



VOLUME 13 | ISSUE 13

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CONTENTS

CMR's View

AMERICA

Lotte and Axiall to start up shale gas-fed ethane cracker in the US in 2018

ExxonMobil offers a new processing technique for EPDM compounds

Pennsylvania issues Shell air permit for proposed petrochemical complex

Formosa to set up a new PP facility in Texas

Kraiburg TPE establishes Mexico subsidiary

Bolivia to conduct feasibility study of gas pipeline and petrochemical plant projects

EUROPE

Poland's Grupa Azoty chooses UOP as technology provider of its new on-propose propylene facility

MIDDLE EAST & AFRICA

Basel sets to invest in Iran's Petrochemical sector

Dow's JV Sadara on schedule for commercial operation by 2016

ASIA PACIFIC

SABIC and SK form JV for high performance PE production

BORL to build a new petrochemical complex at Bina

PolyOne opens Asian Innovation Center in Shanghai

MRPL begins commercial production at new PP facility

Gettel Group China to expand BOPP film capacity

SHALE GAS DEVELOPMENT

UK officials reject key shale gas fracturing projects

Alpha Natural Resources takes over Marcellus shale JV

MAJOR FEEDSTOCK PRICING TRENDS

MAJOR THERMOPLASTIC PRICING TRENDS

CMR's View

Chemical Industry Summary

Heading into Q2 earnings season, chemical margins generally look positive for most chemical sectors with olefins/polyolefins leading and the chlor-alkali chain less profitable.

Macroeconomics and Geopolitics

The International Monetary Fund (IMF) reports Q1 global GDP growth at 2.2%, 0.8% below the April forecast. The year 2015 now looks to be at 3.3% growth, marginally below 2014. A US growth contraction of 0.2% in Q1 has once again started a year in disappointing fashion. Global economic news has focused on the potential Greek default, but Greece is only 2% of the \$17B Eurozone economy. A third bail-out for Greece is now proposed, but hurdles remain.

Feedstock – Crude Oil

The global crude market remains oversupplied and risks to the downside dominate. The global oil price correction of last fall began with OPECs decision to defend its market share that has increased incrementally to 41% this year. Unfortunately, the oil price correction has not yet seen a full supply response even though US rig count has halved. In the last month, prices for Brent crude have fallen over 10% from near \$64 per barrel to currently near \$57 per barrel. Easing of sanctions on Iran could result in an immediate increase supply of 0.5 million barrels per day, and Iran's high crude inventories could accelerate the negative impact.

Feedstock – Natural Gas & NGLs

US natural gas prices remain below \$3/MM BTU. Ethane prices have slid below \$0.20/gal and propane has been near \$0.40/gal not providing much uplift to the fractionation spreads.

US Olefins & Polyolefins

Spot US ethylene prices have slid reflecting soft feedstock prices, but ethylene margins for light crackers have remained steady in the low 20's. After being nearly flat since February, US contract ethylene dropped 0.75 cents/lb in June to \$0.2925, the lowest level since August 2009. PE prices that were up 5 cents/lb in May, and are proposed up 5 cents/lb in July, but are facing headwinds of high inventory and sinking ethylene costs.



European Olefins & Polyolefins

In July, contract ethylene prices in Europe rolled over at €1,105 per tonne, but were still up nearly €300 per tonne from the February low point. Ethylene margins for European heavy feed crackers have recovered due in part to lower feedstock prices associated with crude oil softness. PE prices increased in May, mirroring the increases seen in the US. European contract propylene settled at €1,030 per tonne in July, down €20 per tonne from June. Spot butadiene prices in Europe are near \$1,000 per tonne, up 41% from a month ago.

Asian Olefins & Polyolefins

Spot ethylene prices in Asia are currently near US\$1,400 per tonne, up from US\$900 per tonne at the beginning of the year. Propylene prices are near US\$1,000 per tonne, also up strongly from January levels. Film grade HDPE is currently US\$1,300 on a spot basis. The ethylene/naphtha spread in Asia in July has gone to US\$700 per tonne, up from beginning of the year levels of US\$400 per tonne.

Global Chlor-alkali

The global chlor-alkali industry continues to be weighed down by weak global demand especially as it impacts caustic prices. In the US, caustic spot prices are well below US\$400/ST and industry operating rates in May were only 82%. The US40/ton increase for chlorine met early success but recently seems stalled. For Europe, the April operating rate of 72.5% reflected poor demand and industry outages.

