

Asia Petrochemical Industry Conference 2005

Country Report

From

MALAYSIA



Prepared by:

Malaysian Petrochemicals Association (MPA)

FACTS ON MALAYSIA

TOTAL AREA

330,000 Square Kilometres
(127,000 Square Kilometres)

POLITICAL STRUCTURE

A Federation of 13 states

SYSTEM OF GOVERNMENT

Parliamentary Democracy with a Constitutional Monarch

FEDERATION CAPITAL

Kuala Lumpur

ADMINISTRATIVE CENTRE

Putrajaya

POPULATION

25 Million

MAJOR ETHNIC GROUPS

Malays, Chinese, Indian, Kadazans and Ibans

MAJOR LANGUAGES

Malay (Official Language), English, Mandarin and Tamil

TIME

GMT + 8 Hours

US Eastern Standard Time + 13 Hours

CLIMATE

Tropical – Warm and sunny throughout the year

Daily temperatures ranges from 33°C (90°F) in the afternoon to 22°C (70°F) during the night

CURRENCY

Ringgit Malaysia (RM) which is divided into 100 cents

EXCHANGE RATE

Pegged at US\$1 = RM3.80 on September 1998

Asia Petrochemical Industry Conference 2005

KUALA LUMPUR, MALAYSIA

Country Report – MALAYSIA

	<i>Page</i>
MALAYSIAN ECONOMY	1
PETROCHEMICAL INDUSTRY	3
COMPETITIVE FACTORS	14
PLASTIC INDUSTRY	16
PRODUCT COMMITTEE REPORTS ~ BY MALAYSIA	20

1. MALAYSIAN ECONOMY

OVERVIEW OF THE MALAYSIAN ECONOMY IN 2004

Malaysia GDP Growth Rate

Year	Growth Rate (%)
2001	4.2
2002	4.1
2003	5.2
2004	7.1
2005 F	5

(Source: Central Bank of Malaysia)

The Malaysian economy expanded at a slower pace during the fourth quarter of 2004 and registered a growth of 5.6%. The growth was driven by private sector activity and was achieved amidst low inflation. For 2004 as a whole, the Malaysian economy expanded by 7.1%. In the manufacturing sector, the more diversified base has provided support to moderate the impact of slowdown in the electronic equipment sub-sector. The services sector continued to remain firm, with higher growth in most sub-sectors. The primary commodity sector recorded another quarter of strong performance supported by higher palm oil and natural gas production. Overall, domestic demand in the region is expected to be supportive of growth, backed by favourable fundamentals and contribution from new growth areas. Outlook for domestic demand is positive, driven by greater private sector spending, expanding consistent with increasing private investment and sustained consumption. Private sector consumption will expand by 7.9% and private investment, 11.9% due to improved business confidence in view of favourable external demand and heightened domestic activities.

The strong economic growth of recent years and Malaysia's large current account surpluses, which averaged 11.4% of GDP annually in 1998-2003, have resulted in a gradual build-up of foreign exchange reserves. As at November 2004, the international reserves reached USD 63 billion which was equivalent to approximately 7.8 months of retained imports and 5.8 times higher than the country's short-term debt obligations. The rapid accumulation of reserves has recently been seen as a sign that the ringgit's peg to the dollar has been set at an undervalued level. However, the Malaysian government has informed that there are no near-term plans to alter the arrangement. Malaysia recorded a strong growth in Gross Domestic Product (GDP) increasing from 5.3% in 2003 to 7.1% in 2004. However, it is expected to decrease, ranging from 5.0-6.0%. In 2004, GDP growth was led by private sector that contributed to 6.2% points to the overall economic expansion. Private consumption increased significantly, supported by higher disposable incomes, a rebound in consumer confidence following the events of early 2003 including the Severe Acute Respiratory Syndrome (SARS) outbreak, various tax rebates and low interest rates.

(Source: Central Bank of Malaysia)

OUTLOOK FOR 2005

In January 2005, Malaysia recorded a trade surplus amounting to RM 7.8 billion (USD 2.05 billion) compared with that of RM 6.5 billion (USD 1.71 billion) in January 2004. This 20.7 % or RM1.3 billion increased was mainly due to strong growth in exports. Export earnings for January 2005 was RM39.2 billion (USD 10.3 billion), an increase of 11.3% compared to RM 35.2 billion (USD 9.26 billion) in the January 2004. The main exports were electrical and electronic products, followed by crude palm oil and palm oil-based. Nevertheless, *crude petroleum maintained as the third largest export* followed by timber and timber-based products. The total import value for January 2005 was RM 31.4 billion (USD 8.26 billion), an increase of 9.2% compared to January 2004. The imports comprised of intermediate goods, capital goods and consumption goods. Malaysia's top four trading partners were United States, Singapore, Japan and China. These four countries contributed 49.7% of the total trade Malaysia for the month of January 2005.

2. PETROCHEMICAL INDUSTRY

OVERVIEW

The Malaysian Petrochemical Industry has developed over the last twenty years into a vibrant and strong regional player, in large part through the efforts of MIDA and Petronas, the national oil company. Petronas has pursued a policy of adding value to its various hydrocarbon streams in partnership with global petrochemical companies.

