall Street Journal, Market Data Center

Despite a severe winter, 2014 spending for US commercial construction increased by nearly 15 percent and growth in industrial construction increased by almost as much.³⁶ Prospects for construction in 2015 remain positive, with overall commercial/industrial spending expected to increase almost 8 percent.³⁷ The housing outlook remains cautious but inventory and interest rates remain low. Job growth, a major long-term

driver for housing, is also improving, helping to support a 7.5 percent increase in housing starts between 2013 and 2014.³⁸

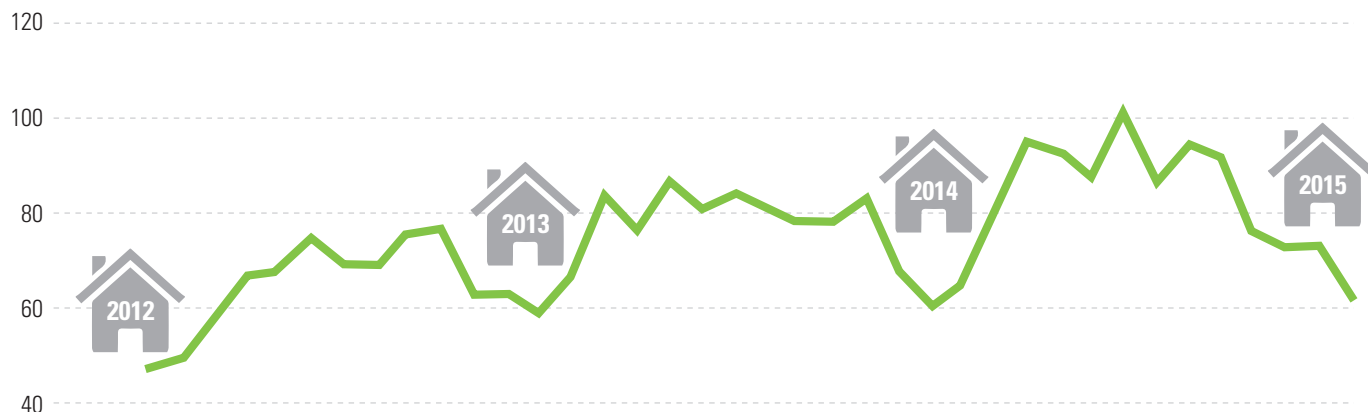
Sustained growth is also expected in consumer/retail markets, such as electronics, furniture, housewares, packaging, paints, coatings and adhesives, personal care, pharmaceutical, processed foods, pulp and paper, textile and carpets.

³⁶ Steady Construction Growth in the Forecast, American Institute of Architects Consensus Construction Forecast, December 2014, <http://www.aia.org/practicing/AIAB105516>

³⁷ Ibid.

³⁸ Ibid.

US new home starts (in thousands of units)



Source: KPMG International 2015

Domestic use of water treatment chemicals

The US is the largest market for water treatment chemicals in the world and demand is expected to remain steady in 2015.³⁹ Traditional domestic markets for water treatment include food and beverage, pulp and paper and chemical processing for water reuse and zero discharge of water. Many companies are saving money on fees to municipalities by treating wastewater in-house and then reusing it.

Water scarcity in California and across the southwest is also driving increased demand, as more communities develop closed-loop systems in which all water is reused and none is discharged.⁴⁰ California has announced a

target to cut its water usage by 20 percent by 2020.

State regulations involving water quality and reuse also influence the market. Wisconsin has passed new rules on phosphorous discharges, making it difficult to use certain water treatment formulations.

In addition, the rise of hydraulic fracturing in North America has steadily increased the demand for water treatment chemicals, since hydrofracking uses large amounts of water, which must be treated and recycled. A slowdown in drilling is affecting this market but wells already upstream continue to support demand.⁴¹

The chemical manufacturing sector is one of the top exporting industries in the US, accounting for US\$189 billion in trade that represents 12 percent of all US exports.⁴² Recent recessions in Japan and Brazil, coupled with economic slowdowns in other nations, have reduced exports of US basic chemicals and a trade surplus is not expected until 2017.⁴³ But as new investments in the chemical industry come online, basic chemicals export growth will accelerate, with an anticipated chemicals trade surplus of US\$77 billion by 2019.⁴⁴

Plastics will likely reach US\$21.5 billion of net exports by 2030, an increase of US\$15 billion. Specialties will total US\$20.5 billion, an increase of US\$9.3 billion. Intermediates will likely see moderate growth, reaching

US\$9.15 billion, which represents an increase of US\$3.1 billion.

By 2030, chemicals overall and plastics, in particular, are forecast to see a significant rise in exports to the following regions:

- China, reaching US\$11.7 billion, an increase of US\$8.7 billion
- Mexico, reaching US\$13.8 billion, an increase of US\$5.4 billion
- Other Americas, totaling US\$10.9 billion, an increase of US\$8.6 billion
- Europe, totaling US\$5.4 billion, an increase of US\$2.6 billion.

Two prospective trade initiatives are currently under debate in the US: the

TransPacific Economic Partnership (TPP) and the Transatlantic Trade and Investment Partnership (TTIP). Both of these initiatives are backed by the Obama administration but Congress remains divided in its support. Many in the chemical industry see these initiatives as critical to increasing the industry's competitiveness and driving economic growth. The ACC has argued that eliminating tariff barriers on trans-Atlantic trade in chemicals would save US\$2 billion per year for chemical manufacturers, including more than US\$600 million per year for intra-company trade.⁴⁵ Anticipated savings from the TPP might generate US\$1.2 billion in additional export growth.

