Asia Petrochemical Industry Conference 2007

Country Report

From

MALAYSIA

Prepared by:

Malaysian Petrochemicals Association (MPA)

Asia Petrochemical Industry Conference 2007
TAIPEI, TAIWAN

Country Report – MALAYSIA

1. MALAYSIAN ECONOMY

OVERVIEW OF THE MALAYSIAN ECONOMY IN 2006

Malaysia GDP Growth Rate

Year	Growth Rate (%)
2001	4.2
2002	4.1
2003	5.2
2004	7.1
2005	5.0
2006	5.9
2007F	5.6

(Source: Central Bank of Malaysia)

Malaysia has achieved significant progress in developing the economy and improving the quality of life of its people, despite the difficult and volatile external environment in recent years. Economic management in 2006 remains challenging amidst an environment of persistently high crude oil prices, rising global interest rates and increasing competition from China, India and other emerging regional economies. Growth in 2006 is broad-based, led by services, manufacturing and agriculture sector. Major long-term policy initiatives to be implemented this year comprise the Ninth Malaysia Plan (9MP), 2006-2010 and the Third Industrial Plan (IMP3), 2006-2020.

While the 9MP aims to achieve a stronger and higher value-added economy, it will also give substantial policy focus to socio-economic issues towards uplifting the quality of life for all Malaysians. The National Mission, as encapsulated in the 9MP, provides the framework for planning and implementation of the nations' development policies over the next 15 years to achieve the goals of Vision 2020. Additionally, the IMP3 provides the strategic direction in spearheading growth and competitiveness of the manufacturing sector and manufacturing-related services industry.

The economic growth momentum in 2006 is expected to continue into 2007 at a stronger pace of 6% supported by sound economic fundamentals and a conducive business environment. However, several downside risks remain. High crude oil prices, further hikes in international interest rates, global economic imbalances and geopolitical tensions are likely to dampen world growth and trade. Despite these challenges, bolstered by much improved oil-related revenue, the Government remains in a position to pursue a budgetary stance that supports further expansion in domestic economic activities.

Output of petroleum products increased by 12.1% in the first half of 2006 (January-June 2005:10.4%), boosted by higher consumption, following robust domestic economic activities. This was complemented by higher external demand for refined petroleum products and rising sales of 23.7% during the period (January-June 2005: 48.2%). Similarly, export receipts from petroleum products registered higher growth of 34.9%, due to both higher export volume and prices.

Export receipts of crude petroleum continued to increase by 24.3% to RM15,976 million (January-June 2005:38.9%;RM12,855 million) with export prices averaging USD68.9 per barrel(RM1,912 per tonne) in the first six months of 2006 (January-June 2005:USD50.4 per barrel; RM1,455 per tonne. However, export volume declined by 5.4% to 8.357 million tonnes (January-June 2005:-3.8%; 8.834 million tonnes), consistent with lower production due to scheduled maintenance stoppages and increased domestic consumption. Crude petroleum is exported mainly to Australia (20.4%), India (18.7%), Thailand (14.6%), Republic of Korea (11%) and Indonesia (10.5%).

Export earnings of LNG continued to expand with a growth of 11.4% (January-June 2005: 24.9%) on account of a 17.6% increase in export prices notwithstanding a decline in export volume. Major importers of LNG continued to be Japan (62%), Republic of Korea (22%) and Taiwan (15%). Malaysia, accounting for 15.7% of global LNG exports, is presently the world's second largest exporter of LNG after Indonesia, with a total export volume of 20.8 million tonnes.

(Source: Economic Report 2006/07)

MOVING FORWARD INTO 2007

The challenges confronting the economy in 2006 are expected to persist in 2007. On the external front, concerns over high crude oil prices following strong demand and tight refining capacity as well as heightened geopolitical tensions in the Middle East are expected to remain. This could lead to a sustained rise in global inflation and subsequent hikes in global interest rates, impacting both trade and growth. The current global imbalances can also have a disorderly effect on the financial markets and hamper world trade as well as investment flows. Given these uncertainties, global growth is expected to moderate slightly to 4.7% in 2007 (2006: 4.9%), backed by sustained world trade investment flows. However, given Malaysia's endowment of crude oil resources and with prevailing high oil prices, the nation is in a better position to weather the moderation in global growth to achieve a strong growth of 6% in 2007 (2006: 5.8%). The Government will continue to focus on supporting economic growth with price stability, increasing employment opportunities, especially for graduates as well as addressing issues of rapid urbanization and regional imbalances.

However, rising inflation due to higher crude oil prices could pose a challenge to the monetary stance. Nevertheless, the nation's strengthening macroeconomic fundamentals and diversified economic structure will provide flexibility for the Government to respond appropriately, in the event of significant changes in inflation and growth prospects. The Malaysian economy is expected to remain resilient, supported largely by private sector activities and the Government's continuing efforts to support growth through effective macroeconomic policies and liberalization measures. The 9MP coupled with other sectoral development plans such as IMP3 will provide the direction for further progress of the Malaysian in the medium and longer term. It was also hoped that private finance initiatives (PFIs) announced in the 9MP will provide more opportunities for the private sector to participate in the implementation of development projects.

2. PETROCHEMICAL INDUSTRY

OVERVIEW

The petroleum and petrochemicals industry is one of the leading industries in Malaysia. Presently, Malaysia is a major exporter of petrochemical products within the ASEAN region, exporting both commodity grade polymers, as well as petrochemical derivatives. The major investors are Dow Chemicals, BP Amoco, Shell, BASF, Eastman Chemicals, Toray, Mitsubishi, Idemitsu, Polyplastic, Kaneka, Dairen and Titan Petchem Group.

Factors contributing to the development of the industry include:

- Availability of resources in hydrocarbon feedstock from oil and gas;
- Cumulative investments of RM55 billion in the industry, with Malaysian investments contributing RM34.8 billion, or 63.3 percent, and foreign investments, RM20.2 billion (36.7 per cent); and
- Presence of 40 petrochemical companies in operation, with a combined capacity of RM12.8 million metric tonnes per annum. As at the end of 2005, investments by these companies totalled RM31.5 billion. PETRONAS is the major domestic investor in the industry. The United States of America (USA) is the largest source of foreign investments, contributing 40.3 per cent of the total foreign investments, followed by Germany (22.8 per cent) and Japan (14 per cent).