The presence of petroleum giants such as Shell and ExxonMobil for over 100 years demonstrates their long-term confidence in Malaysia's oil and gas industry. Through efforts spearheaded by the government and the country's national oil company, Petroliam Nasional Berhad (Petronas), Malaysia has also attracted investors and business partners among petrochemical multinationals such as Dow Chemicals, ConocoPhillips, Idemitsu, Titan, DSM, Thirumalai and Eastman Chemicals.

The United States is the largest source of investments in Malaysia's petrochemical sector, followed by Japan, the United Kingdom, Germany and Taiwan. Malaysia has the world's 25th largest crude oil reserves (4.5 million barrels), the world's 12th largest natural gas reserves (89 trillion cubic feet) and the world's 3rd largest producer of liquefied natural gas.

The Malaysian Petrochemical Industry has a large percent of lower value-added methane-based products. It also has a strong olefins-based sector represented by competitive cost ethane-based production as well as a higher cost naphtha-based complex. Gas separation units also segregate propane and butane for olefin and derivative production. Malaysia's aromatics capacity is not as high as some of the other countries, principally resulting from limitations in by-product pygas production from naphtha cracking (ethylene is produced more from ethane, which has no pygas, than from naphtha cracking in Malaysia).

Location of Oil Refineries in Malaysia

Oil Refineries	Location
Petronas Penapisan (Terengganu) Sdn Bhd	Kertih, Terengganu
Petronas Penapisan (Melaka) Sdn Bhd	Tangga Batu, Melaka
Malaysia Refining Company Sdn Bhd	Tangga Batu, Melaka
Shell Refining Company (FOM) Bhd	Port Dickson, Negeri Sembilan
Esso (Malaysia) Bhd	Port Dickson, Negeri Sembilan

Oil and Gas Reserves in Malaysia (as at January 2004)

Reserves	Natural Gas (trillion cubic feet)	Crude Oil (billion barrels)
Peninsular Malaysia	32.5	2.03
Sabah	46.6	1.26
Sarawak	9.9	1.21

To further boost the gas supply within the country, Malaysia has formed joint-venture partnerships with ASEAN members. It has signed an agreement with Indonesia to purchase 1.8 trillion cubic feet of gas over the next 20 years. A new source of gas supply will also be made available when the Malaysia-Thailand Joint Development Area comes onstream.

The availability of feedstock at competitive prices has made Malaysia a viable petrochemical hub in the ASEAN region, attracting more than US\$9 billion of investments from leading petrochemical and chemical manufacturers.

The six gas processing plants located in Kertih Terengganu – with a combined capacity of 2,000 million cubic feet (mmscf) of sales gas per day – ensure the industry an adequate supply of petrochemical feedstocks such as methane (sales gas), ethane, propane, butane and condensates. Meanwhile, Malaysia's Peninsular Gas Utilisation (PGU) trans-peninsular gas transmission pipeline channels sales gas to industries around the country.

Production of Petrochemical Feedstocks (as at January 2004)

Petrochemical Products	Capacity (mtpa)	Company/Refinery
Naphtha	2,380,000	<ul style="list-style-type: none"> ▪ Petronas Penapisan (Terengganu) Sdn Bhd ▪ Petronas Penapisan (Melaka) Sdn Bhd ▪ Malaysia Refining Company Sdn Bhd ▪ Shell Refining Company (FOM) Bhd ▪ Esso (Malaysia) Bhd
Methane (sales gas)	2,000 mmscfd	Petronas Gas Berhad
Olefins:		
Ethane	1,383,000	
Propane	1,799,000	
Butane	1,166,000	
Condensate	1,260,000	
Propane	148,400	Malaysia LNG Tiga Sdn Bhd
Butane	273,900	
Liquefied Petroleum Gas (LPG)	137,700	
Ethylene	1,560,000	<ul style="list-style-type: none"> ▪ Titan Petrochemical (M) Sdn Bhd ▪ Ethylene Malaysia Sdn Bhd ▪ Optimal Olefins (M) Sdn Bhd
Propylene	766,000	<ul style="list-style-type: none"> ▪ Titan Petrochemical (M) Sdn Bhd ▪ MTBE (M) Sdn Bhd ▪ Optimal Olefins (M) Sdn Bhd
Benzene, Toulene and Xylene (BTX)	775,000	<ul style="list-style-type: none"> ▪ Titan Petrochemical (M) Sdn Bhd ▪ Aromatics Malaysia Sdn Bhd

WORLD-CLASS FACILITIES IN PETROCHEMICAL ZONES

1) KERTIH, TERENGGANU

Formerly a quiet fishing village, Kertih has now transformed into a petrochemical hub. It houses the Petronas Petrochemical Integrated Complex (PPIC) that links the entire range of the oil and gas value chain – beginning from upstream exploration and production to the final stage of petrochemical manufacturing.