³⁹ Water treatment: Increase, reuse, recycle, Chemical Week, 6 February 2015

⁴⁰ Ibid.

⁴¹ Ibid.

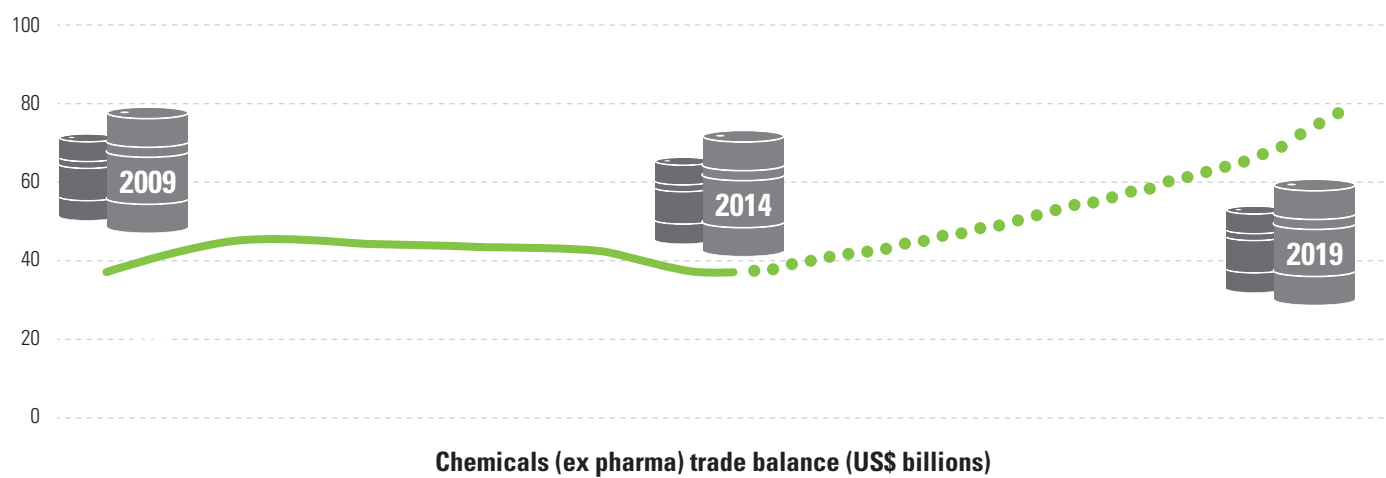
⁴² ACC website, <http://www.americanchemistry.com/Policy/Trade>

⁴³ Op. cit., Year-End 2014 Chemical Industry Situation and Outlook

⁴⁴ Ibid.

⁴⁵ American Chemistry Council, www.americanchemistry.com/Policy/Trade

Product exports to double by 2030



Source: Year-End 2014 Chemical Industry Situation and Outlook: American Chemistry Builds Momentum, American Chemistry Council, December 2014

