
UPCOMING RECESSION – GLOBAL PETROCHEMICAL INDUSTRY RESPONSE

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INTRODUCTION

The perfect storm for the 2009 is on its way – All the undesirable forces will culminate into one - (1) The U.S financial crisis, (2) China Demand Slowdown; (3) Global Excess Capacity on its way – Down Cycle and (4) Low Oil Prices. The overall objective of this analysis is to present the current situation, general impacts and future directions. It is important to take an immediate action, but it is also equally important, not to over-react and avoid undesirable long term consequences.

This article will essentially look at the impact regionally, by organizational type and provide some strategic options.

BACKGROUND

All the four major factors that are impacting the Global petrochemicals have been brewing for a while, but came

together into a perfect storm during the last three weeks of October. The four major factors coming together are:

China Slowdown: Now that the confetti from 8-8-8 Olympics is all cleaned up, the Chinese Dragon, the world worshipped in the last decade is having its own tail spin – impacting the rest of the world. Most analysts predicted that an unrestrained double digit growth year after year is not sustainable.

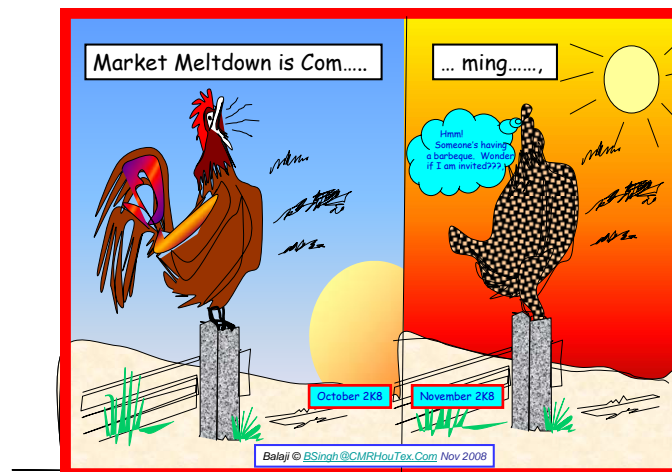
Excess Capacity/Downturn: The excess capacity coming on stream in most countries, except U.S, Europe and Japan will result in Global chemical industry downturn. The neat thing about the chemical industry is that it is extremely predictable – due to high infrastructure costs and capital investments. The chemical industry's 7

year cycle is well known and anticipated.

We are currently in the down cycle preparing for the up cycle starting 2013 +/- 2 years. Only new concept in this particular

cycle is the factor of Globalization. Globalization of information technology occurred in the last cycle – but for chemical industry, this would be the first Global Down Cycle.

Lower oil prices – was it a surprise???? We experienced it once in 1978; once in 1992; By third time we



should have known. Oil is a major commodity and reacts predictably to the market dynamics – Supply-Demand. The lowering oil prices this time had the help of financial crisis and Global slowdown in demand due to China slowdown. This double impact of slow demand and the financial crisis will be a harder one deal with.

The American Initiated Global Financial Crisis

The post-world war literature amply elucidates the American mystique in much detail. When America goes down – it will take the whole world with it, an integral part of the mystique – the recent financial crisis proved it right.

For example, the Asian Crisis impacted most of the Asian countries from 1993 to almost 1997/8. No one in the U.S got impacted, even though the advanced Nations of that time – U.S, Western Europe and Japan were partly responsible for the crisis by investing without the infrastructure in place.

The financial crisis is still new and coincident elections and leadership vacuum may extend the recovery to the end of first quarter of 2009.

CURRENT SITUATION

Global economic slowdown, collapse of demand in China, and falling oil prices have significantly impacted the chemical industry. Many companies have announced operating rate cuts and capacity shutdowns to balance the supply in light of demand destruction. Polyolefins pricing in Asia has also declined significantly in the last two months. This trend of declining prices is

now affecting other regions such as Western Europe and North America. Platts recently reported that shipments from the Middle East are now headed towards Western Europe due to lack of demand in Asia. Shipping costs have also decreased by almost 30% due to declining demand.