Facilities & Infrastructure

- Gas processing plants
- Peninsular Gas Utilisation (PGU) project
- Centralised utility facilities
 - Supply of utilities such as power, industrial gases, water and steam
- Institut Teknologi Petroliam
 - Training Centre
- Kertih Port
 - Centralised tankage facilities
 - Mainly bulk liquid port
- Kuantan Port
 - Centralised tankage facilities
 - Container and bulk liquid port
 - Railway linking Kertih, Gebeng and Kuantan Port
- East Coast Highway (expected completion in 2008)

Petrochemical Plants in Kertih

Petrochemical Plants	Products
Aromatics (M) Sdn Bhd	Paraxylene, Benzene
Petronas Ammonia Sdn Bhd	Ammonia
BP Petronas Acetyls (M) Sdn Bhd	Acetic Acid
Ethylene (M) Sdn Bhd	Ethylene
Polyethylene (M) Sdn Bhd	Polyethylene
Optimal Olefins (M) Sdn Bhd	Ethylene and Propylene
Optimal Chemicals (M) Sdn Bhd	Ethanolamines, Ethoxylates, Glycol Ethers, Butanol and Butyl Acetate
Optimal Glycol (M) Sdn Bhd	Ethylene Oxide, Ethylene Glycol
Petlin Sdn Bhd	Low Density Polyethylene
Vinyl Chloride (M) Sdn Bhd	Vinyl Chloride Monomer and Polyvinyl Chloride

The second option has also been mooted – as, for example, the establishment of the Terengganu Plastics Industrial Park and others have been considered. However the competitiveness of the Malaysian plastic fabricator industry versus the industry in China or in other countries in ASEAN (Thailand, Vietnam and Indonesia) need to be considered both with respect to current and future capabilities, and market opportunities. China has been very successful in developing a global position in plastic fabrication where the ability to provide consistency in quality, delivery and other key requirements is necessary. Opportunities for Malaysia need to identified and evaluated.

2) GEBENG, PAHANG

Gebeng is another petrochemical hub for multinational players like BASF, Amoco, Kaneka, Eastman and Polyplastics. The petrochemical zone provides an integrated environment that meets the specific needs of the petrochemical industry.

Facilities & Infrastructure

- Peninsular Gas Utilisation (PGU) project
- Centralised utility facilities
 - Supply of utilities such as power, industrial gases, water and steam
- Kuantan Port
 - Centralised tankage facilities
 - Container and bulk liquid port
 - Pipeline and piperack system connecting Gebeng to Kuantan Port
 - Railway linking Kertih, Gebeng and Kuantan Port
- East Coast Highway
- Environment Technology Park
 - Incorporating a training centre, a waste collection and processing centre as well as raw material management and storage facilities, maintenance and servicing facilities

Petrochemical Plants in Gebeng

Petrochemical Plants	Products
BASF Petronas Chemical (M) Sdn Bhd	Acrylic Acid and Esters, Syngas, Phthalic Anhydride and Plasticizers. Butanediol, Tetrahydrofurane and Gamma-butyrolactone
Eastman Chemicals (M) Sdn Bhd	Polyesters Copolymers
Amoco Chemicals (M) Sdn Bhd	Purified Terephthalic Acid
Kaneka Paste Polymers Sdn Bhd	Dispersion Vinyl Chloride
MTBE (M) Sdn Bhd	MTBE, Propylene
Polyplastics Asia Pacific Sdn Bhd	Polyacetals
Polypropylene (M) Sdn Bhd	Polypropylene

3) PASIR GUDANG-TANJUNG LANGSAT, JOHOR

Pasir Gudang, located next to Johor Port, is now an established industrial area. To cope with the needs of the growing petrochemical industry, the adjacent Tanjung Langsat site has been developed to enhance manufacturing capacity.

Facilities & Infrastructure

- Peninsular Gas Utilisation (PGU) project
- A co-generation plant
- Tank farms are being developed for bulk storage of petrochemical liquid
- Johor Port
 - With a 1,000-metre berth and hazardous cargo jetty
 - Three hazardous liquid bulk terminals to handle LPG, chemicals and petrochemicals
- Tanjung Pelepas Port, a world-class container port
- Tanjung Langsat Port
 - Located adjacent to the 4,000 acres of industrial land in Tanjung Langsat
 - Equipped with a twin-berth jetty consisting of outer (30,000 DWT) and inner (7,000 DWT) berths

Petrochemical Plants in Pasir Gudang – Tanjung Langsat

Petrochemical Plants	Products
Titan Petrochemicals (M) Sdn Bhd	Ethylene, Propylene, BTX
Titan Polyethylene (M) Sdn Bhd	Polyethylene
Titan PP Polymers (M) Sdn Bhd	Polypropylene
Petrochemicals (M) Sdn Bhd	Polystyrene
Idemitsu SM (M) Sdn Bhd	Ethylbenzene, Styrene Monomer
BASF (M) Sdn Bhd	Expandable Polystyrene
Dairen Chemical (M) Sdn Bhd	Ethylene Vinyl Acetate

It was understood that the first option has been mooted as a petrochemical complex has been proposed to be located at Tanjung Pelepas. However, this needs to be integrated with a refinery to enhance competitiveness and will most probably require major infrastructure investment such as power generation and facilities for liquid and oil shipment and storage. With proper planning however such a facility would most probably be synergistic with the existing petrochemical facilities at Pasir Gudang and Tanjung Langsat. For example, local-based naphtha supply to the Titan cracker, which would most probably improve its competitiveness.

4) BINTULU, SARAWAK

Home to several gas-based petrochemical plants, Bintulu is also the largest producer of liquefied natural gas (LNG) in Malaysia. There are three LNG plants with a combined capacity of 24 million tonnes a year.