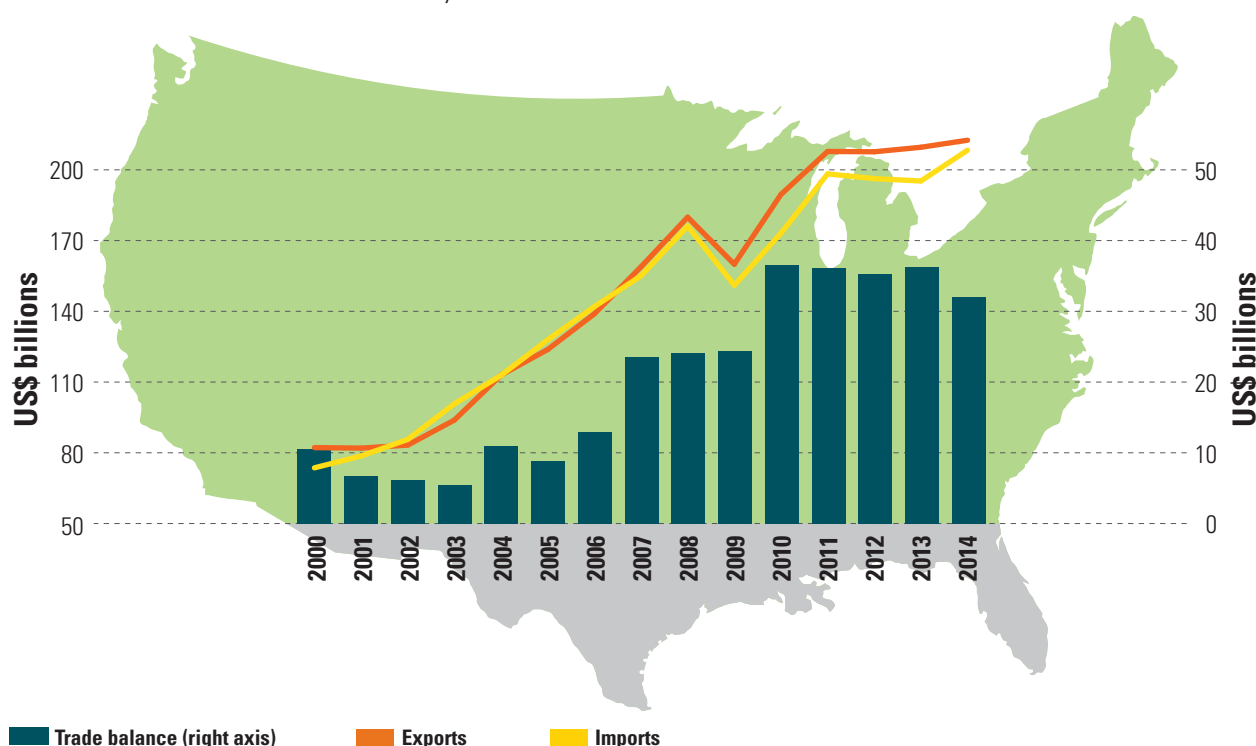


Strategic challenges and constraints to growth

Investment in supply chains for exports

Business of chemistry exports, imports and trade balance

US trade in the business of chemistry



Source: U.S. Department of Commerce, U.S. International Trade Commission

While the US chemical industry has seen a significant increase in exports over the last 10 years from an historical low base, the sheer scale of planned new capacity suggests that further export growth will be required in the coming years. Despite the strong recent performance of the US economy, the US remains a mature market that will not be able to absorb all of the capacity growth.

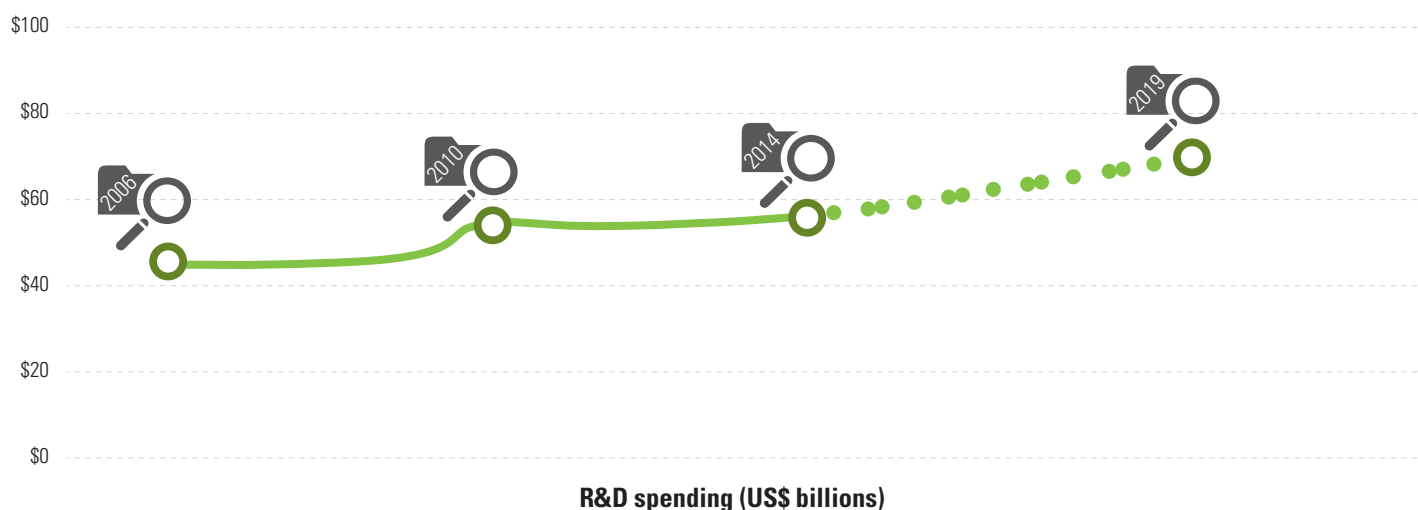
As a result, significant further investment in supply chains and overseas sales and marketing entities

will be required by US chemical producers to enable them to move and sell product to other markets around the world, be it Latin America, China, Other Asia or even Europe.

Failure to invest sufficiently will, at best, result in production cost advantages being lost through bloated and inefficient logistics networks and, at worst, product being stranded in a US market that cannot consume it, resulting in a disruptive downcycle for the US industry.

Despite the strong recent performance of the US economy, the US remains a mature market that will not be able to absorb all of the capacity growth.

A continued focus on research and development (R&D)



Source: Year-End 2014 Chemical Industry Situation and Outlook: American Chemistry Builds Momentum, American Chemistry Council, December 2014

/// The re-energized commodity end of the industry provides a strategic challenge for the leaders of US chemical companies. ///

Prior to the shale gas boom, the strategic focus of many large US chemical companies was to continue their downstream expansion into high-end specialty products, focused on responding to emerging global mega trends. In fact, about 17 percent of US patents are chemistry or chemistry-related, including medical treatments, automobile safety improvements and clean energy technologies.⁴⁶ In 2014, chemical companies invested US\$56 billion in research and development (R&D) to support new innovation. R&D spending for 2015 is expected to increase 3.3 percent to US\$59.4 billion.⁴⁷ By 2019, R&D spending is expected to reach US\$69.8 billion.⁴⁸

Although in-house R&D accounts for a significant amount of new product development, many US chemical companies are supporting innovation through venture capitalist investments for start-ups, leading deals or joining with other lead investors across all stages of development, from seed to late stage. Dow Venture Capital invests in start-up companies that are developing new solutions for clean water, renewable energy generation and conservation and increased agricultural productivity.