AMERICA

Lotte and Axiall to start up shale gas-fed ethane cracker in the US in 2018

Korea-based Lotte Chemical and Axiall have formed a joint venture called LACC LLC. This JV's vision is to design, build and operate an ethane cracker in Louisiana. The final investment is still subject to approval by the board of directors from both companies, which is scheduled in the second half of this year. If the project is approved, the ethylene production unit will be fed by shale gas and have a capacity of approximately 1,000 KTA. Proposed start up is 2018. The split of ownership of the ethylene plant is subject to the amount of capital contributed by Axiall. Axiall has an available option to increase its ownership level to 50%.

Comments:

Shale gas boom has changed competitive landscape to ethylene-derivative producers in the North America. Ethylene is an important raw material for manufacturing vinyl chloride, which is monomer of PVC resins. U.S. PVC producers have announced several ethane cracking projects to be built mainly in Louisiana, where shale gas is abundant and cheap. Shintech has a US\$1.4 billion ethane cracker project in Iberville Parrish, Louisiana, Occidental Petroleum has 544 KTA ethane cracker in Ingleside, Texas being constructed to complete by 2017 and Formosa Plastic is currently conducting a feasibility study for an ethylene facility in Baton Rouge, Louisiana. These shale gas fed ethane cracking projects allow US PVC players to enjoy cost advantages over oversea producers. Once LACC's new cracker comes on-stream, the ethylene output will meet 50% of Axiall's ethylene need at advantaged costs and offers feedstock to Lotte's nearby whole-owned monoethylene glycol facility.

ExxonMobil offers a new processing technique for EPDM compounds

ExxonMobil has developed a new approach for compounding its Vistalon EPDM elastomer for automotive sponge weatherseals. The EPDM compounds which comprise of amorphous, high-diene Vistalon EPDM and a propylene-based elastomer Exxon IT0316 offer reduced density of the sponge profile, while maintaining key attributes required for automotive weatherseal specifications. The new route is said to be based on metallocene polymerization to precisely control the molecular architecture and co-monomer introduction.

Comments:

EPDM is widely used as a preferred material in body seals and weather seals in automotive applications. EPDM competes with TPV and SBC compounds to an extent in this area, but on a volumetric basis it is the dominant material. ExxonMobil is a leading EPDM producer. This latest innovation in terms of the EPDM compound formulated for automotive weatherseal applications is an interesting development since ozone resistance, cracking and better sealability in all weather conditions are all critical properties in choosing the right material for vehicle bodyseals.

Pennsylvania issues Shell air permit for proposed petrochemical complex

Shell completed the purchase of land for the possible petrochemical complex and has gotten air permit approval for its proposed ethane cracker complex in western Pennsylvania from the Pennsylvania Department of Environmental Protection (DEP). Currently, Shell has yet to make a final decision on whether to build the complex. If the project materializes, the complex will include one 1,500 KTA ethane cracker and three polyethylene plants with a combined capacity of 1,600 KTA. Gas-phase technology is projected to be utilized by two of these PE production units, while the other will adopt slurry technology that has a capacity of 500 KTA.

Comments:

Growing supplies of natural gas driven by drilling of Marcellus and Utica formation has made some petrochemical producers consider northeastern USA an alternative location for ethane cracking projects. There are three groups of petrochemical companies also considering building ethane crackers in this region, including Shell's proposed complex in Pennsylvania,

Formosa to set up a new PP facility in Texas

Taiwan-based Formosa Plastic has announced a plan to build a new polypropylene facility at its Point Comfort, Texas site. At this point of time, there is further detail on capacity, technology, size of investment, or anticipated start-up being released.

Comments:

As a result of shale gas boom in the USA, C3 producers have been looking into on-purpose propylene production that will take advantage of cheap gas feedstock. As of now, there are eight new propane dehydrogenation (PDH) projects being proposed in North America, including Formosa Plastics, Dow, Enterprise Products, Ascend Performance Materials, REXtax, Sunoco Logistics and Williams. Along with the wave of new propylene capacity in North America, this new plant will be the first new polypropylene production to be built in the United States in a decade. In addition to Formosa's announcement, Braskem is also considering bottlenecking projects at its existing sites or a new PP facility in the United States.

Kraiburg TPE establishes Mexico subsidiary

Kraiburg TPE has set up a new subsidiary in Mexico under the name of KRAIBURG TPE Mexico S. de R.L. de C.V. The new division will provide importation operation, logistic management, and administrative support for clients in Central America. Therefore, aiding in accelerated growth, offering higher level of localized service and improving turnaround time.