Sabic Innovative Plastics (former GE) recently announced that they will have an across-the-board production cut of approximately 20%. Slowing demand in automotive and electronics markets will reduce the demand for some of the engineering plastics manufactured by Sabic innovative plastics. BASF recently announced that they will shutter approximately 80 plants and reduce the operating rates on approximately 100 plants. Most of these are impacted by reduction in automotive, construction, and textile demand. Similar announcements have been made by other engineering thermoplastic companies.

Exhibit 1 is a compilation of news releases regarding capacity closures or decrease in operating rate. Some these press releases have not been confirmed by the producing companies. The current issue covers the shutdowns for cracker, polyolefins, VAM, and elastomers. Approximately 5% of global PP capacity and 1.5% of global PE capacity has been taken off the market. In addition to these there have been announcements of capacity closures for acrylonitrile, polystyrene, ABS, polycarbonate, and others.

Exhibit 2 presents the prices for Dubai crude & WTI crude and Asian prices for naphtha, ethylene, propylene, LDPE, LLDPE, HDPE, and PP at different time

intervals in the last year. While the overall trend shows a significant decline in pricing it is important to note the following:

- (1) decline in polyolefins pricing is proportional to the decline in crude prices
- (2) the prices have declined from the high of July 2008 and reached close to mid-2007 prices

Overall it seems that declining demand has had more adverse effect on the chemical industry than the price declines; since the price declines are complemented with equal decline in raw material costs. The price of naphtha is now much closer to the price of cost advantaged ethane in the Middle East. Therefore, an improvement in demand at lower oil prices could be beneficial to the chemical industry.

IMPACT ON ASIAN COUNTRIES

The largest impact has been on Asian countries due to the decline in demand and prices in China. The impact will be largest in export-oriented countries such as Singapore, South Korea, and Thailand. Asian countries using naphtha as feedstock saw a decline in cost along with the decline in prices. Companies in Thailand that are based on ethane mainly saw a decline in price without a significant decline in cost.

These countries in the short-term will focus on decreasing the operating rates via capacity shut-down. In the medium-term the focus will be on shifting exports to countries other than China and increase participation in specialty polyolefins markets.

IMPACT ON EUROPE

As the demand in Asia decreases we will see more and more product being shipped from the Middle East to Europe. Europe should be the next region that will see a decline in operating rates and prices as there is shift in exports. The biggest exporter of polyolefins to Europe at this time will be the Middle East. We do not anticipate seeing much of the product moving from Asia to Europe.

IMPACT ON NORTH AMERICA

North America is still in a better position than other regions – both demand and prices are more stable in North America than in Asia. A decline in exports is putting pressure on the operating rates in North America. Some of the older and smaller capacity will be taken off the market to optimize production.

Both ethane and naphtha prices have declined in the US; therefore there has been some reduction in cost along with the decline in price. It will be harder for the Middle East to ship product to the US after adding sea-freight, tariffs, and in-land transportation cost. North America will become more competitive to the Middle East at lower oil prices.

Canada with its Alberta advantage will still compete effectively; however some of the naphtha based capacities in the US have become more competitive at these oil prices.

In the short-term we anticipate that the margins will be highest in North America followed by Europe and Asia. North America, for now, is in a better position compared to other regions but the situation is deteriorating fast. This will be

an ideal time for investing in specialty products/applications and rationalizing capacity.

IMPACT BY TYPE OF PLAYER

The industry currently can be divided into three major categories:

1. Commodity focused players with cost advantage
2. Commodity focused players without cost advantage
3. Players with balanced portfolio (mix of commodity, differentiated commodity, & specialty products)

Players that are heavily focused on the commodity markets and do not have cost advantage will have to transform to survive. These companies will have to increase their differentiated commodity & specialty products portfolio. They will also have to use unique methods to reduce production cost, improve product differentiation, and provide systems cost reduction to their customers. These strategies will allow the companies to fight the perfect storm.