The availability of hydrocarbon feedstock from indigenous oil and gas has led to the development of the petrochemical industry. The two ethane crackers in Kerteh, Terengganu which use from the six GPPs in Kerteh and Tok Arun, Terengganu provide feedstock for the polyethylene plants, acetic acid plant and DOW PETRONAS ethylene derivatives complex. Condensates from the GPPs also provide feedstock to the aromatic plant in Kerteh, Terengganu for the production of paraxylene and benzene.

Propane from the GPPs is the raw material for the propane dehydrogenation plant in Gebeng, Pahang. This provides feedstock to the polypropylene and MTBE plants and to the BASF PETRONAS integrated propylene derivatives complex for the production of acrylics, oxo alcohols, butanediol,butylacrylates, plasticisers and tetrahydrofurane. Titan's integrated operation in Pasir Gudang-Tanjung Langsat, Johor includes a naphtha cracker which provides feedstock for its own production of polypropylene, polyethylene and aromatics. It also provides feedstock for the production of ethylene vinyl acetate (EVA). Naphtha is available from the petroleum refineries and Shell's middle distillates synthesis (MDS) plant in Bintulu Sarawak. However, a large proportion of the naphtha requirement is still being imported.

Major Projects Approved were:

- SKS Development Sdn Bhd, a wholly Malaysian-owned project, which is building a new crude petroleum refinery in Kedah with a capacity of 200,000 barrels per day based on imported crude. All the products will be exported. Total cost of the project is RM7.68 billion.

- Petronas Methanol (Labuan) Sdn Bhd with an investment of RM2.04 billion, to expand its production capacity of methanol. The project is expected to make Labuan the single largest site for the production of Methanol in the world

- A new butanediol plant in Sabah with an investment of RM1.06 billion by Panca Intan Sdn Bhd

- Toray Plastics of Japan to expand its production of acrylonitrile-butadiene-styrene (ABS) resin with the introduction of speciality grade of this engineering plastic with an additional capital investment of RM450 million. Implementation of this project has commenced at the company's existing site in Penang.

During the period of the Third Industrial Master Plan (IMP3), 2006-2020, the industry will be encouraged to further develop its potential. Areas of focus include expanding its current manufacturing activities, as well as developing new products and diversifying into manufacturing-related services and facilities. These developments will assist in achieving the full integration of the industry. The range of petrochemical products includes:

- Commodity grade plastic resins, such as polyethylene (PE) resins, polypropylene (PP) resins, polyvinyl chloride (PVC) resins and polystyrene (PS) resins;

- Engineering grade plastic resins, such as acrylonitrile-butadiene (ABS) resins, polyoxymethylene (POM) resins and polyester co-polymer (PETG) resins;

- Petrochemical derivatives, such as ethylene oxide (EO), butanols and acetic acid; and

- Specialized and fine chemicals, such as food additives and raw materials for pharmaceuticals.

Feedstock from Natural Gas

The production of petrochemicals has been stimulated by the availability of natural gas as feedstock for the industry. Natural gas is mainly used for the production of liquefied natural gas (LNG) and power generation. Malaysia is presently the third largest producer of LNG in the world, after Algeria and Indonesia, with a production capacity of 24 million metric tonnes per annum, largely concentrated in the Bintulu complex in Sarawak. The entire LNG produced is exported, mainly to Japan, Republic of Korea and Taiwan. Presently, the Bintulu complex also produces 450,000 million metric tonnes per annum of liquefied petroleum gas (LPG), mostly for exports.

Methane, ethane, propane, butane and condensates are obtained from natural gas, and used feedstock for the petrochemicals industry. These feedstocks are produced by six gas processing plants in Terengganu, with a combined capacity of 2,000 million standard cubic feet of gas per day. The gas processing plants are part of the Peninsular Gas Utilisation Project, which includes a trans-peninsular gas transmission pipeline system, connecting the gas processing plants to petrochemical zones of Kertih in Terengganu and Gebeng in Pahang, as well as industrial areas in Peninsular Malaysia. These petrochemical zones use the feedstocks from the gas processing plants as basic raw materials to produce downstream petrochemical products.

For the production of petrochemicals, ethane is cracked into ethylene. There are two ethane crackers in Terengganu. Ethylene is used for the production of polyethylene, acetic acid and ethylene derivatives. Propane is used as the raw material for the propane dehydrogenation plant in Gebeng, Pahang, to produce propylene. Propylene is used for the production of polypropylene, and together with butane, they are used for the production of methyl tertiary butyl ether (MTBE) and propylene derivatives, such as acrylics, oxo alcohols, butanediol, butylacrylates, plasticisers and tetrahydrofurane. Condensates are used as raw materials by the aromatics plant in Terengganu to produce paraxylene and benzene. These products are, in turn, used for the production of polyethylene terephthalate and polystyrene.

Feedstocks from Petroleum

The production of petrochemicals also uses naphtha obtained from petroleum refining. Naphtha is available from the existing petroleum refineries in Peninsular Malaysia, and the gas-based middle distillates syntheses (MDS) plant in Bintulu, Sarawak. To complement domestic requirements, a large proportion of naphtha is also imported. The naphtha cracker in Pasir Gudang-Tanjung Langsat, Johor, provides ethylene, propylene and butadiene as feedstocks for the production of polypropylene, polyethylene and aromatics. It also provides feedstock for the production of ethylene vinyl acetate (EVA).