Comments:

Kraiburg TPE is a German-based thermoplastic elastomer manufacturer. It is estimated that 45% of Kraiburg's sales in the Americas comes from Mexico going primarily into the automotive industry. Mexico's automotive manufacturing cluster has been experiencing strong growth in plastics used. The establishment of the Mexican subsidiary will allow Kraiburg to better serve clients in this region and to capitalize on fast-growing demand for elastomers.

Bolivia to conduct feasibility study of gas pipeline and petrochemical plant projects

Bolivian state-run petrochemical producer Yacimientos Petroliferos Fiscales Bolivianos (YPFB) plans to study the feasibility of building a new petrochemical facility on Southern Purevian coast and installing a natural gas pipeline between Peru and Bolivia. These two proposed projects will be subject to a detailed assessment of economic benefits and feasibility.

Comments:

Bolivia with the second largest natural gas reserves in South America mostly exports its natural gas to Brazil and Argentina. However, Brazil with offshore subsalt field and Argentina with Vaca Muerta shale are eventually expected to be self-sufficient in natural gas. The cooperation between Bolivia and Peru to build one gas pipeline will help Bolivia open up an opportunity to export natural gas as LNG to Asian-pacific region. Besides seeking alternatives for natural gas exports, Bolivia is also dedicated to developing petrochemical industry attempting to add more value to the natural gas. There are several petrochemical projects underway in Bolivia that are in various stages of completion. For example, one ammonia and urea plant in Cochabamba is scheduled to come on-stream in 2016, while a 350 KTA PP complex in Tarija is expected to start up in 2018.



EUROPE

Poland's Grupa Azoty chooses UOP as technology provider of its new on-propose propylene facility

Poland's leading chemical producer Grupa Azoty has selected C3 Oleflex process technology of Honeywell UOP for new 400 KTA propylene production unit. The plant is scheduled to come on-stream in 2019 and will have significant impacts on European petrochemical market. Besides licensing the technology to Grupa Azoty, Honeywell UOP also will provide engineering design, catalysts, adsorbents, equipment, and technical service for this project.

Comments:

Byproduct propylene production has been declining in Europe as several old plants have been shut down and crackers using lighter feedstock that is more cost advantaged for ethylene production. Grupa Azoty, a group formed by the consolidation of Poland's four largest chemical companies, has built up a diverse portfolio of chemical plants and aims to become one of the leading players in the global market. Around 40% of the PDH plant's production is slated for domestic use, to cover Grupa Azoty's downstream OXO alcohols, acrylic acid and polypropylene businesses.

MIDDLE EAST & AFRICA

Basel sets to invest in Iran's Petrochemical sector

In the past few months, several European companies has voiced their interests in expanding cooperation in Iran's petrochemical industry after post-sanction period. According to news reported by Iran's media, German-based giant Basel plans to put an investment of over US\$ 300 million in Iran's petrochemical projects, which would also include transfer of technology. Currently, Iran's petrochemical sector has production output of 60,000 KTA and plans to double its capacity to 120,000 KTA in the first phase and then to 180,000 KTA in a further stage.

Comments:

Iran has been under United Nations sanctions in previous years leading to reduced production in petrochemical sector. With interest from Basel to invest in Iran, this signals a new direction for Iran and for foreign investors who wish to tap into the Middle Eastern market. Iran is in advanced stages of talks on reducing the economic and financial sanctions imposed by the United Nations. With the focus of increasing (tripling) its petrochemical production in the coming years, Iran will be an attractive market for future investors.

Dow's JV Sadara on schedule for commercial operation by 2016

The construction of Sadara's chemical complex in Jubail Industry City II is 94% complete. The complex will begin initial polyethylene production by the end of 2015 and is scheduled for full operation by 2016.

Comments:

Sadara is a US\$ 20 billion joint venture between Dow and Saudi Arabian Oil Company. Upon completion, this huge complex will have 26 manufacturing units that will manufacture plastics and chemicals. Sadara's plastics manufacturing units are planned to supply the booming demand for exports to Asia, especially to China. Dow's investment in the Sadara petrochemical complex is in line with the company's business strategy to participate in cost advantaged and fast growing regions of the world.

ASIA PACIFIC

SABIC and SK form JV for high performance PE production

SABIC and SK Global has finalized their 50:50 JV with a total investment of US\$ 632 million deal for using SK's PE technology Nexlene that will produce and market high performance polyethylene. The SABIC SK Nexlene Co JV, will be located in Singapore and is expected to operate a series of PE production facilities. The first facility will be the former SK 230 KTA PE complex in Ulsan, South Korea which came on-stream in 2014. The company also plans to set up another manufacturing facility in Saudi Arabia within few years and later other manufacturing sites globally.