Players that are focused on commodity markets and have a cost advantage will be able to optimize the operating rates for plants but at lower margins. These players will be able to ride the storm but will have to start thinking of innovating and differentiation as cost advantage can not be a long term strategy.

Players with a balanced portfolio will try to cover their costs by selling commodity products and gain margins from the differentiated commodity & specialty products. These companies will have the advantage of being established players in the specialty products market. However, these companies should start

anticipating competition from new entrants. Overall, these players will try to ride the storm based on their balanced portfolio.

What Does Microeconomics Theory Suggest??? **Recessions relevant to current Petrochemical Industry Situation?**

RECESSION

A recession has many attributes and can include declines in: (1) overall economic activity, (2) employment, (3) cash flow, (4) investment, and of course, (5) the corporate profits.

Recessions are the result of falling demand and cash flow – and are called **DEFLATION** when associated with falling prices, **INFLATION** when associated with raising prices and **STAGFLATION** when prices go up without growth.

In the U.S, we went through recessions related to inflation and stagflation in the 1975 and 1981. This Global recession of 2008 is classified as “Deflation” - Falling prices; No Income; No Jobs; Serious Cash Crunch; Excess Capacity; Temporary Drop in Demand.

A severe or prolonged **RECESSION** can lead to an economic **DEPRESSION**. In general, a decline in GDP or production of more than 10% constitutes a depression. As markets weaken, the margins will fall – generating less cash – less employment – less utilization – increasing costs leading to shut down economics.

WHAT REMEDIES DO ECONOMISTS SUGGEST???

Strategies for moving an economy out of a recession vary depending on which economic school of thought the policymakers follow. There is no one right answer or wrong answer – all of them follow their philosophies...

1. The **Keynesian economists** advocate deficit spending by the government to spark economic growth.
2. **Supply-Side Economists** suggest tax cuts to rich to promote business capital investment.
3. **Populist economists** suggest subsidies for low income individuals or lower-bracket tax reductions are more effective and serve a double purpose including relieving the suffering caused by a recession.
4. **Free Market Economists** simply recommend that the government not interfere with natural market forces – the invisible hand of Adam Smith will bring it back to normal - whatever is left of It.,

These are, of course the four options – in the past, all four worked equally well in the United States and the most recent Asian Crises. Either way, recessions, like most other illnesses will recover with time – after causing some short-term damage. It is time to think how to recover from the sickness and not how you got into it or who to blame???????

PETROCHEMICAL INDUSTRY RECESSION

Petrochemical industry recession is a bit more involved and more predictable than the country economics. Until 1986-87 the petrochemical markets were regional. The markets were measured in terms of US, Europe and Japan and then the Rest of the World. Starting the late eighties the petrochemical industry became Global in nature.

However, the definition of Globalization in the 80s was quite different from the Globalization of the 21st century.

In the 80s, the definition of Globalization covered expansion of US, Europe and Japan (mostly the US) beyond its borders to encompass growing markets in the developing regions. The investments were mainly driven by the advanced nations, independent of how developed the emerging regions were. This resulted in the classic Asian Crisis of the mid 90s – lack of infrastructure of developing countries to fully utilize the investments from advanced nations. Ultimately, the advanced nations withdrew finances from Asia, causing the collapse.

On the other hand, the Globalization of the 21st century is primarily driven by domestic growth in Asia and lower feedstock prices elsewhere. The advanced nations flocked to monetize and capitalize on these developments. The Globe became interdependent to optimize the human and capital resources.

This interdependency, a double edged sword, impacted both the positive growth factors and the financial

implications – independent of who originated the disruption. This current recession initiated by the United States' drive to “deregulate” and take the government out of private sector essentially drove the private sector to the brink of collapse and come back for bail outs.

Just contrast the two most recent congressional hearings – one by the oil companies – justifying their higher than normal(?) profits - and One by the automotive companies – requesting bail out because of lack of profits - otherwise the whole economy will collapse.