Petrochemical Zones

During the period of Second Industrial Master Plan (IMP2), 1996-2005, three petrochemical zones were established in Kertih, Terengganu; Gebeng, Pahang and Pasir Gudang-Tanjung Langsat, Johor. Each zone is an integrated complex, supplied with crackers, syngas and aromatics facilities to produce basic feedstocks for the production of downstream petrochemical products. PETRONAS has contributed significantly to the development of support infrastructure, dedicated utilities and services to the petrochemical zones of Kertih, Terengganu and Gebeng, Pahang. This has created a conducive investment environment for the expansion of the petrochemical industry within the zones. Major products manufactured in the three petrochemical zones are:

Zone	Core Products	Derivatives and Products
Kertih, Terengganu	Ethylene, propylene, para-xylene, benzene and syngas	Ammonia, acetic acid, polyethylene (PE), ethanolamines, ethoxylates, glycol ethers, butanol, butyl acetate, ethylene oxide (EO), ethylene glycol (EG), vinyl chloride monomer and polyvinyl chloride (PVC)

Zone	Core Products	Derivatives and Products
Gebeng, Pahang	Propylene and syngas	Polypropylene (PP), acrylic acid and esters, butyl acetate, oxo-alcohols, pthalic anhydride and plasticisers, butanediol, tetrahydrofurane, gamma-butyrolactone, polyester copolymers, (PETG), purified terephthalic acid, dispersion PVC (DPVC), methyl metacrylate copolymers, methyl tertiary butyl ether (MTBE) and polyacetals
Pasir Gudang-Tanjung Langsat, Johor	Ethylene, propylene, benzene, toluene, xylene and butadiene	Polyethylene (PE), polypropylene (PP), ethylbenzene (EB), styrene monomer (SM), polystyrene (PS), expandable polystyrene (EPS) and ethylene vinyl acetate (EVA)

There are also other petrochemical plants located in various parts of the country. The major ones include:
- ammonia and urea fertiliser plants in Bintulu, Sarawak; and Gurun, Kedah;
- acrylonitrile butadiene styrene (ABS) plant in Pulau Pinang
- methanol plant in Labuan; and
- nitrile-butadiene rubber (NBR) plant in Kluang, Johor

There is potential for these areas, especially Bintulu, Gurun and Labuan, to be developed into new petrochemical zones.

Technology Development

Most of the existing companies are multinational corporations (MNCs) or joint ventures, with the MNCs providing the technology for the production of petrochemicals. Most of the plants have installed the latest equipment, with distributed control system, process reaction kinetics, purification procedures and effluent treatment systems.

New uses for petrochemical-based products are continually being development. With advances in technology, the linkages of the petrochemical to consumers are expected to increase in the future. The emphasis will be on environment-friendly and biodegradable products.

Linkages with Other Industries

The petrochemical industry has extensive intra-linkages with downstream activities, as well as other industries. Plastics parts and components and products are the preferred materials, in view of their superior properties and lower costs, compared with traditional materials, such as paper and metal. The downstream activities mainly involve polymer compounders, converters (such as plastics packaging producers) and fabricators (plastics injection moulding producers), producing products for application in industries such as electrical and electronics (E&E), medical devices, automotive, construction and agriculture. The involvement of Malaysian-owned companies, including small and medium enterprises (SMEs), is mainly in downstream activities, mostly producing plastics parts and components, and packaging materials.

The availability of polymers and plastics resins has encouraged the development of plastics fabrication activities. At least 60 per cent of the plastics resins and polymers consumed by the domestic market are sourced locally. These manufacturers are mainly involved in the production of packaging materials, parts and components for the E&E, construction, automotive, furniture and agriculture industries and household consumer products. Plastics packaging is the largest market segment, with a share of 37 per cent of the total market for plastics products, followed by parts and components for E&E (25 per cent), household consumer products (15 per cent), and parts and components for construction (8 per cent), automotive (7 per cent) and agriculture (3 per cent).

The industry also has significant linkages with many other industries. Fertilisers made from petrochemicals, such as urea and ammonia, are used by the agriculture industry, resins by the fibre and fabrics industry, and coatings and adhesives by the wood and paper industries. Speciality and fine chemicals derived from petrochemicals are used as food additives, flavours and preservatives, as well as in the manufacture of pharmaceuticals, cosmetics and paints.

Investments

During the IMP2 period, the total approved investment for petrochemicals, including petroleum products, amounted to RM31.2 billion, of which RM27.8 billion, or 89.1 per cent, were for petrochemicals, and RM3.4 billion (10.9 per cent) for petroleum products. As at 2005, a total of 40 companies were in operation , with investments amounting to RM31.5 billion. Of the total investment, RM15.6 billion, or 53.2 per cent, were foreign direct investments (FDIs), mainly from the USA, Germany and Japan. PETRONAS is the largest domestic investor. Of the total 40 companies in operation , 19 were joint venture companies, 14 wholly foreign-owned and seven wholly owned-by Malaysians.

Investments in the Petrochemicals Industry

	1996-2000	2001-2005	1996-2005
Total investments (RM billion)	**20.9**	**6.9**	**27.8**
Domestic (RM billion)	7.6	1.1	8.7
Foreign (RM billion)	13.3	5.8	19.1
No. of projects	36	34	70
Employment (persons)	5,734	1,130	6,864
CIPE[1] (RM million per employee)	3.6	6.1	4.1

Note: [1] Capital investment per employee ratio
Source: Malaysian Industrial Development Authority

The industry employs an estimated workforce of 10,000 persons, largely at the packaging line. Reflecting the capital and skills intensive nature of the industry, the capital investment per employee (CIPE) ratio recorded during the IMP2 period was RM4.1 million, higher than the average ratio of RM0.4 million in the manufacturing sector. The ratio increased from RM3.6 million in the first phase of the IMP2 (1996-2000) to RM6.1 million in the second phase (2001-2005). This reflected a shift towards more capital and technology intensive operations, with the production of higher value-added products.

Exports and Imports

During the IMP2 period, total exports of petrochemicals increased by an average annual rate of 21.8 per cent, from RM2 billion in 1996 to RM14.6 billion in 2005. Total imports of petrochemicals increased by an average annual rate of 10.1 per cent, from RM5.8 billion in 1996 to RM17.2 billion in 2005. Major exports of petrochemical in primary forms were commodity grade polymers, such as polyethylene (PE) and polypropylene (PP), and petrochemical derivatives, such as acrylic acid, methanol, methyl tertiary butyl ether (MTBE) and speciality chemicals. Polymers were mainly exported to the People's Republic of China, India and ASEAN. Exports of speciality chemicals were mainly to the People's Republic of China, the European Union (EU) and the USA. Major Import comprised specialised and engineering grade polymers and co-polymers from the USA, Japan and the Republic of Korea.