One example is the company's new POWERHOUSE Solar Shingle, a thin-profile roofing product for homeowners as well as the building industry. NuvoSun, now a wholly owned subsidiary of Dow, is a second-generation innovator of thin-film photovoltaic cells and modules based on flexible Copper Indium/Gallium di-Selenide technology, low-cost equipment and a low-cost proprietary manufacturing process.

In the same way, DuPont Ventures works closely with enterprising small companies, investing in new technologies and products. DuPont provides not only capital investment support but also manufacturing expertise, deep industry relationships and marketing support. Investment areas of interest include agriculture, nutrition and health, industrial biosciences, cleantech, electronic materials, safety technology and construction.

With the shale boom now providing advantaged feedstock, which has re-energized the commodity end of the industry in the US, there is a clear strategic challenge for the leaders of US chemical companies to decide exactly what sort of company they want to be and how they will best drive shareholder value for the long term.

⁴⁶ Op. cit., Year-End 2014 Chemical Industry Situation and Outlook

⁴⁷ Ibid.

⁴⁸ Ibid.



Investor activism targeting chemical companies

Shareholder activism continues to gain momentum, driven mainly by hedge funds that pursue initiatives aimed at driving increased value for shareholders.

Activist investors have targeted some of the largest chemical companies in North America over the last 2 years. These include companies whose share prices have lagged the S&P Chemicals Index, those that have built large cash balances or those that have benefited from low US energy and feedstock costs without proportionally increasing returns to shareholders.

Some analysts expect this activism to continue as US chemical companies generate increased cash flow from lower feedstock prices based on shale gas and an improving economy. Given the past volatility in their industry, some companies have been relatively conservative in boosting shareholder returns and in making bold strategic moves. While many have been looking to use the proceeds of asset sales for new acquisitions, M&A activity has been limited by the perception that valuation multiples are high. For activist investors, however, a delay in strategic activity is often viewed as a weakness

and represents a clear opportunity for short-term gains.

Activist investor activity that targets the chemical sector is likely to spur more deals because it drives business reorganizations and changes in strategic focus, which are often precursors to M&A activity. Indeed, alongside the recent activism in the sector, a number of companies have continued to implement their long-term strategies to divest non-core or slower-growth businesses. In December 2014, Ashland completed the sale of its elastomers business to Lion Copolymer.

Dow is spinning off its chlor-alkali business in a transaction with Olin and is increasing its divestiture target to US\$7-8.5 billion by mid-2016. In December 2014, the company agreed to sell Angus Chemicals to private equity firm Golden Gate Capital for US\$1.2 billion, its sodium borohydride business to Vertellus Specialty Materials and its polyolefin films plant to Valgroup Packaging Solutions for a total of US\$225 million.

DuPont has completed the spin-off of its performance chemicals segment

Some analysts expect this activism to continue as US chemical companies generate increased cash flow from lower feedstock prices based on shale gas and an improving economy.

(Chemours), which includes the world's largest titanium dioxide business, by mid-2015. OMNOVA Solutions is being targeted by activist investor Barington Capital, which is pushing for the sale of the company's engineered surfaces segment that produces decorative components and functional surfaces for buildings and automotive vehicles.

To avoid the dislocation and disruption that can come with activist investors, management teams need to retain a clear focus on long term strategy and avoid making what are often difficult strategic decisions that enable their companies to capitalize on the opportunities in the industry and drive value for shareholders.

Environmental regulations and response

The Obama Administration, a number of Congressional members, government agencies and other groups have long supported a more rigorous approach to environmental regulations. In the US, cap and trade mechanisms to limit carbon and other greenhouse gas emissions have the greatest potential to influence the chemical industry. US chemical companies argue that tougher regulations will have a negative impact on their operations, cost structures, supply chains and end markets.

Existing US cap-and-trade programs include:

- Acid Rain Program, part of the 1990 Clean Air Act⁴⁹
- NOx Budget Trading Program, a cap and trade program created to reduce the regional transport of NOx emissions from power plants and other industrial sources in the eastern United States⁵⁰

- Regional Greenhouse Gas Initiative, a market-based effort by 10 northeast and mid-Atlantic states to limit greenhouse gas emissions⁵¹
- Midwestern Greenhouse Gas Reduction Accord⁵² and the Western Climate Initiative,⁵³ in which US states and jurisdictions in Canada and Mexico are designing regional cap-and-trade programs.

A recent area of dispute over environmental regulations involves a 2014 proposal by the Environmental Protection Agency (EPA) to lower the National Ambient Air Quality Standard (NAAQS) for ozone to 65-70 parts per billion. In response, the ACC argues that the EPA should not move forward with a lower standard until it fully implements the current standard of 75 parts per billion. "The current ozone NAAQS of 75 ppb is the most stringent ever and has not been fully implemented across the United States," reads a

statement from the ACC. "We are very concerned that EPA appears to be lowering the ozone standard before finishing the job on the current standard. With air quality improving, maintaining the current standard would enable further reductions in emissions while supporting US manufacturing growth."⁵⁴

US chemical companies also remain concerned with the Regulation on Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) implemented by the European Union (EU). While this regulation has no effect on US soil, US producers exporting an additive or solvent or other substances for use by an EU manufacturer may find their product within REACH jurisdiction and not allowed in the EU market.⁵⁵ The European Commission has estimated that the direct costs of REACH to the chemicals industry will total US\$2.8 billion over the first 11 years of the regulation.⁵⁶

The KPMG perspective

A number of upside and downside risks remain for US chemical companies. Overcapacity in the next few years has the potential to become a significant issue. Companies should be proactive in developing a stronger market presence, end-to-end supply chains and business partnerships in emerging economies to help absorb rising production as new US plants come online.