The current recession in the petrochemical industry can be characterized as the “perfect storm”. All the undesirable forces will culminate into one - (1) The U.S financial crisis, (2) China Demand Slowdown; (3) Global Excess Capacity on its way – Down Cycle and (4) Low Oil Prices.

The factors 2 and 3 were anticipated for the last three years. Chemical industry undergoes predictable cycles due to the high capital intensity - a fact taught in the lesson 1 – on chemical economics.

The U.S financial crisis may not have been predicted, but the impact was well known. The factor of low oil prices was predicted as a potential (See Middle East Economics and Saudi Government Documents). However, these factors caught everyone by surprise within two months.

THE IMPACT OF A RECESSION ON PETROCHEMICALS AND STRATEGIES

Here are some of the potential events and strategies for reacting to the petrochemical recessions – industry with high capital intensity – applicable to petrochemical industries.

THE SEQUENCE OF EVENTS

1. Markets (demand) weaken, the prices will fall
2. Falling prices will depress the short-term margins
3. The secondary impact - the utilization rates will fall
4. The variable costs will (ex- raw materials) will go up – putting additional pressure on margins
5. Overall impact – lower revenues – constant to increasing expenses – lower margins – PANIC... PANIC ...PANIC focused on margins above all else..,

HOW DO ORGANIZATIONS REACT?????

1. **Spending Freeze:** Cut costs indiscriminately – Belt Tighten (Have everyone travel by UPS instead of commercial airliners – even when you never did it before...) - this is short term solution. – as a means of propping up margins as a show of efficiency.
2. **Cancel projects:** (layoff the innocent and promote the inefficient... guilty... Clean the house... cut off expenses that you cannot understand..,)

3. Cancel all new ideas and innovations or delay them...

Simply put.,. Not a good idea ...Don't kick the dog, just because your cat is acting up... Take care of the cat first.. try and understand how recessions occur and find relevant solutions instead of propping up margins just to look good...

HOW SHOULD THE ORGANIZATIONS REACT????

1. Remember – the markets weaken in a business downturn – The petrochemical organizations knew the downturn is coming. It is coincidental that the financial crisis is occurring when the chemical industry was already going through: (1) excess capacity, (2) downcycle, (3) Global Product Migration trends and Of course (4) demand slow-down. The financial crisis was just a trigger for the explosive mixture that had been building for the last few years (See our reports....)

Don't act surprised... Next time spend more time in long term planning beyond... quarterly supply/demand/price issues.,.

2. In general, a reduction of 20 % in capacity utilization reduces the

margins as much as 65% - that is the nature of the beast. So, do not touch capacity utilization it can only hurt you more once the recession is over.

3. In the oligopolistic situation (few dominant players), the dominant players should independently hold the price up.
4. In a non-dominant player markets, the participants should explore other marginal markets, even at a lower price and try and maintain the utilization at the cost of margins.
5. Focus on optimizing production – not maximizing it - Don't drop prices (unless you are forced to meet a competitive price)
6. Educate your customers on petrochemical economics
7. In a recession, export prices drop faster than domestic prices (due to transparency and time lag) – hence protect the domestic prices and deal with export prices.

... Don't kick the dog, just because your cat is acting up....

..... try and understand how recessions progress and find relevant solutions, instead of propping up .. margins just to look good...,

In general the petrochemical industry is better off: (1) protecting the margins, (2) optimizing the utilization rates and (2) incorporating smart marketing. This is not the time to cut costs indiscriminately; cut people unreasonably; cut innovations or emphasize stockholder value.,.

More importantly, these issues will negatively impact most of the alternate feedstock programs – a situation we cannot afford – after abandoning the program twice in the past (1979 and 1992) It will be too expensive and redundant.

THE OTHER LOW PROBABILITY HIGH CONSEQUENCE EVENTS THAT CAN DISRUPT THE GLOBAL PETROCHEMICALS ???????