Exports and Imports of Petrochemicals

	1996		2005		1996-2005		1996-2005	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
	(RM billion)						Average Annual Growth (%)	
Petrochemicals	2.0	5.8	14.6	17.2	69.4	101.4	21.8	10.1

Note: Exports and imports of petrochemicals are recorded as polymers in primary forms and organic chemicals, excluding oleochemicals.
Source: Department of Statistics

Presently, Malaysia is a net importer of petrochemicals. This situation arises because the petrochemicals which are imported are used as materials in the manufacture of various products, including other petrochemicals, which are subsequently exported as intermediate or consumer goods. As an example, plastics products may be exported as components of E&E, automobiles or medical devices, or used as packaging materials in almost all exported products. Petrochemicals may also be exported as adhesives in plywood or furniture, or as surface coatings in lacquers and paints. Food additives and pharmaceuticals which are exported may also contain petrochemicals. Imports of certain petrochemical are required to manufacture other downstream petrochemical products. While naphtha from crude petroleum and natural gas plus condensates are the main raw materials which are available locally, imports of other petrochemical-based raw materials are required to produce certain petrochemical products. For example, ethylene dichloride, for the production of vinyl chloride monomers and subsequent production of polyvinyl chloride resins, is not produced locally and needs to be imported. Similarly, 40 per cent of the resins requirements, mainly engineering and specialised grade resins for the manufacture of plastics products, are imported.

In terms of intra-ASEAN trade, with the full realisation of the Common Effective Preferential Tariffs Scheme (CEPT) under the ASEAN Free Trade Area (AFTA), the volume of trade for petrochemicals between Malaysia and its ASEAN partners has increased significantly. Total exports to ASEAN countries increased by 149.3 per cent, from RM2.1 billion in 2001 to RM5.2 billion in 2005. ASEAN accounted for 35.6 per cent of Malaysia's exports of petrochemicals in 2005. Imports from ASEAN countries increased by 138.6 per cent, from RM2.8 billion in 2001 to RM6.7 billion in

2005. ASEAN accounted for 38.9 per cent of Malaysia's imports of petrochemicals in 2005. Malaysia's major trading partners in ASEAN were Singapore, Thailand and Indonesia.

PROSPECTS

(a) Regional Market

Features of the regional market include:

- In ASEAN, Singapore, Thailand and Indonesia are major producers of petrochemical products and are direct competitors for foreign investments;
- The People's Republic of China is expected to remain the largest market for Malaysia's exports of petrochemicals. There will be considerable potential for the export of higher value-added products, for example, petrochemical derivatives, to the People's Republic of China;
- Demand for commodity-type petrochemicals from ASEAN countries, especially Cambodia, Lao PDR, Myanmar and Vietnam, is expected to increase, in tandem with the growth of their economies; and
- Demand for higher value-added products, such as fine and specialty chemicals, from other ASEAN countries, namely Thailand, Indonesia and the Philippines, is also expected to increase.

The industry has linkages with many other countries. Malaysia has an advantage over Singapore, in that there are downstream industries using the products produced. However, the downstream industries are not as developed in Thailand. This is attributed to the limited local market, due to the smaller population. With the progressive implementation of the ASEAN Investment Area (AIA), there is a need for ASEAN to be considered as a single market. Producer countries in ASEAN will need to focus on areas where they have resources or key competencies. Malaysia will need to further develop the downstream industries, thereby increasing the demand for locally produced petrochemicals.

(b) Creation of New Zones

There is potential to develop additional petrochemical zones in Bintulu, Sarawak; Labuan Gurun, Kedah; and Port of Tanjung Pelepas, Johor.

- Presently, Bintulu has an LNG complex, a urea and ammonia plant, a MDS plant, deep water port and supply of natural gas and LPG. In the medium term, there are opportunities to integrate these plants into a petrochemical zone, with the provision of centralized utilities and facilities (CUF). This will, in turn, attract new investments in downstream activities, depending on the available feedstock;

- Labuan has a modern methanol complex, which is presently undergoing expansion. There is a potential to promote an oil refinery, catering for the export market and downstream products, based on methanol. Dedicated infrastructure facilities will be required to realize its potential to become a fully developed petrochemical zone;

- Presently, Gurun has an ammonia, urea and formaldehyde plant each. It is situated close to the gas available from the Joint-Development Area between Malaysia and Thailand, which has an initial capacity of 390 million standard cubic feet daily. The gas is being piped to Gurun and linked to the gas separation plant in Southern Thailand via the Peninsular Gas Utilisation Project facilities. Port facilities, and common utilities and services will need to be developed to attract investments in downstream products; and

- Another possible area for development into a new petrochemical zone is Tanjung Pelepas, Johor. Development in the area is initially focused on bunkering activities, with the potential to attract new investments in petroleum in a petroleum refinery and a petrochemical complex for downstream products.

Development of the Potential Growth Areas

The full integration of petrochemical zones will require further investments in related services, such as logistics, tank farms and CUF. Other services include regional distribution centres (RDCs) for petrochemicals and regional maintenance centres for petrochemical equipment and spares. There are investment potentials for testing laboratories and R&D activities for petrochemical process technologies, including pilot plants for new and innovative material.

The infrastructure and manufacturing-related services with potential for development include:

- Enhancement of the petrochemical zone in Gebeng, Pahang by extending the existing CUF in Gebeng to all the petrochemical projects in the entire Gebeng industrial estate

- CUF and other support facilities, for example, centralized waste water treatment, in Pasir Gudang-Tanjung Langsat, Johor and all future petrochemical zones;

- Manufacturing-related services, such as engineering and maintenance services, storage facilties, tank farms and transportation, in all existing and new petrochemical zones; and

- Deep water ports, as well as new rail links to ports and roads, to facilitate product movements in the domestic market and exports.