Facilities & Infrastructure

- Bintulu Port
- Bintulu Airport

Petrochemical Plants in Bintulu

Petrochemical Plants	Products
Asean Bintulu Fertiliser (M) Sdn Bhd	Ammonia, Urea
Malaysia LNG Sdn Bhd	Liquefied Natural Gas
Malaysia LNG Dua Sdn Bhd	Liquefied Natural Gas
Malaysia LNG Tiga Sdn Bhd	Liquefied Natural Gas
Shell MDS (M) Sdn Bhd	Middle Distillates

Container Throughout at Major Malaysian Ports & Singapore

The major Malaysian container ports (as summarized in table below), relevant to petrochemicals and polymer imports and exports, are Pasir Gudang (Johor Port), Kuantan and Tanjung Pelepas. Bintulu (liquids and bulk cargo mainly methanol, acetic acid and urea exports most of which is bulk cargo). Penang is relevant for the export of ABS/SAN resins from TORAY, manufactured goods and oleochemicals. Tanjung Pelepas is the only Malaysian Port that compares with the scale of the major Singapore terminals.

Port	Throughout (thousands TEUs)
Bintulu	145
Kuantan	108
Pasir Gudang	720
Penang	770
Port Klang: North Port	2,530
West Port	300
Tanjung Pelepas	3,500
Singapore	18,410

APPROVED PETROCHEMICAL PROJECTS**1) Subsector : Feedstocks Producers**

	Company	Product	Location	Commence operation in year
1	Petronas Methanol Sdn Bhd	Methanol	Labuan	1985
2	MTBE (Malaysia) Sdn Bhd	Propylene Methyl t-butyl ether	Gebeng, Kuantan	1992 1993
3	Titan Petrochemicals (M) Sdn Bhd	Ethylene Propylene Benzene, toluene, xylene	Pasir Gudang	1993 1993 2000
4	Ethylene Malaysia Sdn Bhd	Ethylene	Kertih	1995
5	BP Chemicals (M) Sdn Bhd	Purified terephthalic acid	Gebeng, Kuantan	1996
6	Idemitsu SM (M) Sdn Bhd	Styrene monomer Ethylbenze	Pasir Gudang	1997 1997
7	Aromatics Malaysia Sdn Bhd	Benzene Xylene (Paraxylene)	Kertih	2000 2000
8	Optimal Olefins (M) Sdn Bhd	Ethylene Propylene	Kertih	2001 2001

2) Subsector : Polymer

	Company	Product	Location	Commence operation in year
1	Industrial Resins (M) Sdn Bhd	Polyvinyl chloride (PVC)	Tampoi, Johor	1972
2	Malayan Electro-Chemical Industry Co. Sdn Bhd	Polyvinyl chloride (PVC)	Prai, Penang	1973
3	Petrochemicals (M) Sdn Bhd	Polystyrene	Pasir Gudang	1974
4	Rexplas (M) Sdn Bhd	DOP/DINP (plasticisers)	Kluang, Johor	1986
5	Titan PP Polymers Sdn Bhd	Polypropylene	Pasir Gudang	1991
6	Toray Plastics Sdn Bhd	ABS, SAN	Prai, Penang	1992
7	BASF (Malaysia) Sdn Bhd	Polystyrene (EPS)	Pasir Gudang	1992
8	Polypropylene Malaysia Sdn Bhd	Polypropylene	Gebeng, Kuantan	1992
9	Titan Polyethylene (M) Sdn Bhd	Polyethylene	Pasir Gudang	1993
10	Polyethylene Malaysia Sdn Bhd	Polyethylene	Kertih	1995
11	MPI Polyester Industries Sdn Bhd	Polyethylene terephthalate (PET)	Shah Alam	1996

	Company	Product	Location	Commence operation in year
12	Penfibre Sdn Bhd	PET chips and film, PET	Prai, Penang	1996 1998
13	Hualon Corporation (M) Sdn Bhd	Polyethylene terephthalate (PET)	Gebeng, Kuantan	1997
14	Titan Polyethylene (M) Sdn Bhd	Low density polyethylene	Tg. Langsat	1999
15	Petlin (M) Sdn Bhd	Low density polyethylene	Kertih	2001

3) Subsector : Specialty petrochemicals

	Company	Product	Location	Commence operation in year
1	TCL Industries (M) Sdn Bhd	Maleic anhydride Phtalic anhydride	Kemaman	1997
2	Kaneka (M) Sdn Bhd	Methyl methacrylates copolymers	Gebeng, Kuantan	1997
3	Eastman Chemicals (M) Sdn Bhd	Polyester copolymers	Gebeng, Kuantan	1998
4	DIC Epoxy (M) Sdn Bhd	Epoxy resin	Pasir Gudang	1999
5	ASEAN Bintulu Fertilizer Sdn Bhd	Ammonia Urea	Bintulu, Sarawak	1985 1985
6	Petronas Fertilizer (Kedah) Sdn Bhd	Methanol Ammonia Urea Formaldehyde	Gurun, Kedah	1999 1999 1999 1999
7	BASF Petronas Chemical (M) Sdn Bhd	Glacial acrylic acid Crude acrylic acid Butyl acrylate 2-EH acrylate Butyl acetate 2-E-Hexanol Phtalic anhydride DOP/DINP Butanediol Tetrahydrofuran Gammabutyrolactone	Gebeng, Kuantan	2000 2000 2000 2000 2001 2001 2001 2001 2001 2002 2002 2002
8	Vinyl Chloride (Malaysia) Sdn Bhd	Vinyl chloride monomer Polyvinyl chloride (PVC)	Kertih	2000
9	Polyplastics Asia Pacific Sdn Bhd	Polyacetals	Gebeng	2000