Comments:

Under the cooperation agreement, SK will contribute its Nexlene Technology and its newly-built metallocene linear low density polyethylene (mLLDPE) complex in Ulsan to secure US\$ 475 million in cash, while SABIC brings raw material competitiveness and will provide access to its complete global sales network. The new JV allows both SABIC and SK Global to jointly get into high performance markets in which Dow, ExxonMobil and Mitsui hold significant roles. Another Korea-based producer LG Chem also recently entered POE market with Lucene™ brand. Nexlene is a metallocene catalysis PE technology developed in 2010 by SK's wholly-owned subsidiary SK Innovation. The new venture will produce Polyethylen, polyolefin elastomers, and polyolefin plastomers based on metallocene technology to meet growing demand from automotive and packaging industry.



BORL to build a new petrochemical complex at Bina

Bharat Oman Refineries Limited (BORL) plans to set up a petrochemical complex in Bina, India that will be connected to 1st phase of capacity expansion project at its existing refinery. The expansion project is to increase capacity in two phases, 1st from 6,000 KTA to 7,800 KTA by 2018, and then to 15,000 KTA with additional investment of US\$ 2.8 billion by 2021. The planned complex is aimed to produce value added downstream products and is expected to start up in coincidence with the completion of the 2nd phase refinery expansion project.

Comments:

BORL is a JV between Oman Oil Company (OOC) and Bharat Petroleum Corp Ltd (BPCL) was actually first initiated in 1993. Delays have put the plan on hold for long periods of time. BORL currently has a 6 million MT of capacity with plans to expand this by 30% to 7.8 million MT by 2018. OOC is on board with BPCL for the first part of the expansion plan, but is hesitant to commit to the second part of BPCL's proposal which is to double to capacity to a total of 15 million MT by 2024.

PolyOne opens Asian Innovation Center in Shanghai

PolyOne has set up an Asian Innovation Center in Shanghai, China to enable collaborative innovations, accelerating application development and increasing speed-to-market for customers in the Asia-Pacific region. The facility will focus on fast growing markets regionally and global R&D projects. Examples cited were healthcare, packaging, transportation, electronics, and consumer goods.

Comments:

PolyOne has operations in thermoplastic compounds, specialty polymer formulations, thermoplastic resin distribution and vinyl resins. PolyOne is also a highly specialized developer and manufacturer of performance enhancing additives, liquid colorants, fluoropolymer and silicone colorants. This facility will focus on high growth end markets such as healthcare, packaging, transportation, electronics, and consumer goods. PolyOne provides value to customers through their abilities to link knowledge of polymers and formulation technology with their manufacturing and supply chain capabilities to provide value added solutions to different segments of the plastics industry. PolyOne's presence in China will help its goal to attain market share in the Asian region and also focus on innovation in the market segments to which they wish to cater.

MRPL begins commercial production at new PP facility

Mangalore Refinery and Petrochemicals Ltd (MRPL) has launched commercial production at its new 440 KTA PP plant in Southern India's Mangalore, Karnataka. The new PP plant adopts Novolen® polypropylene technology and feedstock from MRPL's own upstream petrochemical fluidized catalytic cracking unit (PCFCC).

Comments:

Recently, India government has launched "Make in India" initiative that encourage local production, thereby creating jobs and increasing self-sufficiency in goods. In India, almost all petrochemical products rely on imports to meet market demands. Approximately 14% of polypropylene consumed in India is imported from foreign countries. Most of India's polypropylene is produced in Northern India, while MRPL's new plant is one of 2 polypropylene facilities which are located in Southern India. The demand for polypropylene in South India is estimated to be 500 KTA. MRPL's PP plant can not only meet the demand for PP in Southern India but also increase India's self-sufficiency in PP.

Gettel Group China to expand BOPP film capacity

China-based film manufacturer Gettel Group is setting up its sixth BOPP facility in Huishui, Guizhou province. The new facility will install one Brückner BOPP production line and is expected to be running by the end of this year. Gettel Group currently has five BOPP plants with 13 BOPP production lines in Chongqing, Panjin, Suqian, Tongcheng, and Wenzhou. The company also plans to add another Brückner production line at its Chongqing factory next year.

Comments:

The Chinese BOPP film industry has expanded dramatically over the past five years, currently featuring over 80 manufacturers with over 5,700 KTA in total capacity. As a result, operating rates have fallen below 70%. However, rates vary drastically between large producers with modern equipment such as Gettel Group and smaller lines that are facing shutdowns. Gettel has become the largest global player in BOPP film with over 400 KTA in capacity on-stream by the end of 2015. Gettel will likely slow down with capacity additions for commodity BOPP film after 2015 and instead focus on value-added specialty films to support its margins and become a major player in the export market.