The scenario approach to corporate planning recommends identifying the low probability high consequence events prior to assess potential impacts and possible impacts. Based on our experience, we developed the following low probability scenarios for the Global petrochemical industry future.

Basic Scenario – Global Shifting Trade Flows - 2008-2020

- The China and Middle East - a regional balance until China's reaches self sufficiency
- Middle East positioned to supply Europe and North America to replace the Chinese demand
- U.S industry will stand still till the regional balances are complete
- Overall, Middle East will supply the raw materials, China will be the processor; US, Europe and Japan will be the primary consumers – followed by China India/Asia

Basic Scenario – 2012 Middle East Phase I on Stream

- The phase I of Middle Eastern production comes on stream
- China's supply/demand moves toward a balance
- Less direct impact on U.S, Japan and Asia
- ASEAN economies continue to benefit from Chinese growth
- Phase II of Middle Eastern expansion announcements – emphasis on level II and value added products

The New Race for Global Value Added Products

Basic Scenario – 2015 Middle East Phase II on Stream

- The phase II of Middle Eastern demand comes on stream
- China's supply/demand closer to a balance
- The Middle Eastern Demand needs outlet Impact on ASEAN, Japan
- ASEAN economies continue to move to value addition and downstream
- Phase II of Middle Eastern expansion on stream = level II and value added products

Scenario – Global Shifting Trade Flows - 2008-2020

- The U.S, Europe and Japan – Commodity industry under pressure
- ASEAN economies continue to move to value addition and downstream

- Phase II of Middle Eastern expansion on stream level II and value added products
The World is Really Flat

DISRUPTIVE SCENARIOS

Potential Scenario I - Western Accepted peace in the Middle East – Iran/Iraq/Venezuelan

Oil Resources freely available

In this scenario, the oil prices will bottom out. – bringing on the hydrocarbon energy bust. None of the alternate feedstocks programs will be viable and we exactly do what we did in 1979 and 1993 – Abandon all alternate feedstock programs

Potential Scenario II - West finally moves to Carbon footprint reduction and the Alternate Energies make a dent

This has been attempted unsuccessfully twice in the past. If we do succeed the third time, the problems will be different.

Alternate feedstocks will impact food and other commodities which in turn can transfer the impacts to energy making hydrocarbons more attractive

Potential Scenario III - West develops an economic transport of Natural Gas; Russia develops gas fields

This scenario will create a new and more economical natural gas economy and West will boom again. No need for migrations to low cost feedstocks.

Potential Scenario IV- Solar, wind and nuclear energies reach a point of indifference – to hydrocarbon energy

All together a new set of issues -

CONCLUSIONS & RECOMMENDATIONS

This is a classical recession and the solutions and action items for organization have been written in economic textbooks since decades. In this section Chemical Market Resources, Inc. provides its analysis of the current situation and provides some of the basic strategy recommendations. Each organization is unique and should develop their own strategy while using these guidelines.

Exhibit 1 Partial List of Announced Capacity Closures

Source: Chemical Market Resources Inc.

