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Executive Summary

The global financial crisis and economic slowdown has dealt a severe blow to Vietnam's plans to expand its petrochemical industry, according to **BMI**'s latest Vietnam Petrochemicals Report. Concerns have mounted over the strength of the markets the new petrochemicals complexes were designed to serve, while joint venture partners have struggled to secure multi-billion dollar financing they need.

In 2009, **PetroVietnam** was constructing a petrochemical complex in the Dung Quat economic zone, which was due to come online in Q110 with capacity to produce 260,000tpa propylene feedstock for a 150,000tpa PP plant. The **Nghi Son Refinery and Petrochemical** complex is scheduled to come online in 2013 with capacities of 150,000tpa of propylene, benzene and PP each and 480,000tpa of paraxylene. Also due to come online is the **Long Son Petrochemical** complex with capacities of 1.1mn tpa of ethylene, 550,000tpa of propylene, 400,000tpa of VCM, 330,000tpa of PVC and 1.45mn tpa of polyolefins. However, the Long Son project, which is backed by **Siam Cement** and PetroVietnam, has been delayed by at least two years to 2015. **SP Chemicals** has also cancelled plans for a US$1.5bn complex, including a cracker with ethylene capacity of 800,000tpa, citing unfavourable market and economic conditions. The Nghi Son complex could go the same way, although by end-2009 the joint venture partners appeared to be still on board. It includes capacities of 150,000tpa of propylene, 150,000tpa of benzene, 480,000tpa of paraxylene and 150,000tpa of PP and is scheduled to come onstream in 2013.

However, there is still investor interest in Vietnam. **Methanex** is reportedly considering locating a 1.6mn tpa methanol plant in Ba Ria Vung Tau province. In November 2009, Siam Cement, **Qatar Petroleum**, PetroVietnam and **Vinachem** signed an agreement to build a US$3.5-4.0bn petrochemical complex in Vietnam. In November 2009, PetroVietnam commenced propylene shipments from its newly commissioned oil refinery at Dung Quat. The refinery is also designed to produce 150,000tpa of propylene, which PetroVietnam plans to sell to **Marubeni** until PetroVietnam builds a 150,000tpa polypropylene facility at the site, under a contract signed in 2008. In September 2009, Taiwan's **Formosa Heavy Industries** received an approval from the government to build a US$12.47bn petrochemical and oil refinery project in Vung Ang Economic Zone. The project is to have capacity of 300,000b/d of oil and 16mn tpa of petrochemicals. No further details have been provided. The company is constructing a US$7.9bn steel project in the same zone.

Nevertheless, the failure of petrochemicals projects has dealt a major blow to Vietnam's industrialisation efforts. The complexes would supply key industries in the country, notably the automotive and consumer goods packaging sectors, as well as exporting products to other South East Asian markets. The country's per capita plastic consumption is also set to grow fast as a result of strong economic growth. The other

concern is the impact of increased Asian petrochemicals capacities over 2009 and 2010 on product prices, particularly in a climate of slackening demand growth.

With little domestic petrochemicals activity, Vietnam is at the bottom of **BMI**'s Asia Petrochemicals Business Environment Rankings with 31.1 points, down 5.4 points since 2009. The deterioration in the country's score is related to the cancellation and postponement of petrochemicals projects as well as negative risk associated with long-term external and financial factors. There is no likelihood of a significant increase in the country's score and it is likely to remain at the bottom of the league until world-scale complexes come online. Risk factors also need to improve, particularly in relation to most areas of the economy and the government's regulation of downstream industries.

SWOT Analysis

Vietnam Petrochemicals Industry SWOT	
Strengths	▪ Self-sufficiency in oil production gives a feedstock advantage, which helps in the development of the petrochemicals industry ▪ Well placed to cater to the Chinese demand for petrochemicals ▪ Has attracted some foreign investment for polyvinyl chloride (PVC) production
Weaknesses	▪ Petrochemicals product portfolio is more or less limited to PVC ▪ Scarce refining capacity ▪ High input costs for petrochemicals production ▪ Limited interest from foreign petrochemicals majors in investing, while partners have dropped out of past projects
Opportunities	▪ Plans to establish refinery and development of plastics and intermediate petrochemicals production ▪ Feasibility studies underway for ethylene cracker ▪ Rising gas production could provide feedstock for petrochemicals production
Threats	▪ Plans are not expected to lead to any initial olefins production, with the country continuing to rely on imported monomer feedstock for some time ▪ To enter the WTO, the country has pledged to remove restrictions over several products, including petrochemicals. This could result in further lowering of tariffs, which can be a deterring factor for foreign companies to invest in Vietnam