	Company	Product	Location	Commence operation in year
10	BP Petronas Acetyls (M) Sdn Bhd	Acetic acid	Kertih	2000
11	Kaneka Paste Polymers Sdn Bhd	Dispersion Polyvinyl Chloride	Gebeng, Kuantan	2000
12	Optimal Glycol (M) Sdn Bhd	Ethylene oxide Ethylene glycol	Kertih	2001 2001
13	Optimal Chemicals (M) Sdn Bhd	Ethanolamines Ethoxylates Glycol ethers Butyl acetate Butanol	Kertih	2001 2001 2001 2001 2001
14	Petronas Ammonia Sdn Bhd	Ammonia	Kertih	2001
15	Synthomer Sdn Bhd	Styrene butadiene Rubberlatex, Acrylonitrile Butadiene rubber latex	Kluang, Johor	2001
16	Dairen Chemical (M) Sdn Bhd	Ethylene vinyl acetate	Tg. Langsat	2002

THE DEVELOPMENT

FUTURE DIRECTIONS FOR THE MALAYSIAN PETROCHEMICAL INDUSTRY

Exploitation of Malaysia's gas-based competitive advantage needs to be cognizant of future global petrochemical developments. Significant new capacity in petrochemicals will be developed in feedstock-advantaged locations in the world, with Middle East taking a leading share. From a demand perspective, the highest growth region in the world, for the foreseeable future, for petrochemical is in Asia, with Asia growth dominated by China. Malaysia has an advantaged position within the selected ASEAN countries driven by a combination of local feedstock advantage and domestic market size, as demonstrated in this report, but future investments will need to compete more with global imports into Asia and hence the need for Malaysia production and supply to be globally competitive.

Developing investments in specialty sectors can provide a basis for economic growth and development in Malaysia, with investments slated to serve the domestic, neighboring country and broad Asian markets. With regard to the last point, there may be opportunities to optimise the Malaysian petrochemical industry through restructuring or other structural initiatives to yield a more competitively robust sector – more capable of capturing the future Asian growth opportunities. Such opportunities for structural improvement imply significant change and would need to be carefully studied to determine the level of attractiveness and improvement.

Broad possible directions for the Malaysian Petrochemical Industry include the following:

- New major grass-roots naphtha-based petrochemical complex integrated with a refinery and close to major port
- Further integration to downstream products (e.g.: plastics fabrication, higher value-added products from existing intermediates produced)
- Exploit gas-based petrochemical competitive advantage
- Evaluate production of specialty petrochemicals and chemicals
- Optimize the current industry facilities and structure by evaluating opportunities

Industry Structure/Profile

Raw Material Base	Malaysia Capacity ('000 tons)
Methane & Derivatives	4,300
Ethylene & Derivatives	3,685
Propylene & Derivatives	1,984
C4 & Derivatives	370
Aromatics	2,434

COMPARISON OF KEY COST INPUTS

The Table below provides a summary comparison of Malaysia's key cost drivers of investment and operating cost competitiveness in comparison with Indonesia, Thailand, Singapore and Philippines.

	Unit	Malaysia Rank
Industrial Land, lease rate	RM/sqm/month	1
Feedstock		
- Methane	RM/metric ton	2
- Ethane	RM/metric ton	1
- Naphtha	RM/metric ton	4
Utilities		
- Power	RM/Kwh	1
Local Factor (Capital Cost)	(Relative to US Gulf Coast of 1.0)	2
Freight costs (per ton of polyethylene exports)		
- China, Shanghai	RM/metric ton	3
Manpower cost		
- Labor	RM/person/year	4
- Skilled	RM/person/year	3

Some observations which result from this comparative review include:

- Capital related: Malaysia has the lowest land charges and its relative location factor (cost to build) is ranked at second place amongst the ASEAN countries under analysis. The latter has more significance in terms of total capital costs.
- Variable Operating cost-related: Malaysia has an advantaged gas feedstock position, especially for ethylene production. Also power costs are competitive, with the lowest cost comparing with the other countries.
- Freight costs to export market: Malaysia has a ranking of 3 on this factor. Currently, a large portion of Malaysia's petrochemical production is domestically consumed, so this factor is not as critical as it is for Singapore which is highly export orientated. However, future investments would require a greater need for exports and need for export competitiveness will be critical.
- "Fixed Operating Costs" Malaysia has a relatively higher cost for labor/plant operators, than the other locations, which is the higher element of manpower costs on a total bases than the skill manpower requirements of petrochemical plants.

3. COMPETITIVE FACTORS

Competitive Comparisons

There is a world scale on-purpose propylene facility in Malaysia, which utilizes UOP's Propane Dehydrogenation (PDH) technology to produce propylene direct from propane.