Linkages with Other Sectors

Based on the present and future market trends, there is potential to create greater synergies, by increasing Malaysia's share in both the domestic and regional markets for petrochemical products. This can be realized by taking advantage of the high intra-and inter-linkage nature of the industry. As an example, the plastics product manufacturing industry can contribute in enhancing the value chain. It has the potential to drive petrochemical developments in specific strategic applications. They include engineering plastics, composite materials and environment-friendly products. In line with the current green requirements, there are opportunities to develop renewable raw materials and biodegradable materials, as well as hybrid of natural materials. Due to the growing global awareness on the environment, products made from such materials will attract higher demand and prices.

3. THE CHALLENGES

(a) High Cost of Developing New Petrochemical Zones

The establishment of new petrochemical zones is costly, in view of the high investments required in the provision of dedicated infrastructure facilities, such as ports and CUF, as well as support services. Upstream linkages to a refinery or gas processing plants, including a cracker, will be an advantage to ensure the availability of feedstocks. However, the challenge will be to structure the downstream products, which will generate optimum value-added in the utilization of oil and gas resources.

(b) Competition for Investments and Markets

The cyclical nature of the petrochemical business is a characteristic of the industry. The industry will need to overcome short-term and sporadic volatilities in feedstock costs, product prices and low margins, brought about by competition in the global and regional markets, notably from West Asia and other ASEAN producers. Malaysian petrochemical companies will face increasing competition to gain greater access to the ASEAN markets, as these countries are also developing their own petrochemical industries. Malaysia will need to increase the volume of production of petrochemicals and provide a more conducive environment to promote investments in a wider range of high value-added products.

The challenge for the industry is the need to:

- Maintain a long-term perspective of the business and build a business portfolio with a range of products, which will sustain its competitiveness throughout the business cycle;
- Improves its cost structure through enhancing supply chain management;
- Develop superior customer-service orientation, with niche- market products; and
- Create awareness in the development of environment-friendly products

(c) Lack of Synergies and Economies of Scale

Main users of petrochemicals, which mostly comprise SMEs, generally lack economies of scale, capital and technical and marketing expertise to become major producers. There will be a need to encourage consolidation within the industry, through joint ventures, strategic partnerships and other forms of collaboration with MNCs, to benefit from technology transfer, cost efficiencies and larger markets in areas such as medical devices, automotive parts and biotechnological products.

(d) Availability and reliability of Feedstock

The availability and reliability of feedstock at competitive prices is a key factor for the further development and enhancement of the industry. Natural gas and condensates, obtained from the gas fields off the coast of Terengganu, are the main raw materials for petrochemicals in Kerteh, Terengganu and Gebeng, Pahang. In Pasir Gudang-Tanjung Langsat, Johor, naphtha is the main raw material. Although naphtha is available from the oil refineries in the country, the current requirement of naphtha is still met mainly through imports.

The challenge is to ensure the availability of sufficient feedstock at competitive prices for existing and new petrochemical zones. For gas and condensates, major sources will be from the Joint Development Area with Thailand, new gas discoveries offshore or the purchase of gas from neighbouring countries, for example Indonesia. For naphtha, new refineries will need to be built in the petrochemical zones. The refineries will also be able to supply alternative feedstock for example, gas oils, leading to greater feedstock flexibility and wider growth options in the industry.

(e) Insufficient Infrastructure and Support Services

The future growth of the industry in the existing and new petrochemical zones requires the further development of infrastructure, utilities, facilities and manufacturing-related services. Such infrastructure, facilities and services will need to be provided at competitive costs.

(f) Technology Enhancement

There is potential to improve the process technologies. Efforts will need to be channeled towards development in specific areas, such as high-end polymer applications, engineering plastics and composite materials. The key challenges include:

- Establishing R&D centres for chemical processes and process technologies at the local institutions of higher learning, in particular, PETRONAS University;
- Nurturing expertise in management and innovative utilization of catalysts to improve yields;
- Encouraging applications of composite materials by formulating guidelines for the definition, production and usage of such materials, which will, in turn, lead to the diversification in the range of petrochemicals produced; and
- Focusing on research in new materials and development of renewable raw materials and biodegradable materials (for example polylactic acid) and hybrids of natural materials (for example, glucose or palm oil) with petrochemicals, leading to new products (for example, polyhydroxybutaric acid or esters). Such technologies are relatively new and expensive.