Company	Location	Product	Capacity	Comments
LG Chem	South Korea	Methacrylate Butadiene	50,000	30% production cut for Nov-Dec
LG Chem	South Korea	Butadiene Rubber	100,000	30% production cut for Nov-Dec
ExxonMobil	Singapore	LLDPE/HDPE	480,000	Rumors of shutdown in Nov-Dec
Dairen Chemical	Taiwan	VAM	350,000	100% Shutdown Since October 1 - indefinitely
Dairen Chemical	Taiwan	VAM	300,000	Running at 90% Capacity - indefinitely
Formosa Plastics	China	Polypropylene	450,000	Operating at 60% since September now shut-down - indefinitely
Formosa Plastics	China	Polypropylene	400,000	Operating at 60% since September now shut-down - indefinitely
Formosa Plastics	Taiwan	Polypropylene	350,000	Shutdown since mid-October
LyondellBasell	Germany	LDPE & HDPE	1,300,000	10% cut in operating rate
LyondellBasell	France	LDPE & HDPE	320,000	10% cut in operating rate
Reliance Industries	India	Polypropylene	1,000,000	50% capacity down for four weeks
Polymirae	South Korea	Polypropylene	650,000	25% Capacity down
TPC	Singapore	Polypropylene	80,000	100% Capacity down from Nov. 1
TPC	Singapore	Polypropylene	480,000	Operating at 80% since October
TPC	Singapore	LDPE	180,000	Operating at 80% since October
TPC	Singapore	LDPE/EVA	70,000	Shutdown since a fire in october
Honam	South Korea	Polypropylene	250,000	Operating at 80% since September & plans to shutdown
Honam	South Korea	Polypropylene	300,000	Operating at 65% since September & plans to shutdown
Flint Hill	United States	Polypropylene	54,000	Shutdown for first half of 2009
Flint Hill	United States	LDPE	200,000	Shutdown for first half of 2009
Flint Hill	United States	LLDPE	160,000	Shutdown for first half of 2009
SCG	Thailand	LDPE	100,000	Shutdown around October 22 for 1.5 weeks
SCG	Thailand	LLDPE	100,000	Shutdown around October 22 for 3 weeks
SCG	Thailand	HDPE	580,000	Operating at 80% capacity since end-October
SCG	Thailand	Polypropylene	180,000	Shutdown around end of October for three weeks
Ineos	United States	Polypropylene	235,000	Shutdown by end of 2008 & early 2009
Sinopec	China	PP and PE		Operating rate cuts to decrease production by 100,000 tons

Exhibit 2 Partial List of Announced Cracker Closures

Source: Chemical Market Resources Inc.

Company	Country	Ethylene Capacity	Comments
LG Chemical	South Korea	750,000	Considering rate cuts
LG Chemical	South Korea	860,000	Considering rate cuts
Lotte Daesan	South Korea	650,000	Operating at 90%
KPIC	South Korea	460,000	Cosidering rate cuts
SK Corp.	South Korea	190,000	Shutdown end of Oct.
YNCC 1	South Korea	857,000	Operating at 80%
YNCC 2	South Korea	555,000	Operating at 80%
YNCC 3	South Korea	400,000	Operating at 80%
Formosa 1	Taiwan	700,000	Operating at 85-90%
Formosa 2	Taiwan	900,000	restarted to run at 85-90%
Formosa 3	Taiwan	1,200,000	restarted to run at 85-90%
CPC 3	Taiwan	230,000	operating at 65%
CPC 4	Taiwan	380,000	Shut for turnaround until end of Nov.
CPC 5	Taiwan	450,000	Operating at 70%
Maruzen	Japan	550,000	Operating at 85%
Mitsubishi	Japan	450,000	Shut down Oct 8, Restarted Oct 23
Mitsubishi	Japan	375,000	Operating at 80-85% until Dec
Mitsubishi	Japan	476,000	Operating at 80-85% until Dec
Mitsui Chem	Japan	600,000	Shut down for repaing in Oct. for 10 days
Nippon Oil	Japan	404,000	considering rate cuts
Sanyo	Japan	470,000	Operating at 95%
Sumitomo Chem	Japan	416,000	Operating at 96%
Titan Petchem	Malaysia	260,000	Operating at 80%
Titan Petchem	Malaysia	407,000	Operating at 80%
PCS	Singapore	475,000	Operating at 70%
PCS	Singapore	655,000	Operating at 70%
LyondellBasell	United States	770,000	All Capacity down from Oct. 1 to Early 2009
LyondellBasell	United States	300,000 (Propylene)	All Capacity down from Oct. 1 to Early 2009
LyondellBasell	Germany	290,000	Operating Rate cut - actual rate cut unknown
LyondellBasell	Germany	760,000	Operating Rate cut - actual rate cut unknown
LyondellBasell	France	530,000	Operating Rate cut - actual rate cut unknown

Exhibit 3 Polyolefins & Related Pricing, Asia
Source: CMR Inc.