Companies should also keep a close eye on domestic markets, such as construction and automotive, where

growth remains positive but still in flux. Other risks include increased competition from emerging markets, a slowdown in the global economy, uncertainty about trade agreements, regulatory pressure and investor activists more focused on short-term gains than a company's sustainability.

Granted the advantages of shale gas, record levels of capital investment, a track record of continued innovation and the overall strength of the domestic economy now is the time to make the

tough decisions that will build a robust, outward-looking, globally dominant chemical industry in the US. Failure to do so risks wasting a once in a 100 year opportunity. Executives who are delaying making bold strategic decisions should remember that in an industry as dynamic as this one, the status quo generally does not last for long. Something will inevitably come along to change the rules of the game once again.

⁴⁹ Acid Rain Program, EPA, <http://www.epa.gov/AIRMARKETS/programs/arp/index.html>

⁵⁰ NOx Budget Trading Program, EPA, <http://www.epa.gov/airmarkets/programs/nox/index.html>

⁵¹ Regional Green House Gas Initiative, www.rggi.org/

⁵² Center for Climate and Energy Solutions, www.c2es.org/us-states-regions/regional-climate-initiatives/mggra

⁵³ Center for Climate and Energy Solutions, Multistate Climate Initiatives, www.c2es.org/us-states-regions/regional-climate-initiatives

⁵⁴ ACC website, <http://www.americanchemistry.com/Policy/Environment/Environmental-Regulations>

⁵⁵ Costs of EU chemical regulations reach US businesses, Chemical News & Intelligence, 17 February 2010

⁵⁶ REACH in Brief, European Commission, October 2007

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Chemical companies fighting the new war for talent

By **Sammy Ahmed**

Talent is at the top of the agenda for many executives around the world and this is especially true for the chemical industry. Growing demand for skilled resources is driving the need to recruit, train, motivate and retain employees across the organization. But companies require not only the right talent but also new approaches to talent management. What worked 10 or even 5 years ago might not work today in an increasingly competitive marketplace. Forward-looking chemical companies are launching new initiatives that focus on hiring more women and Millennials, leveraging the value of senior workers, developing cross-generational corporate cultures, using data analytics to improve talent management, investing more in specialized training and supporting local talent in emerging markets.



“We need the very best talent available, talent working in a culture that encourages innovation, excellence and organizational effectiveness.”⁵⁷

Yousef Al-Benyar
Vice Chairman and CEO,
SABIC



A matter of demand and supply

A decade ago, Bayer MaterialScience would receive about 2,000 applicants for 20 to 30 jobs.⁵⁸ For the same number of openings today, the organization receives maybe 250 applicants, among which only about 40 are truly qualified. As a result, positions can remain vacant for up to 9 months before being filled.⁵⁹

This example is being repeated around the world as chemical companies struggle to find and retain the employees they need for sustainable growth. Why the scarcity of talent? In many ways, it's simply a matter of current demand and supply.

As the global economy recovers from the downturn and the chemical industry remains in expansion mode,⁶⁰ employees have more options and

employers have less. The US Bureau of Labor Statistics estimates a steady 4 percent job growth in the chemical industry between 2012 and 2022,⁶¹ making it difficult for managers to find the right people with the right skills.

Although chemical companies are looking for professionals in sales, marketing, finance and other areas, an especially troubling development is the growing shortage of applicants with science, technology, engineering and mathematics (STEM) degrees. The Center on Education and the Workforce estimates that between 2008 and 2018, 1.1 million new STEM jobs will be created and 1.3 million more replacement positions will need to be filled in the US alone.⁶²

Added pressures on talent supply include an aging workforce with increased rates of retirement, the reluctance of younger workers to consider a career in chemicals and limited efforts to retain and promote women.

Talent scarcity is also on the rise in emerging countries as local markets expand and diversify. China has the highest number of top-rated chemical engineering schools in Asia,⁶³ but a shortage of technicians and engineers has recently caused delays and low utilization rates in two major projects: Shaanxi Yanchang Petroleum Group's 1.8 million ton methanol-to-olefins (MTO) project and another 1.8 million ton MTO project by China National Coal Group.⁶⁴

⁵⁷ Foundation for the future, Sustainability Report, 2014, http://www.sabic.com/corporate/en/images/sabic_sustainability-report_2014_tcm12-15473.pdf

⁵⁸ US STEM workforce shortage: Myth or reality? The jury is in, Chemical Week, 25 February 2014

⁵⁹ Ibid.