SHALE GAS DEVELOPMENT

UK officials reject key shale gas fracturing projects

Due to strong local opposition across UK and restrict regulations, British local council has rejected two separate Cuadrilla Resources applications for shale gas fracturing campaigns in northwest England of Lancashire, which would have been the UK's first full scale fracking. The series of decisions are serious setbacks to UK shale gas industry.

Comments:

UK is a country relying heavily on imported natural gas, mostly from Norway, to meet domestic demand. British government would like to duplicate the success of US shale gas, thereby reducing reliance on imported energy and boosting U.K. economy. According to the British geological survey published in 2013, the UK possess approximately 800 billion cubic feet of shale gas reserves. However, the shale gas development in UK is not moving forward as fast as the government and industry insiders would like. Public concerns over environment and safety concerns have been amplified since UK's first shale gas well triggered an earth tremor in 2011, which resulted in 18 month long ban on hydraulic fracturing. Since, there have been very few shale gas applications being proposed.

Alpha Natural Resources takes over Marcellus shale JV

US coal producer Alpha Natural Resources has acquired the other 50% stakes in its 50:50 shale gas JV Pennsylvania Land Resources Holding Company, owned by EDF Trading Resources, LLC. This is a US\$ 126 million transition through its wholly-owned subsidiary Pennsylvania Services Corporation, which allows Alpha Natural Resources to fully control a highly economic shale gas program in Marcellus shale formation.

Comments:

Virginia-based Alpha Natural resources is one the largest metallurgical coal suppliers to the steel and power industries in the US. Alpha's decision to buyout the full stake in the shale gas exploration partnership comes after its Europe based partner EDF Trading Resources, LLC decided to exit upstream exploration and production activities in North America. The acquisition gives Alpha an opportunity to increase diversification of its business out of coal and into natural gas exploration.

MAJOR FEEDSTOCK PRICING TRENDS

Exhibit A – Natural Gas and Ethylene Price

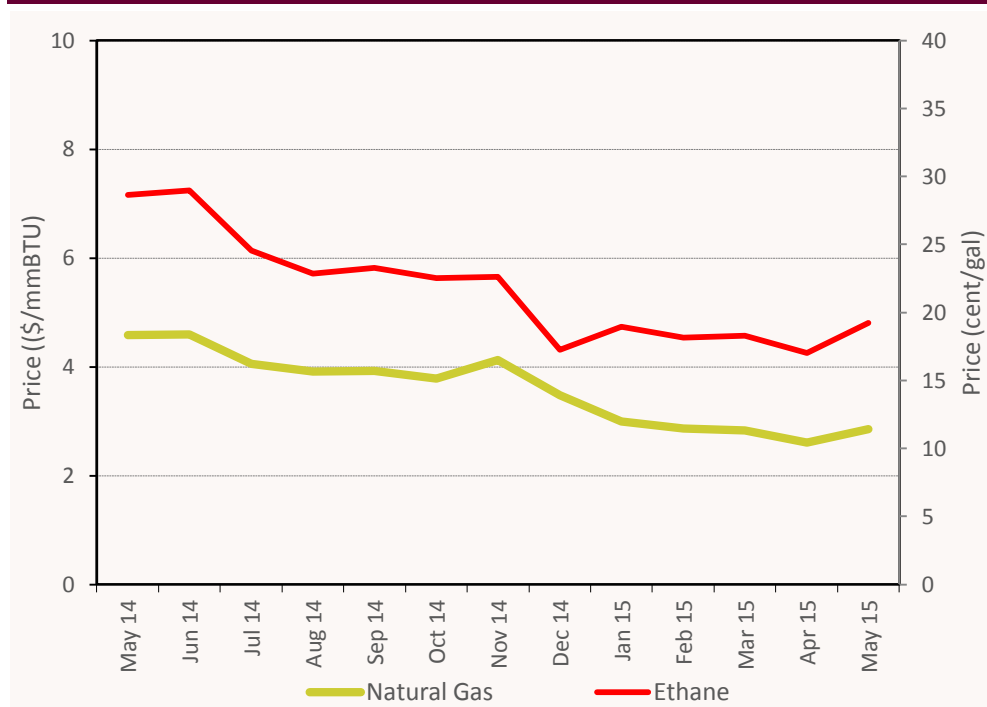


Exhibit A presents prices of Henry Hub natural gas and ethane from May 2014 to May 2015 in the United States.