(g) Shortage of Skilled Personnel

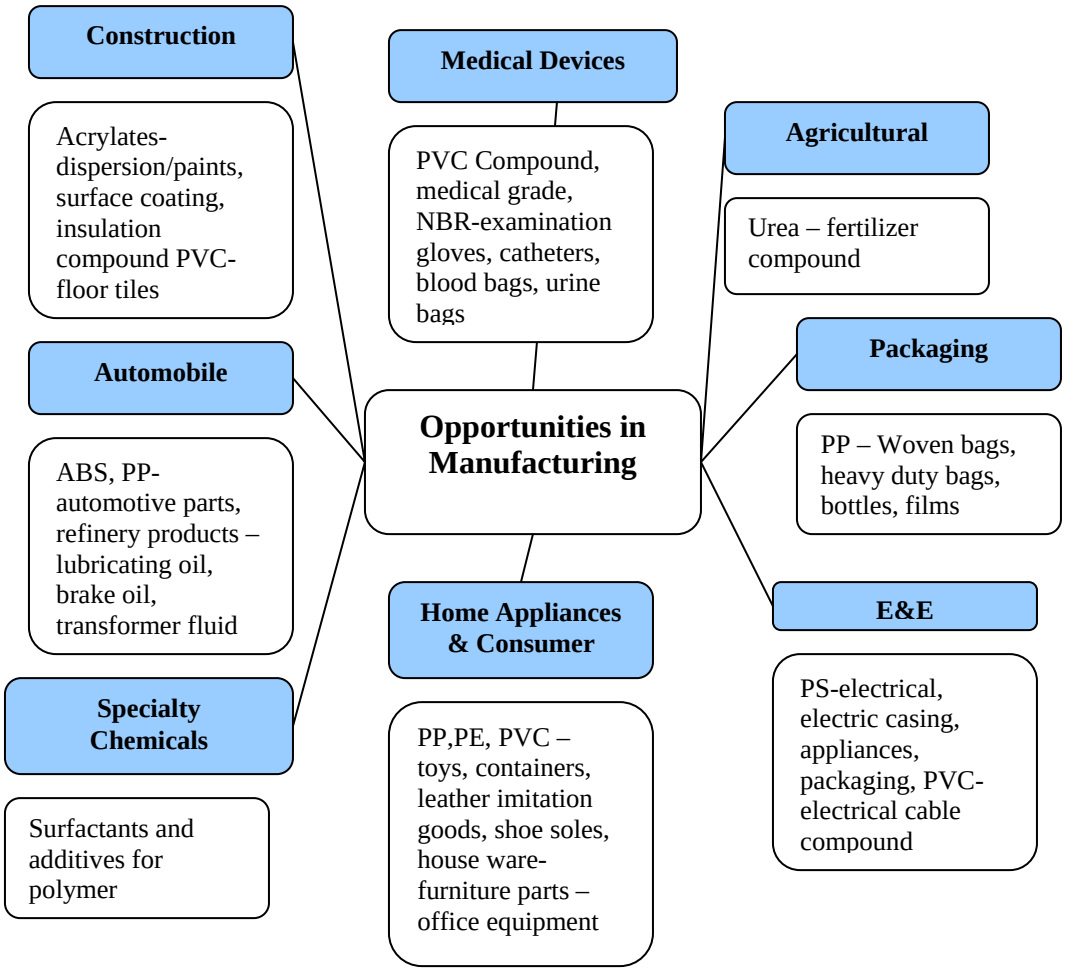
There is a shortage of experienced workforce with the relevant technical skills, awareness and responsibility towards safety, health and environmental concerns. There will be a need to enhance collaboration between industries and training institutes to nurture the technical skills of trainees. This collaboration can take the form of an industrial apprenticeship scheme, as practiced in more developed countries.

(Source: IMP3-MITI)

4. PLASTICS INDUSTRY

The development of the plastic fabrication industry is assisted by the local production of polymers and plastic resins. At least 60 per cent of domestic consumption of plastic resins is sourced locally. The plastic conversion and fabrication sub-sector is an important supporting industry catering mainly to the E&E, automotive and construction industries. Plastic resin compounders, converters and fabricators provide the downstream linkage to the polymer industry.

Opportunities in Manufacturing



The plastics products industry currently consists of 1,500 manufacturers employing more than 95,000 persons. The annual turnover was estimated at RM15.6 billion in 2006, an increase of 11 per cent compared with RM14.1 billion in 2005. Resin consumption increased to 1.85 million tonnes from 1.72 million tonnes in 2005, giving a per capita resin consumption of RM75 kg.

Of the 1,500 plastic manufacturers, about 900 or 60 per cent are SMIs. About 800 (53%) of the companies are majority Malaysian-owned. The SMIs in this industry generally lack economies of scale, capital and technical and marketing expertise to become global; producers.

Malaysia is a net exporter of plastic products. Exports of plastic products are expected to increase by 18 per cent to reach RM7.9 billion in 2006. Major export destinations were People's Republic of China, Hong Kong, Singapore, Japan and Thailand while major items exported were packaging materials such as flexible films, sheets and bags, bottles and containers (50%) and plastic components for the E&E industry (27%).

Imports of plastic products increased to RM6.5 billion in 2006 from RM5.2 billion in 2005. Major sources of imports were Japan, Singapore, People's Republic of China, USA and Thailand. Main items imported were articles of plastic (54%) and plates, sheets, films and foils (31%). The main production processes in the plastic product industry are injection moulding, film extrusion, blow moulding, pipe and profile extrusion, foam moulding and composite fabrication. The main market segments are plastic packaging, E&E components, household, automotive, construction and agriculture.

Polyethylene (PE), polypropylene (PP), polyvinylchloride (PVC) and polystyrene (PS) remain the main types of resins consumed in the country. The industry also witnessed increasing usage of engineering plastics such as acrylonitrile butadiene styrene (ABS), acrylonitrile styrene (AS), polyacetyl (PA), polyester copolymers and polybutylene terephthalate (PBT), which are available locally. Other engineering plastics such as polyamides (nylons) and polycarbonates (PC) will continue to be imported. Polymer blends such as glass reinforced polypropylene and nylons have also been introduced. These engineering plastics are mainly used for the production of parts and components for the E&E industry, automotive parts and medical equipment. In flexible packaging, more degradable plastics are being introduced as the industry becomes more aware of the need to be environment-friendly.

In 2006, a total of 10 projects were approved with investments of RM242 million, mainly in the engineering plastics and specialty polymers and composites sub-sector. These are high value-added products which are in-line with the Government's effort to move the industry up the value chain. These products are used for the production of plastic components for high performance E&E, medical equipment and automotive industries.

CONCLUSION

The petroleum and petroleum products industry, a leading industrial sector in Malaysia, with accumulated investments of some RM55.5 billion, saw increased interest in 2006, where it emerged at pole position with RM11.4 billion in approved investments in 10 projects. This represented a huge jump from the RM0.7 billion investments in 15 projects in 2005. Of the total, RM8.8 billion was approved for six new projects while four were for expansion/diversification.

As expected domestic investors, spearheaded by Petronas, the National Oil Company accounted for RM10.8 billion or about 95% of total investments.

KIC Oil and Gas Sdn Bhd, an oil storage and blending company has partnered Trek Perintis Sdn Bhd, a government-approved strategic financial and equity investor to form a new 90:10 joint venture company- Asia Petroleum Hub Sdn Bhd, to develop and operate a RM1.4billion petroleum terminal near the Port of Tanjung Pelepas (PTP).