Capacity and Technology Basis

Product		Capacity '000	Technology
Methane	Methanol	660	syngas
	Ammonia	380	reforming of NG
	Urea	310	stripping methanol
	Acetic acid	500	carbonylation
Ethylene		615	ethane SC
		600	naphtha SC
	LDPE	255	tubular
	LLDPE	205	unipol
	HDPE	140	INNOVENE
	MEG	365	EO hydration (UCC)
	VCM PVC	400 150	EDC cracking suspension
Propylene	PP	300	PDH
	Acrylic acid	200	spheripol
		160	propylene oxidation
Butane	MTBE	300	FCC-isobutylene
Aromatics	Benzene	110	pygas extraction
			absorption/Isomerization
	p-xylene	420	TDP
	Styrene	200	Bz alkylation
	PS	90	GP/HIPS
	ABS	170	Emulsion
	Cumene	-	
	Phenol	-	
PET		PTA 30 polycondensaion	

Location Factor

Malaysia has adopted a policy of requiring the best international practice in plant designs to meet high standards in occupational health, safety and environmental protection. The scope and performance of these facilities should be comparable with European and North American. Low wage rates in Malaysia provide some advantage in lower construction costs relative to other locations – labor rates are significantly lower than Singapore but slightly higher than Thailand. Good infrastructure has been established at a number of locations for petrochemical development in Malaysia with room for expansion. E&P services have evolved domestically and are also serviced by international firms. Plant and equipment for petrochemical investments are sourced both domestically as well as through imports. However, most critical machinery and equipment, for example compressors and high-pressure vessels etc., is imported.

Developing investments in specialty sectors can provide a basis for economic growth and development in Malaysia, with investments slated to serve the domestic, neighboring country and broad Asian markets. There may be opportunities to optimise the Malaysian petrochemical industry through restructuring or other structural initiatives to yield a more competitively robust sector – more capable of capturing the future Asian growth opportunities. Such opportunities for structural improvement imply significant change and would need to be carefully studied to determine the level of attractiveness and improvement.

4. PLASTICS INDUSTRY

PROJECTION FOR 2004 / 2005

	2004	2005*
Plastics Industry:		
Turnover	RM 11.5 billion	RM 12.4 billion
Export	RM 5.6 billion	RM 6 billion
Growth Rate (in turnover)	22%	8%
<i>*Projected</i>		

It was estimated that there were less than 700 plastic converters/fabricators in 1995 of which 5% were producers of electrical, electronics and telecommunications components. 25% were producers in the packaging sector and 34% were producers of other sectors. Currently, it was estimated that there are 1400 plastic product fabricators and converters (of which 80% are SMEs) in Malaysia with a total investment of RM8.2 billion.

Turnover for 2004

Total turnover of the plastics industry was estimated to be RM 11.5 billion, an increase of 22% from RM 9.4 billion in 2004.

The increase was mainly attributed to the higher selling price of plastic finished products, as a result of the drastic in resin cost. The 22% growth in turnover for the plastics industry is also in line with the 19.6% growth in sales value recorded by the manufacturing sector.

Total Exports of Finished Plastic Products

Total export of finished plastic products increased by 23% from RM4.53 billion for 2003 to RM 5.57 billion for 2004. The main exported plastic items are bags, bottles and containers (38%), films and sheets (29%) and other plastic articles (30% excluding household wares).

CONCLUSION

The cyclical nature of the petrochemical business is an intrinsic characteristic of the industry, and industry players will need to overcome short-term and sporadic volatility in feedstock costs, product prices and margin squeeze, brought about by competition in the marketplace, notably from Middle-East, as well as the impact of general health of major economies. The key challenge will be for players to be able to maintain a long-term perspective of the business and to build a robust business portfolio that will sustain competitiveness throughout the business cycle.

Over the years, as a result of CEPT and AFTA, the import duties of petrochemicals in ASEAN which had dropped to 0%-5% have significantly affected the volume of trade of Malaysia with its ASEAN partners. Total exports to other ASEAN countries increased from RM 2.3 billion in 2001 to RM 3.6 billion (56% increase). In comparison, imports by Malaysia from other ASEAN countries increased RM 2.8 billion in year 2001 to RM 3.8 billion in year 2003 (35.7%). Major ASEAN trading partners remained Singapore, Thailand and Indonesia which are the other petrochemicals producing countries in ASEAN. Traditionally, Singapore is a net exporter of petrochemicals.

Committee Meetings

1. General Matters & Raw Materials Committee

GENERAL MATTERS & RAW MATERIALS COMMITTEE

1. Review of 2004

Production, import, export and consumption of Ethylene, Propylene and Benzene in Malaysia in 2004 is shown as below:

Table 1: Production, Import, Export and Consumption of Raw Material in Malaysia

(Unit: KMT)

		2002	2003	2004	Change %
Ethylene	Production	1,560	1,494	1,564	5
	Import	27	31	65	110
	Export	116	82	115	40
	Consumption	1,471	1,443	1,514	5
Propylene	Production	795	837	913.5	9
	Import	35	36	18	-50
	Export	51	33	0	-100
	Consumption	779	840	931.5	11
Benzene	Production	192	259	297	14.7
	Import	173	154	153	-0.5
	Export	176	148	141	-4.9
	Consumption	157	168	162	-3.6

Table 2: Nameplate capacity for raw materials in Malaysia in 2004 (Unit: KMT)

Product	Ethylene Malaysia Sdn Bhd	Optimal Olefins (M) Sdn Bhd	MTBE (M) Sdn Bhd	Aromatics Malaysia Sdn Bhd	Titan Petrochemical (M) Sdn Bhd	Shell (FCC)	Total
Ethylene	400	600			700		1,700
Propylene		95	380		400	140	1,015
Benzene				154	110		264

About 95% of olefins capacity in Malaysia is for domestic consumption. Ethylene Malaysia (M) Sdn Bhd, Optimal Olefins (M) Sdn Bhd and Titan Chemicals Corp Bhd consumed olefins for its integrated polyolefins production facilities. Approximately 5% of the olefins productions are for export purpose.