- This rolling 12 month graphs shows a downward movement as the overall macro trend.
- Average Henry Hub Natural gas prices is sourced from Energy Information Administration.
- Ethane prices are closely correlated to natural gas prices.

Exhibit B – Crude Oil and Propylene Price

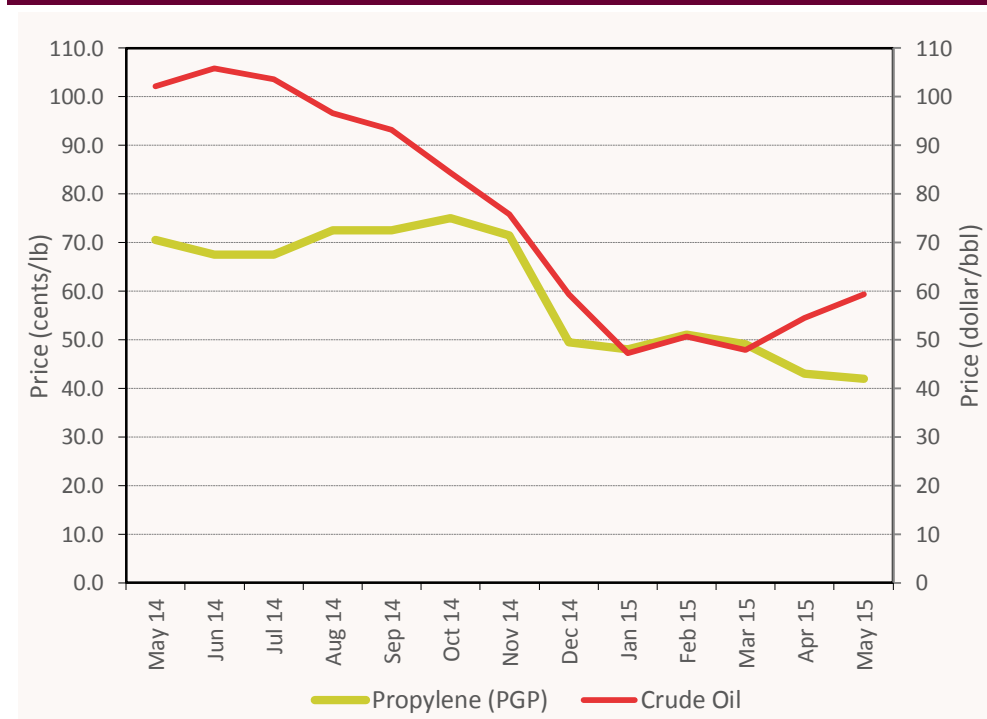


Exhibit B presents prices of WTI crude oil and propylene from May 2014 to May 2015 in the United States.

- Crude steadied in January and began a rebound in April.
- The impact of crude oil prices slump is reflected in propylene settlements in Q4 2015.
- The divergence between prices of WTI crude oil and propylene is shown beginning in April 2015, which results from high inventory level of propylene as well as slightly-improved demand with continued strong production.
- Monthly WTI crude prices is sourced from Energy Information Administration.