⁶⁰ Commentary: Global chemical outlook positive for 2015, ICIS Business, 5 January 2015, <http://www.icis.com/resources/news/2015/01/05/9849398/commentary-global-chemical-outlook-positive-for-2015/>

⁶¹ US Department of Labor, Bureau of Labor Statistics, <http://www.bls.gov/ooh/architecture-and-engineering/chemical-engineers.htm>

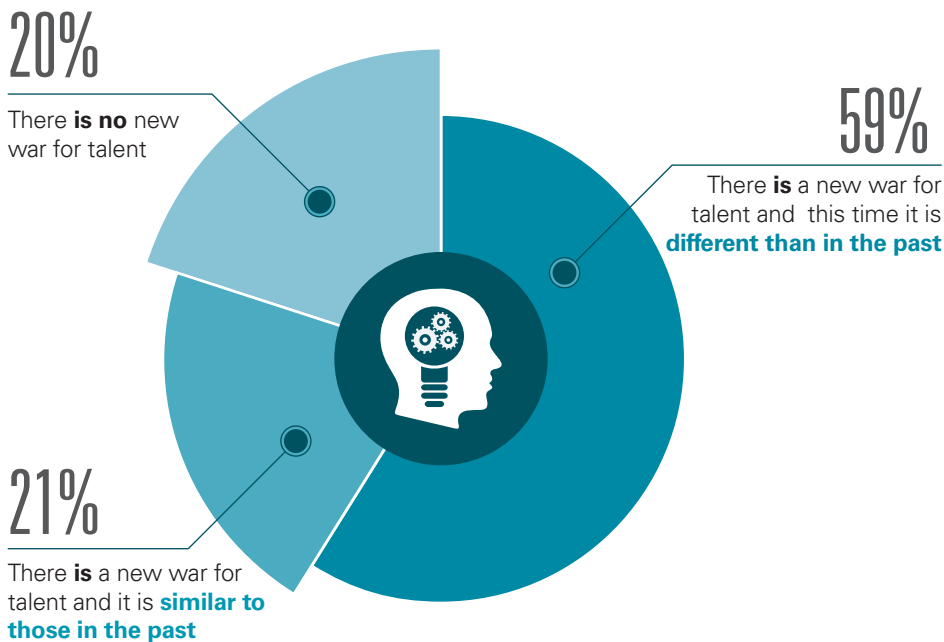
⁶² STEM Education News, quoted in A STEM Talent Gap Primer, <http://www.talentmgt.com/blogs/7-the-recruitment-revolution/post/7201-a-stem-talent-gap-primer>

⁶³ Top Chemical Engineering Schools in 2014, QS Top Universities, 29 April 2014, <http://www.topuniversities.com/university-rankings/articles/university-subject-rankings/top-chemical-engineering-schools-2014>

⁶⁴ Coal-to-olefins may not be an immediate threat, The China Blog, 31 July 2014

Needed: a new, more holistic approach to talent management

Is the war for talent different than in the past?



Source: KPMG International, 2014

“We will only meet our ambitious business goals by becoming more diverse and inclusive.”⁶⁴

Patricia Rossman
Chief Diversity Officer,
BASF

In 1997, the publication of *The War for Talent* changed how many companies managed the scarcity of talent.⁶⁵ The book argued for a recruitment focus on ‘high potential’ and ‘high performing’ employees.

However, research 15 years later shows little evidence that typical ‘war for talent’ practices that focus on top performers actually contribute to improved business performance.⁶⁶ An analysis of 106 companies indicates that such practices have not helped corporate survival and performance. Only 25 percent of the organizations that adopted ‘war

for talent’ practices can be said to be performing well in their market place. A third of those organizations have disappeared entirely.⁶⁷

Many organizations are now turning to new, more holistic strategies for finding the talent they need. In a recent KPMG survey, two-thirds of respondents stated that it is more important to address the talent needs at all levels of the enterprise.⁶⁸ Over half of the respondents indicated that pursuing only high potential talent at the team’s expense puts the overall business at risk.

Holistic strategies are also being developed that include women, minorities, younger hires and support for the long-term career of the employee, from initial training to retirement. This support should go beyond check-the-box efforts to represent a company’s core principles and strategic business goals.

In the following pages, we present a sample of what some large chemicals companies are doing to address challenges around talent management.

⁶⁴ BASF Corporation named one of Diversity Inc Top 50 companies for diversity, ranked #26, BASF press release, 23 April 2014

⁶⁵ *The War for Talent*, Ed Michaels, Helen Handfield-Jones and Beth Axelrod, Harvard Business School Press, 1997

⁶⁶ Survey by AM Azure analyzing firms to evaluate current corporate performance in 2013

⁶⁷ Ibid.

⁶⁸ Global survey. Input gathered from 335 KPMG People & Change consultants from 47 countries between March and April of 2014

Recruiting and supporting women

Many chemical companies are still behind the curve when it comes to actively recruiting, training and promoting women.⁶⁹ A company that effectively ignores half the potential workforce and fails to actively recruit women for senior management and engineering roles is starting on the back foot in maintaining a competitive advantage in the 21st century business world.

The good news is that steady progress is being made by women across the industry, including substantial gains in the upper ranks of major US chemical companies.⁷⁰ The most solid advances have been on boards of directors.⁷¹ Of the 419 board seats at the 42 chemical

firms included in the survey, 15.5 percent are held by women.⁷² However, out of 400 executive officers at the 42 firms, less than 12 percent are women and only one woman was identified as CEO – Ellen J. Kullman of DuPont.⁷³

Effective talent management for women must involve a rigorous review of the company's employee value proposition and culture. This can be used to develop and guide specific initiatives dedicated to hiring women for a larger range of roles, including engineering, R&D and senior management.

BASF has adopted a long-term goal of increasing the proportion of female

executives worldwide. In 2011, the company entered a joint initiative with all 30 Deutscher Aktien Index (DAX) listed companies to raise the percentage of women in executive positions in Germany from 9.8 percent in 2010 to 15 percent by 2020.⁷⁴

In 2013, the Saudi Basic Industries Corporation (SABIC) began to expand its Saudi Arabia employment ranks to include women and gender diversity continues to remain an area of focus for SABIC globally. A company initiative, the SABIC Women's Network (SWN), is a key factor in supporting the professional development of women at SABIC.