Construction work is expected to start on a 40.46ha site on a reclaimed island after the completion of specialist studies such as ship simulations.

The terminal, expected to be ready in 2009, will be an integrated facility with multiple jetties and a Single Buoy Mooring system, capable of handling all sizes of oil tankers, as well as the capability to accommodate over 2,000 vessels calling at the terminal yearly.

The terminal is planned to handle over 60 million tonnes of petroleum products including industrial and marine fuel oil, diesel, jet fuel and biodiesel products.

The terminal would be managed by Kadriah Integrated Facilities Sdn Bhd, which also manages KIC's oil terminals in Port of Tanjung Pelepas and Westport, in Port Klang.

European Union (EU) members have also expressed interest to invest in Malaysia's petrochemical industry, especially in the East Coast State of Pahang, where the potential for growth looks good,

Malaysia is considered a good location for foreign investment and it continues to attract foreign investors. The interest in Pahang is attributed to the State's early decision to focus on the development of the downstream activities in the petrochemical sector.

German petrochemical giant, BASF for example, has a joint venture with Petronas in a downstream project in Kuantan producing petrochemical products such as resins.

Committee Meetings

1. General Matters & Raw Materials Committee

GENERAL MATTERS & RAW MATERIALS COMMITTEE

1. Review of 2006

Malaysian economy registered a 5.9% annual growth rate of Gross Domestic Product (GDP) last year which was 0.7% increase from 2005. The strong annual growth rate was contributed by expansion in manufacturing, services and agricultural sectors. During its presentation of five-year Ninth Malaysia Plan back in April 2006, the Malaysian Government planned to continue accelerating its domestic growth by targeting the development in higher value-added manufacturing and an expansion in the services sectors.

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

Product	Unit: KMT	2004	2005	2006	Change % (2006 vs. 2005)
Ethylene	Production	1,581	1,575	1,598	+1%
	Import	65	39	24	-38%
	Export	115	105	96	-9%
	Consumption	1,404	1,416	1,453	+3%
Propylene	Production	782	836	868	+4%
	Import	18	24	9	-63%
	Export	0	0	5	-
	Consumption	668	720	750	+4%
Benzene	Production	297	275	280	+2%
	Import	153	134	119	-11%
	Export	141	151	162	+7%
	Consumption	162	161	160	-1%

Table 2: Nameplate Capacity for Raw Materials in Malaysia in 2006.

Product (Unit: KMT)	Ethylene Malaysia Sdn Bhd	Optimal Olefins (M) Sdn Bhd	MTBE (M) Sdn Bhd	Aromatics Malaysia Sdn Bhd	Titan Chemicals Corp. Bhd	Shell (FCC)	Total
Ethylene	400	600			730		1,730
Propylene		95	380		420	140	1,035
Benzene				195	125		320

Malaysia owns three cracker complexes with total capacity of 1.73 mit mt/yr. The country's first cracker has a capacity of 0.73 mil mt/yr and it was built in 1993 in Pasir Gudang, Johor. The second and third crackers were built in 1995 in Gebeng, Pahang and Kertih, Terengganu respectively.

The Kerteh cracker, a PETRONAS joint venture plant with BP and Idemitsu, uses ethane as the base feed and it supplies ethylene via pipeline to an adjacent 240,000 mt/yr swing Polyethylene plant and via vessels to Idemitsu Styrene Monomer plant in Pasir Gudang, Johor.

Titan Chemicals owns 2 naphtha crackers in Pasir Gudang, Johor. Besides captive consumption for its downstream Polyethylene plants at the same location, Titan also exports ethylene to its subsidiary, P.T Titan in Indonesia, a company acquired in 2006.

Optimal Olefins, a JV owned 70% by PETRONAS, 15% Dow and 15% Sasol supplies ethylene to an MEG plant owned by Petronas and Dow and LDPE plant owned by Petronas, Sasol and Sabic.

Malaysia currently has no producer for butadiene and relies heavily on imports. Butadiene is mainly used for production of ABS resin in Malaysia. Toray Plastics, the only ABS plant in Malaysia, operates a 200kmt per year ABS facility in Penang.

Benzene capacity in Malaysia mainly comes from Aromatics (M) Sdn Bhd and Titans Chemicals Corp which contribute to approximately 350kmt per annum. Domestic consumption has been remaining at a range of 160-165kmt per year solely from styrene sector. Export market for Malaysian Benzene is primarily in Northeast and Southeast Asia. The benzene exports had increased by 7% from previous year to 162kmt in 2006 with main export countries being Taiwan and Indonesia. Imports on the other hand, had reduced to 119kmt from neighboring countries such as India.

2. Prospects for 2007

International Monetary Fund (IMF) and Bank Negara project Malaysia's GPD to be at 5.8% in 2007. The Malaysian economy continues to be dependent on the growth of top export destinations and key sources of foreign investment i.e. the US, China and Japan.

Titan is targeting to commission its 150kmt per year butadiene plant in November 2007 and 115kmt per year propylene plant, via metathesis process, by end 2007.

The domestic consumption of polyethylene is anticipated to grow by 6.3% to 944kmt per year and polypropylene by 5.9% to 384kmt per annum. These two sectors will continue to be the major force for ethylene and propylene demand.

In the future, increasing competition from China and Middle East continues to pose new challenges for Southeast Asia olefins producers and hence the market prices as evidenced in 2006. The emerging demand and capacity building from China and India, in terms of olefins downstream sectors i.e. polyolefins and vinyls, remain to be the primary pre-dominated factor for international plastics industry. On the contrary, Malaysia's olefins industry is to maintain its significant role to support its downstream activities.

Malaysia's benzene sector is projected to maintain its strong presence as a regional exporter for the coming years. There is no expansion planned due to stagnant domestic consumption growth.

2. Polyolefins Committee

POLYOLEFINS COMMITTEE

Malaysia is a net exporter of polyolefin with export of 620KMT compared to import of 410KMT in 2006. Major exporting destinations were China (including Hong Kong), South East Asia and India Sub-Continent.