MAJOR THERMOPLASTIC PRICING TRENDS

Exhibit C – Ethylene and Polyethylene Price

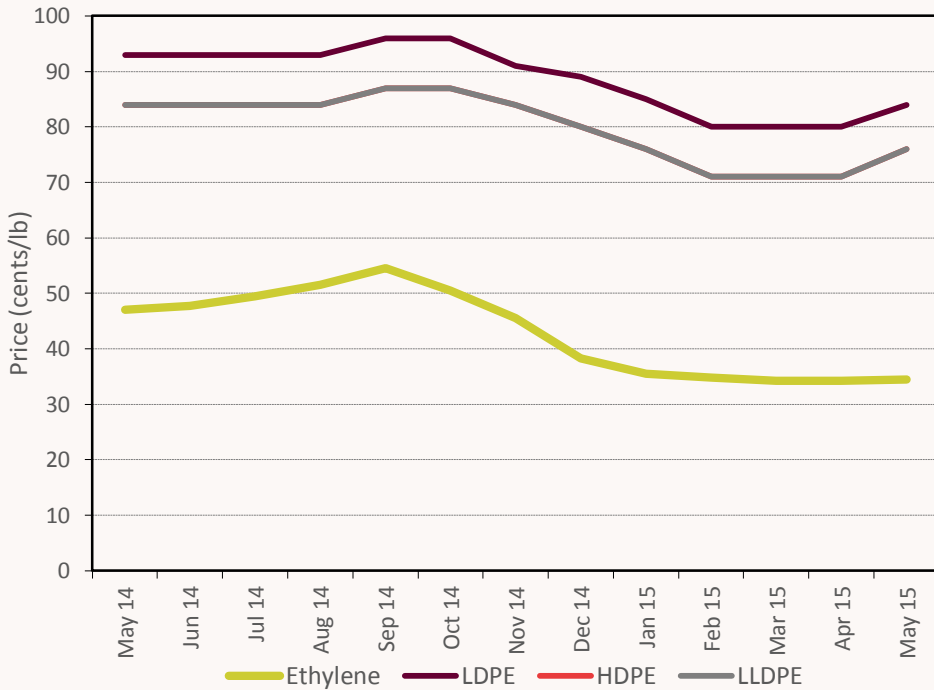


Exhibit C presents the correlation among prices of ethylene, LDPE, LLDPE, and HDPE in the United States from May 2014 to May 2015 in the United States.

- 1st Half of 2015 polymer pricing continue to outpace the rate of ethylene decreases, which aid the producer’s position.
- PE price hike in May is a consequence of good domestic demand along with strong export demand especially from Asia and Latin Americas.
- Prices of LLDPE and HDPE are overlapping during this period.

Exhibit D – Propylene and Polypropylene Price

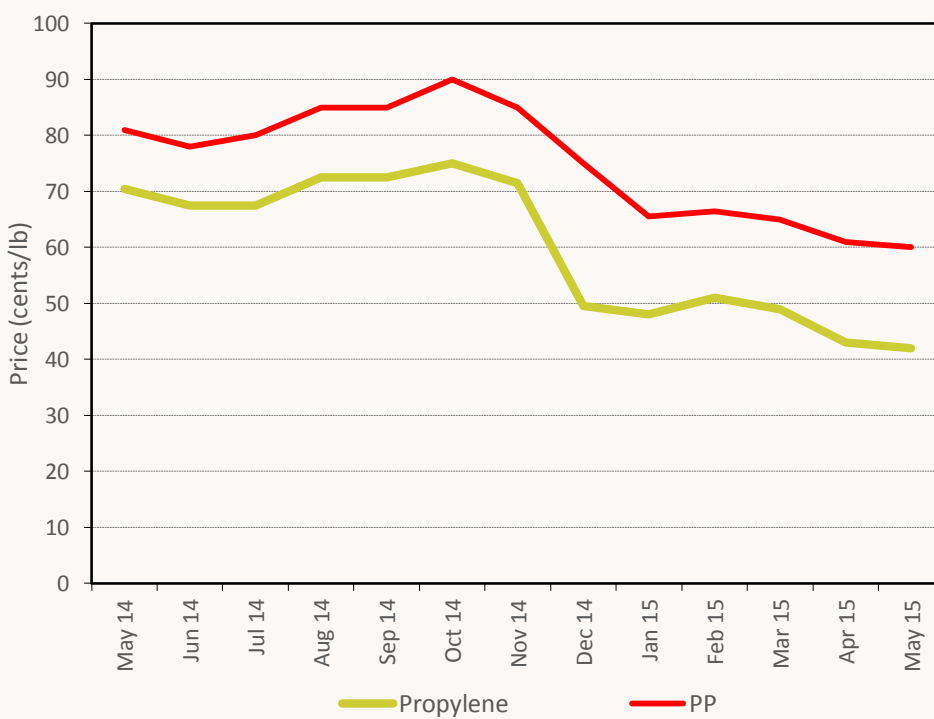


Exhibit D presents propylene price and polypropylene price from May 2014 to May 2015 in the United States.

- During this period, the macro trend is a significantly downward for both propylene and polymer, which will help ward off polymer substitution within some segments
- Polypropylene prices are highly correlated to propylene prices.