Managing Millennials

Among many workers in their thirties, often referred to as Millennials, global chemicals is perceived as an 'old' industry that offers employees little opportunity for personal growth and career advancement.⁷⁵

In response, chemical companies are focusing on developing a better brand image to attract good talent. In China, analysts indicate that graduates do not prefer to work in the chemical industry because chemicals do not fall under higher profile consumer retail sectors. In response, domestic companies are conducting conferences and other events to educate the youth on opportunities in the chemical industry.⁷⁶ Chemical industry organizations are also taking steps to educate the

public about the positive aspects of chemical production. This includes the global industry's Responsible Care® initiative to improve health and environmental performance,⁷⁷ as well as recent reports showing that chemical products overall save twice the greenhouse gas emissions than are emitted in manufacturing the products themselves.⁷⁸

Millennials also have different expectations about employment. They are not ready to spend 25 years quietly developing a career like previous generations. They want quick advancement, they want to be challenged, they want to make a difference, they want to learn and they are not prepared to stay with a

single organization for years. Talent management for these workers should stress both immediate opportunities for training and advancement as well as longer-term career paths toward senior management positions.

In the UK, the Royal Society of Chemistry and Cogent have signed a Memorandum of Agreement to work in partnership to help small and medium-sized companies in the chemicals industry to recruit the best talent.⁷⁹ The agreement will see the Royal Society of Chemistry provide GBP400,000 of funding in the form of grants to enable companies to provide higher apprenticeship training for employees and to host industrial placements.

⁶⁹ Women in chemicals is a story of absence, Chemical Week, 8 October 2014

⁷⁰ Women In Industry, C&EN, 16 June 2014

⁷¹ Ibid.

⁷² Ibid.

⁷³ Ibid.

⁷⁴ BASF Report 2014, https://www.basf.com/documents/corp/en/about-us/publications/reports/2015/BASF_Report_2014.pdf

⁷⁵ Landscape of the European Chemical Industry 2014, cefic.org. See also The Chemical Way in Talent Management, Egon Zehnder, <http://www.egonzehnder.com/us/leadership-insights/the-chemical-way-in-talent-management.html>

⁷⁶ Op. cit., The chemical way in talent management

⁷⁷ International Council of Chemical Associations, www.icca-chem.org/en/Home/Responsible-care/

⁷⁸ American Chemistry Council, www.americanchemistry.com/Innovation/Environment

⁷⁹ Royal Society of Chemistry combines forces with Cogent on future talent recruitment, Royal Society of Chemistry press release, 28 January 2014

Leveraging the experience of senior workers

Every day in the US, 10,000 people turn 65 years old and many will be retiring shortly thereafter.⁸¹ Chemical companies need to prepare now for the growing exodus of retiring workers.

Traditionally, senior workers have transferred their knowledge and experience to younger workers through informal mentoring and on-the-job training. Through their experience and reputation, they provide invaluable networks and connections to other critical resources. Experience has

shown that when different generations can intermix and share values, they can benefit each other in line with their predominant cultures.

Dow Chemical has formalized this process by assigning younger workers as protégés to senior executives who act as mentors.⁸² The company is also building online programs for late-stage career planning that gives retiring employees resources to identify jobs for extended service on a full time or part-time basis.⁸³

“The company is creating ‘bridge’ positions that attract and retain mature workers by enabling them to decelerate between full time work and retirement.”⁸⁴

Kevin Small
Workforce Planning Leader,
Dow

Gauge performance and guide success with data analytics

Beyond a handful of hard metrics involving compensation and employee count, the benefits of effective talent management can be hard to measure. But new technologies are enabling robust data and analytics capabilities, allowing HR functions to evaluate and make evidence-based decisions that positively impact the business.

Rather than following industry trends and adopting off-the-shelf solutions, companies can use data to take a global view of their talent and develop distinct talent strategies tailored to their products, markets and business goals. They can also use analytics to gauge employee performance and fine-

tune their people practices. The same technology can be used to monitor and measure their talent strategies and adjust them to improve results, meet future needs and create opportunities for employees to contribute more value.

Dow Chemical mines historical data on its employees to anticipate workforce needs across volatile business cycles.⁸⁵ It forecasts promotion rates, internal transfers and overall labor availability. The company also uses data for ‘what if’ scenario planning to analyze assumptions on internal variables such as staff promotions or examine external variables such as political and legal considerations.

⁸¹ Pew Research Center. Quoted in Watch Out, Boomers, Here Comes The Millennial Workforce, Forbes, 23 June 2014

⁸² Managing the Older Worker: How to Prepare for the New Organizational Order, Peter Capelli and Bill Novelli

⁸³ Op. cit., Our Aging Workforce – Strategize Now or Stumble Later

⁸⁴ Our Aging Workforce – Strategize Now or Stumble Later, MasteryWorks, http://www.masteryworks.com/newsite/clientimpact/impact_archives_feb08.htm

⁸⁵ Competing on Talent Analytics, Harvard Business Review, October 2010



Partnering for education and leadership development

As with other industries, an investment in education and leadership development is critical to the future of the chemical industry. The Dow Chemical Company is currently investing US\$25 million per year in programs with 11 US universities to strengthen research in traditional scientific fields.⁸⁵

In 2014, Phillips 66, Chevron Phillips Chemical Company LP and the Sweeny Independent School District announced the creation of a petrochemical academy in Sweeny, Texas.⁸⁶ The two companies

are planning to contribute US\$1.6 million to the academy as part of their continued commitment to education and workforce development initiatives in the communities where they operate.