In 2004, Malaysia ethylene production was at average 92% O.R. as polyethylene, ethylene glycol and vinyls demand is high. Domestic demand of Ethylene in 2004 was at 1,514,000 tonnes, which represents 5% increase from 2003. Import of ethylene in 2004 has been double from previous year. This is due to strong demand from polyethylene sector. Malaysia has reduced net export by 50% from 89,000 tonnes in 2002 to 50,000 tonnes in 2004 as strong demand from the domestic downstream activities.

In Sept 2004, Titan Chemicals announced to increase its ethylene production to 700,000 tonnes per year and propylene production was increased from 334,000 tonnes to 400,000 tonnes per year. The export of ethylene reached 115,000 tonnes and 60% of the export was to Indonesia.

As for Propylene, Malaysia reduced the export by 33,000 tonnes from 2003 to 2004 whereas its polypropylene consumption is consumed almost all of the capacity for downstream.

There are 3 majors producers to produce propylene. MTBE (M) Sdn Bhd, Optimal Olefins (M) Sdn Bhd and Titan Chemicals Corp Bhd. MTBE (M) Sdn Bhd produced 80,000 tonnes on purpose propylene by using Propane-dehydration (PDH) process and diverts to its integrated polypropylene production. Titan Chemicals has its propylene production of 315,000 tonnes per year plant and also consumed by its integrated downstream facility. Shell has a capacity of 140,000 tonnes of propylene facility in Port Dickson refinery.

In 2004, propylene production has increased 9% to 914,000 tonnes. Malaysia was a net importer of Propylene and 55% of import was mainly from Singapore.

Polypropylene is still the country's largest consumer of propylene and is expected to grow at 7.4% over the next 5 years. The net total demand for propylene has been over 850,000 tonnes per year.

For Benzene sector, Aromatic Malaysia Sdn Bhd, a joint venture between Malaysia's national oil company Petronas and Mitsubishi Corporation, has scheduled its debottlenecking to 226,000 ton per year by May 2005. The expansion will increase Malaysia Benzene capacity to 336,000 ton per year which include capacity of Titan Petrochemical (M) Sdn Bhd.

Malaysia's benzene export is around 141,000 ton per year mainly to Northeast Asia countries and importing about 153,000 ton per year in 2004 from neighbouring countries.

2. **Prospects for 2005**

According to the current report by IMF, Malaysia's GDP growth rate in 2005 is expected to be 6%. The consumption of olefins is anticipated to be a higher level to fulfill the dramatic demand from its downstream sector. With the expected demand growth rate of 0.7% and 7% for Ethylene and Propylene in 2005, olefins capacity is anticipated to remain at the 95% operating rate level.

Titan Chemicals plans to expand its propylene capacity and establish a butadiene plant in Johor, Malaysia. This plant will be based on Metathesis – Olefins conversion technology which converts ethylene and butanes to propylene. The newly announced butadiene plant will have 100,000 tonnes per year and is scheduled on stream by end of 2007.

With the newly emerged technology, Malaysia olefins industry will continue to maintain its significant role for supporting its downstream activities. With benzene debottlenecking projects, more benzene capacity will be added even though demand will only grow marginally.

2. Polyolefins Committee

POLYOLEFINS COMMITTEE

2004 Review

The Malaysia economy expanded by 7.1% in 2004, the fastest growth since 2000. The economy benefited from both stronger external and domestic demand.

a) LDPE

Production increased by 5% giving a 90% operating rate in 2004. Domestic demand grew 11% on the back of abundant domestic supply.

The export volume is high to all countries around the region as domestic demand is still relatively insignificant.

b) LLDPE

Production volume was same as last year. Domestic demand increased by 19% with new capacity expansion coming mainly from stretch film application. A high portion of LLDPE supply is imported.

c) HDPE

Production increased by 7%. Domestic demand expanded by 50KMT or 13% in line with the country healthy GDP growth.

d) PP

Production reduced by 6% over 2003 due to plant turnaround. Domestic demand increased moderately by 3% as it was affected by high resin price

2005 Outlook

Nearly every consultant agreed that the petrochemical industry is in a recovery phase. They are forecasting utilization rates above 90%; a level where producers have historically enjoyed pricing power. However, record high crude oil price may not only support price hike in petrochemical industry, but can also affect the global demand growth rate.

The Asean Free Trade Area (AFTA) and China will continue to present market opportunities for the industry

a) LDPE

Production is expected to reach 97% of the nameplate capacity as there is no turnaround. The domestic demand is forecast to grow by 10%.

b) LLDPE

Production volume will be maintained. The demand will increase by 5% as last year new arrived machines are fully installed and running.

c) HDPE

Production expected to increase by 9% as there is no maintenance turnaround. The domestic demand is likely to grow by 7% as downstream fabricators continued to invest in the businesses.

d) PP

Production is expected to increase by 5%. PPM had scheduled 2 weeks turnaround in Apr 2005. Similar patterns to past year, the domestic demand is expected to increase by 6% .