Exhibit E – Styrene and Polystyrene Price

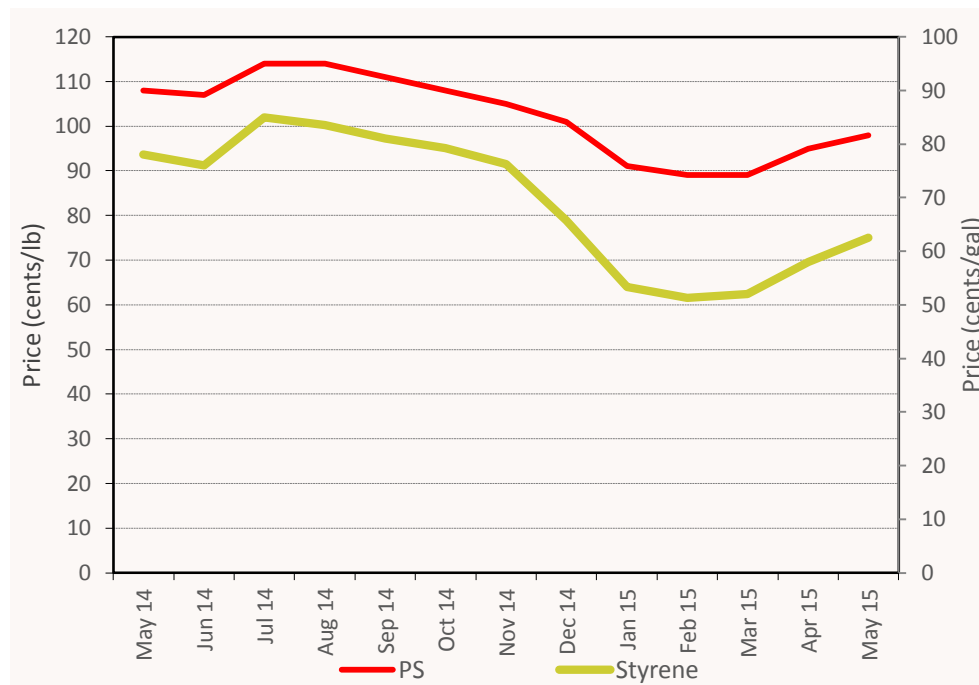


Exhibit E presents prices of styrene and polystyrene from May 2014 to May 2015 in the United States.

- The overall macro trend is showing a downward movement during this period.
- Ethylene decreases impact styrene pricing with improve the producer’s position.
- Benzene disruption in Canada is expected to impact on styrene production in North America.

Exhibit F – Vinyl Chloride Monomer and Polyvinyl Chloride Price

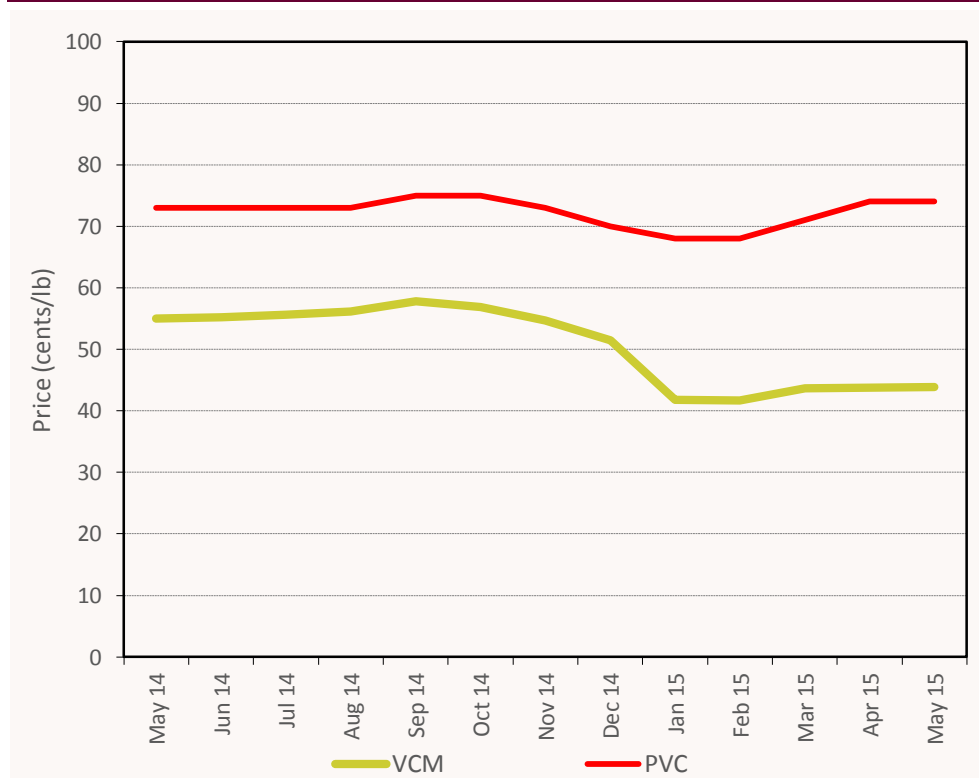


Exhibit F presents prices of vinyl chloride monomer and polyvinyl chloride from May 2014 to May 2015 in the United States.

- Ethylene prices drop has a significant impact on VCM pricing.
- Polymer settlements are correlated to prices of VCM.
- However, prices of PVC has outpaced the rate of monomer increase since Dec 2014, which helps producers’ economics.





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