SABIC recently tapped Thunderbird to carry out executive training at the SABIC Academy in Riyadh and at Thunderbird's campus in the US.⁸⁷ Recognizing that technical ability is no longer enough for today's multinational companies, the focus for training will be codifying what the new leadership should look like in terms of skills and corporate values.

“Real and meaningful progress comes from the only place it has ever come from. It comes from how we, as individuals, interact with one another.”⁸⁸

Dave Kepler
Executive Vice President,
Dow

⁸⁵ Dow Commits \$25 Million per Year to Advance Research & Development in Leading U.S. Universities, Dow company press release, 24 October 2011

⁸⁶ Phillips 66 and Chevron Phillips Chemical Partner With Local School District on Workforce Initiative, Phillips 66 press release, 11 August 2014

⁸⁷ Saudi conglomerate SABIC taps Thunderbird for custom Executive MBA, Thunderbird magazine, <http://magazine.thunderbird.edu/article/saudi-conglomerate-sabic-taps-thunderbird-custom-executive-mba>

⁸⁸ Reliance Accelerated Leadership Program website, <http://alp.ril.com/index.html>



Developing local talent in emerging markets

Many talent shortages are local, not global. There might be a shortage of chemical engineers with a particular skill set in Germany but a large and growing supply in China. However, essential mechanisms that match demand and supply across geographic boundaries are lacking.

Joint ventures and programs supported by multinational companies provide good vehicles for talent sharing and development. In China, Procter & Gamble maintains strong connections with 11 universities through local P&G

'clubs' that offer training, lectures and competitions designed to support the development of local talent.⁸⁹

SABIC is working with the Royal Commission for Jubail and Yanbu (RCJY) and the Human Resources Development Fund to launch a non-profit national training project to aid Saudization efforts.⁹⁰ The program consists of courses on the English language, work ethics and safety, along with extensive technical and vocational training. The project seeks to strengthen the talent pool for technical jobs at

SABIC and at sub-companies in Riyadh, Jubail and Yanbu.

In India, Reliance Industries has created the Reliance Accelerated Leadership Program (RALP), an intensive, two-year program designed to attract, inspire and groom the best talent in the country.⁹¹ Activities include rotations across different areas of the business, functional training with an accent on blended learning, leadership training and a focus on interactive projects and assignments to facilitate collaboration.

⁸⁹ Four Ways to Stop Worrying About Talent in China, BCG perspectives, https://www.bcgperspectives.com/content/articles/globalization_people_management_human_resources_four_ways_stop_worrying_talent_china?chapter=2

⁹⁰ SABIC Launches Training Initiative, press release, US-Saudi Arabian Business Council, 18 December 2014

⁹¹ Dow presentation, www.dow.com/en-us/investor-relations/corporate-governance/leadership/leadership-insights/

Five strategies for talent management

Based on experience in the global chemical industry, KPMG member firms have identified five key strategies that companies can implement now to deal with the talent crisis over the long term:



Overall, chemical companies have to recognize the business imperative to put talent management at the top of their business agenda and take a strategic approach to attracting and retaining the right skills. This is even more critical when it is put in the context of the different expectations that millennials have for their careers.

The chronic issue of talent shortages in the chemical industry will only be addressed if a long-term, comprehensive approach is adopted. Executives must show more leadership by becoming more engaged with the issue.

Conclusion: Talent is everyone's business

Talent is the new currency for building the workforce of today. The very sustainability of an organization is dependent on managing a pipeline of resources in alignment with business strategies and long-term goals.

Talent is not just an HR issue. It's a whole organizational issue. Management should connect with their people, motivate them, think about their career development needs and assure that they can have a fulfilling career within the organization.

In the same way, the HR function itself has to become more business aware. HR and talent professionals need to work with line managers to translate business strategy into talent needs. Specific positions need to be understood in terms of the value add they bring to the business and markets. To ensure we get this right, the entire organization should be taking part in this development process. Waging the 'war for talent' is really everyone's business.

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KPMG in the industry



Norbert Meyring, Partner, Head of KPMG in China's, chemical sector, was a keynote speaker at the China Petrochemical Innovation and Development Congress 2015 and discussed China's petrochemical industry in the economic recession and also provided a regional update.



KPMG in the US recently hosted a table at the Société de Chimie Industrielle award dinner in New York City. The International Palladium Medal is considered one of the Chemical Industry's most prestigious awards.

KPMG in the Middle East

KPMG's Global Chemicals and Technologies leadership team recently spent time in the Middle East, visiting a number of companies located throughout the region. It was a wonderful opportunity for our leaders to hear and learn more about the current changes, challenges and developments in the Middle Eastern chemicals sector.

KPMG Global Chemicals Institute

Look for our upcoming Reaction 17 webcast, taking place in September, which will discuss the US Outlook on the chemicals industry, featuring Mike Shannon and Paul Harnick.

Join our Global Chemicals Institute for access to valuable thought leadership and webcasts on key industry topics. Visit kpmg.com/chemicals for more information.



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