3. PVC Committee

PVC COMMITTEE

PVC:		[UNIT: 1,000MT]		
		2003	2004	2005 - Prospects
SUPPLY	Production	110	150	200
	Import	40	40	50
	Total	150	190	250
DEMAND	Domestic	150	160	180
	Export	0	30	70
	Total	150	190	250
CAPACITY (Year End) #		230	250	250

Number of Producers = 4 (include 1 Paste PVC of 30,000MTS Capacity)

2004 RESULTS:

Domestic Supply was constrained by VCM raw material supply at year-end due to shipment disruptions from typhoon in Japan and local plant shutdown. Demand growth was subdued by rapidly rising prices during the year.

2005 PROSPECTS:

Local supply capacity has increased due to de-bottlenecking of one PVC plant. Demand is expected to increase slightly due to privatization of Government expenditure on water and sewerage pipe replacement projects.

VCM:

There is only one VCM producer in Malaysia with annual rated capacity of 400,000 MTS.

4. Styrenics Committee

B. STYRENICS COMMITTEE

MALAYSIAN STYRENIC DERIVATIVE SUPPLY & DEMAND (2002 - 2006)

		<u>2002</u>	<u>2003</u>	<u>2004</u>	<u>2005</u>
SM	Capacity	200	220	220	220
	Demand	287	315	325	335
PS	Capacity	140	140	140	140
	Demand	170	165	160	165
ABS	Capacity	170	220	220	220
	Demand	95	99	102	105
EPS	Capacity	75	80	80	80
	Demand	32	34	34	35

1. Bigger capacity of styrenic based polymers commenced in early 1990s. Currently:

- GPPS/HIPS:140Kmts(Idemitsu :Petrochemicals)
- ABS : 220Kmts (Toray)
- EPS : 75Kmts (BASF)

3. Idemitsu SM started its production in 1997 with 200Kmts. Capacity was increased to 220Kmts in 2003.

4. Malaysian demand for Styrene based polymers has been closely related to export oriented E&E Industry:

- PS : 154 Kmts
- ABS : 95 Kmts
- EPS : 36 Kmts

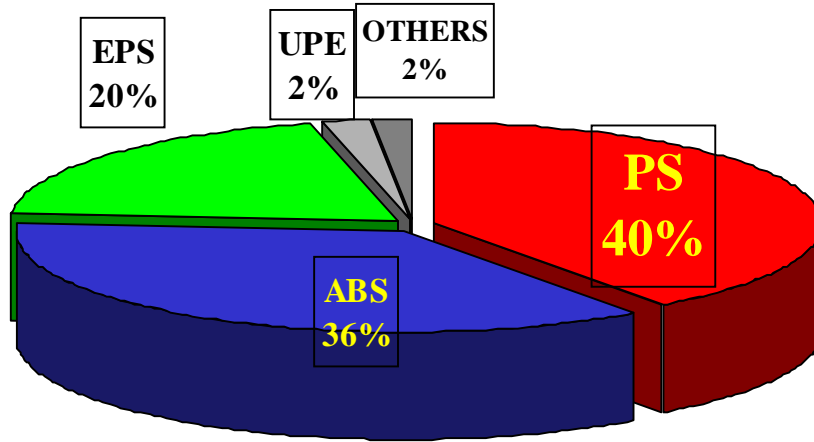
5. Upstream feedstock for SM, i.e.Ethylene & Benzene, are available domestically.

6. There is no indication of capacity expansion up to 2006.

7. Malaysian E&E demand may be stagnant or slightly increased with the relocation of production capacity to China.

Malaysian SM CAPACITY & DEMAND

YEAR	2002	2003	2004	2005	2006
DEMAND	287	315	320	322	334
CAPACITY	200	220	220	220	220
BALANCE	-87	-95	-100	-102	-114

Malaysian SM DEMAND BY PRODUCT - YEAR 2004 (Demand: 320K MT)

5. Synthetic Rubber Committee

SYNTHETIC RUBBER COMMITTEE

MALAYSIAN PRODUCTION OF SR

Malaysia produces synthetic rubber (SR) in very small amounts. It is estimated that 10,000 tonnes of NBR-latex was produced in Malaysia in 2002. Production has risen to 18,000 tonnes in 2003 and 2004.

Locally manufactured rubber makes its way to the glove sector, and butadiene monomer used in the production process is likely to be sourced from neighbouring Thailand.

The Table below presents the latest estimates of SR output for the APIC producing countries.

Synthetic Rubber Production ('000 tonnes)

Country	2003	2004	2005 (a)
India	86	95	98
Korea	700	710	717
Japan	1577	1616	1638
Malaysia	18	18	18
Taiwan	529	545	552
Thailand	125	130	131

(a) Moving Annual Total to March 2005

NR and SR Consumption ('000 tonnes)

Country	2004 NR	2004 SR	2004 Total	2004 %SR	2005 NR(a)	2005 SR(a)	2005 Total(a)	2005 %SR
India	747	223	970	23	755	232	987	23
Korea	348	335	683	49	342	336	678	50
Japan	822	1158	1980	58	832	1171	2003	58
Malaysia	416	137	553	25	426	133	559	24
Taiwan	118	293	411	71	118	295	412	71
Thailand	301	166	467	36	304	167	471	35

(a) Moving Annual Total to March 2005