The domestic polyolefin demand is expected to increase to slightly above 1,200KMT in 2007 with the downstream activities mainly involve in fabrication (plastic injection moulding process), conversion (such as plastic packaging), compounding and the production of products for application in industries such as electrical and electronic (E&E), medical devices, automotives, construction and agricultural. The capacity expansion we saw of PE stretch film in 2006 is likely to continue this year.

a. LDPE

Unit: KTA

Product		2004	2005	2006	2007E
Supply	Production	425	430	430	470
	Import	30	25	20	12
	Total	455	455	450	482
Demand	Domestic	100	100	110	116
	Export	355	355	340	366
	Total	455	455	450	482

Review of 2006

Production maintained at 2005 level due to Petlin turnaround in early 2006. Export remained high due to low domestic demand growth.

Outlook for 2007

Production expected to increase by 9% with no turnaround reported in 2007. The export volume is expected to increase further as domestic demand is still relatively insignificant.

b. LLDPE

Unit: KTA

Product		2004	2005	2006	2007E
Supply	Production	100	80	80	100
	Import	120	150	170	170
	Total	220	230	250	270
Demand	Domestic	220	230	250	270
	Export	0	0	0	0
	Total	220	230	250	270

Review of 2006
Production maintained at 80KMT and the domestic demand increased to 250KTA due to new added stretch film capacities.

Outlook for 2007
Production expected to increase to 100KMT with import expected to maintain 170KMT to meet the domestic demand.

c. HDPE

Unit: KTA

Product		2004	2005	2006	2007E
Supply	Production	400	470	460	505
	Import	150	160	170	196
	Total	550	630	630	701
Demand	Domestic	430	460	470	480
	Export	120	170	160	221
	Total	550	630	630	701

Review of 2006
Production declined slightly to 460KMT with the domestic demand increased to 470KMT due to overwhelming export orders of HDPE carrier bags.

Outlook for 2007
Production expected to increase by 10% to 505KMT and domestic demand expected to increase further to 480KMT on the back of strong export orders.

d. PP

Unit: KTA

Product		2004	2005	2006	2007E
Supply	Production	400	435	430	450
	Import	70	75	50	95
	Total	470	510	480	545
Demand	Domestic	320	330	350	340
	Export	150	180	130	205
	Total	470	510	480	545

Review of 2006
Production maintained at 2005 level due to Titan turnaround in early 2006. The domestic demand increased 6% to 350KMT.

Outlook for 2007
Production expected to increase 5% to 450KMT with domestic demand of 340KMT

3. PVC Committee

PVC COMMITTEE

2006 RESULTS

Demand for PVC was mainly attributable to the following factors: -

a) Instability and fluctuation of Vinyl Chloride Monomer prices;

b) Unskilled foreign labour affecting productivity especially in the construction industry;

c) Inflation affecting competitiveness; and

d) Overseas suppliers sought alternate markets such as Malaysia to maintain export sales due to the expansion of Carbide-based PVC Production in China.

FUTURE PROSPECTS

a) Most 9MP projects are expected to kick off in 2007, the second year of the five-year development plan;

b) Malaysian Government scrapped Real Property Gains Tax (RPGT) on real property transactions commencing 1 April 2007;

c) Incentives will be made available for Iskandar Regional Development Authority (IRDA) which boost property transactions;

d) PVC producers continue to promote and educate the potential users, authorities and public.

4. Styrenics Committee

B. STYRENICS COMMITTEE

MALAYSIAN STYRENIC DERIVATIVE SUPPLY & DEMAND (2004 - 2010)

		2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
SM	Capacity	220	220	220	220	220	220	240
	Demand	320	310	334	334	390	405	435
PS	Capacity	140	140	140	140	140	140	140
	Demand	154	148	137	139	139	142	145
ABS	Capacity	220	220	260	280	330	330	330
	Demand	95	100	100	102	105	108	120
EPS	Capacity	75	75	75	80	80	90	100
	Demand	36	35	38	38	40	40	50

1. Bigger capacity of styrenic based polymers commenced in early 1990s. Currently:
    - GPPS/HIPS:140Kmts(Idemitsu :Petrochemicals)
    - ABS : 280Kmts (Toray)
    - EPS : 80Kmts (BASF)

2. Idemitsu SM started production in 1997 with 200Kmts. Capacity was increased to 220Kmts in 2003 and 240 Kmts by 2005.

3. Malaysian demand for Styrene based polymers has been closely related to export oriented E&E industry:
    - PS : 137 Kmts
    - ABS : 136 Kmts
    - EPS : 38 Kmts

4. Upstream feedstocks for SM, i.e. Ethylene & Benzene, are available domestically.

5. Toray will gradually increase their capacity from current 280mt to 330mt by early 2008.

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

Malaysian SM CAPACITY & DEMAND

YEAR	2003	2004	2005	**2006**	2007	2008	2009	2010
DEMAND	315	320	310	**334**	334	390	405	435
CAPACITY	220	220	240	**240**	240	240	240	240
BALANCE	-95	-100	-70	**-94**	-94	-150	-165	-195

5. Synthetic Rubber Committee

SYNTHETIC RUBBER COMMITTEE

MALAYSIAN PRODUCTION OF SYNTHETIC RUBBER

Malaysia's p0roduction of synthetic rubber (SR) is relatively small compared to natural rubber (NR). It is estimated that 22,000 tonnes of Acrylonitrile Butadiene (NBR) latex was produced in Malaysia in 2006.

The recently announced expansion will add 20,000 tonnes (by the second half of 2007) of capacity per annum in order to meet the growing demand from synthetic glove manufacturers. The butadiene monomer used in the production process is likely to be sourced from neighbouring Thailand.

The tables below show the estimated SR output and consumption (vs NR) for Malaysia.

Synthetic Rubber Production ('000 tonnes)

	2005	2006
Malaysia	**20**	**22**

NR and SR Consumption ('000 tonnes)

	2005 NR	2005 SR	2005 Total	2005 %SR	2006 NR	2006 SR	2006 Total	2006 %SR
Malaysia	**387**	**97**	**484**	**25**	**379**	**109**	**478**	**30**