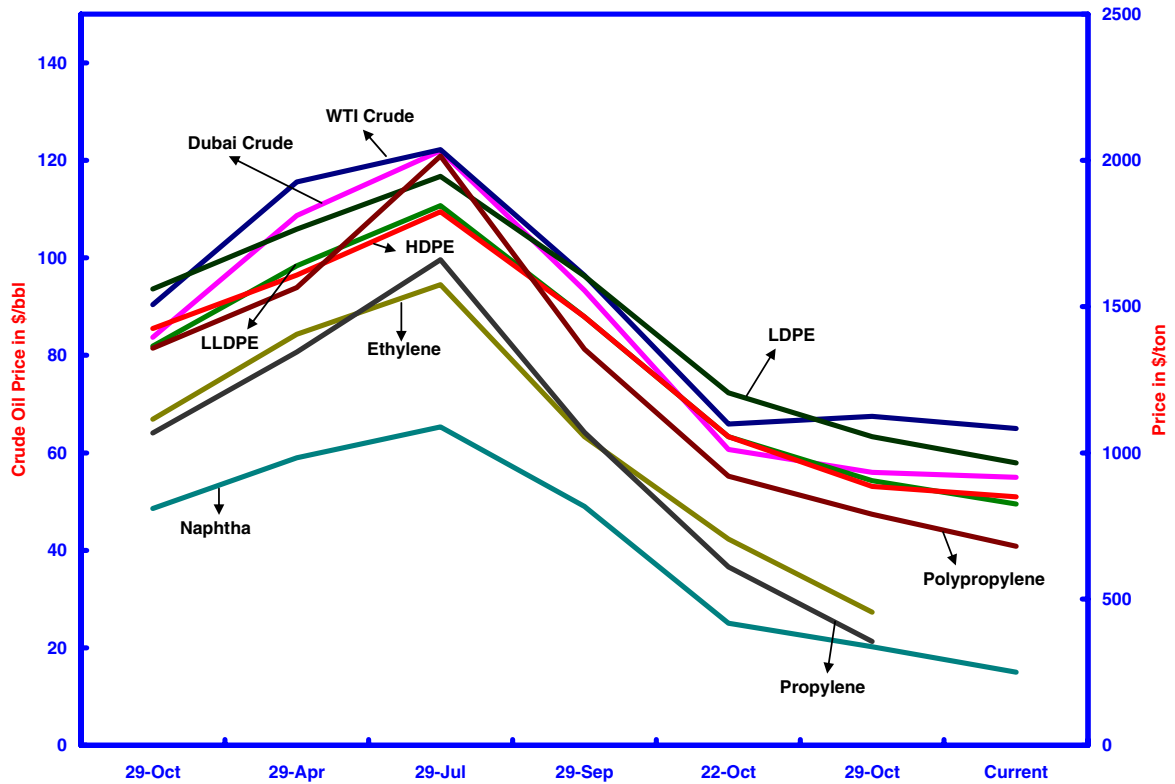


Exhibit 4 Change Prices, Asia
Source: Chemical Market Resources Inc.

	29-Oct 12 months	29-Apr 6 months	29-Jul 3 months	29-Sep 1 month	22-Oct 1 week	29-Oct Current
	% Change					
Dubai Crude	-34%	-49%	-55%	-41%	-9%	-1.8%
WTI	-28%	-44%	-47%	-33%	-1%	-3.7%
Naphtha	-69%	-75%	-77%	-69%	-40%	-25.8%
LDPE	-38%	-45%	-50%	-40%	-20%	-8.5%
LLDPE	-40%	-50%	-55%	-44%	-22%	-8.8%
HDPE	-40%	-47%	-53%	-42%	-19%	-4.0%
PP	-50%	-57%	-66%	-50%	-26%	-13.9%