Vietnam Political SWOT	
Strengths	▪ Communist Party government appears committed to market-oriented reforms. One-party system is generally conducive to short-term stability ▪ Relations with US generally improving. US sees Hanoi as a potential regional ally
Weaknesses	▪ Corruption among government officials a major threat to Communist Party's legitimacy ▪ Increasing (if limited) public dissatisfaction with leadership's control over dissent
Opportunities	▪ The government recognises the threat that corruption poses to its legitimacy, and has acted to clamp down on graft among party officials ▪ Vietnam has allowed legislators to become more vocal in criticising government policies. This is opening up opportunities for more checks and balances
Threats	▪ 2009-2010 slowdown likely to weigh on public acceptance of one-party system, and demonstrations to protest economic conditions could develop into challenge of system ▪ Although strong domestic control will ensure little change to political scene in the next few years, over the longer term, the one-party-state will probably be unsustainable ▪ Relations with China have deteriorated due to Beijing's more assertive stance over disputed islands in the South China Sea and domestic criticism of a large Chinese investment into a bauxite mining project in the central highlands

Vietnam Economic SWOT	
Strengths	▪ Vietnam has been one of the fastest-growing economies in Asia in recent years, with GDP growth averaging 7.6% annually between 2000 and 2007 ▪ The economic boom has lifted many Vietnamese out of poverty, with the official poverty rate in the country falling from 58% in 1993 to 20% in 2004
Weaknesses	▪ Vietnam still suffers from substantial trade, current account and fiscal deficits, leaving the economy vulnerable as the global economy continues to suffer in 2010. The fiscal picture is clouded by considerable 'off-the-books' spending ▪ The heavily-managed and weak dong currency reduces incentives to improve quality of exports, and also serves to keep import costs high, thus contributing to inflationary pressures
Opportunities	▪ WTO membership has given Vietnam access to both foreign markets and capital, while making Vietnamese enterprises stronger through increased competition ▪ The government will in spite of the current macroeconomic woes, continue to move forward with market reforms, including privatisation of state-owned enterprises, and liberalising the banking sector ▪ Urbanisation will continue to be a long-term growth driver. The UN forecasts the urban population to rise from 29% of the population to more than 50% by the early 2040s
Threats	▪ Inflation and deficit concerns have caused some investors to re-assess their hitherto upbeat view of Vietnam. If the government focuses too much on stimulating growth and fails to root out inflationary pressure, it risks prolonging macroeconomic instability, which could lead to a potential crisis ▪ Prolonged macroeconomic instability could prompt the authorities to put reforms on hold, as they struggle to stabilise the economy

Vietnam Business Environment SWOT	
Strengths	▪ Large, skilled and low-cost workforce, making Vietnam attractive to foreign investors ▪ Vietnam's location – proximity to China and South East Asia and good sea links – makes it a good base for foreign companies to export to the rest of Asia, and beyond
Weaknesses	▪ Vietnam's infrastructure is still weak. Roads, railways and ports are inadequate to cope with the country's economic growth and links with the outside world ▪ Rmains one of the world's most corrupt countries. Score in Transparency International's 2008 Corruption Perceptions Index 2.7, in 20th place in Asia Pacific
Opportunities	▪ Increasingly attracting investment from key Asian economies, eg Japan, South Korea and Taiwan. This offers the possibility of the transfer of high-tech skills and knowhow ▪ Pressing ahead with the privatisation of state-owned enterprises and the liberalisation of the banking sector. This should offer foreign investors new entry points
Threats	▪ Trade disputes with US, general threat of US protectionism, will remain a concern ▪ Labour unrest remains a lingering threat. A failure by the authorities to boost skills levels could leave Vietnam a second-rate economy for an indefinite period

Global Market Overview

Global Petrochemicals Overview

Table: World Ethylene Production By Country, 2009 And 2014 ('000 tonnes capacity)

Country	2009e	2014f
US	27,387	25,500
China	12,610	20,910
Saudi Arabia	9,370	18,300
Japan	8,760	8,760
South Korea	7,380	7,580
Germany	5,745	5,745
Iran	5,606	9,006
Canada	4,951	4,951
Taiwan	4,045	4,765
Netherlands	3,980	3,980
Brazil	3,690	5,600
France	3,465	3,465
Russia	3,310	4,460
India	3,025	8,655
United Kingdom	2,885	2,885
Qatar	2,600	6,000
Thailand	2,570	4,470
Belgium	2,540	2,540
Singapore	1,990	3,790
Malaysia	1,770	1,770
Kuwait	1,700	1,700
Mexico	1,580	2,580
Spain	1,480	1,480
Argentina	800	800
Egypt	730	880
Poland	700	700
South Africa	650	650
Hungary	620	620
Indonesia	620	620

Table: World Ethylene Production By Country, 2009 And 2014 ('000 tonnes capacity)

Country	2009e	2014f
UAE	600	2,000
Venezuela	600	1,900
Ukraine	550	550
Czech Republic	545	560
Turkey	520	520
Australia	515	515
Bulgaria	450	450
Israel	450	450
Nigeria	300	300
Azerbaijan	300	300
Central Asia	240	1,450
Slovakia	210	210
Romania	200	200
Algeria	130	1,230
Colombia	60	660
Chile	60	60
Philippines	0	320

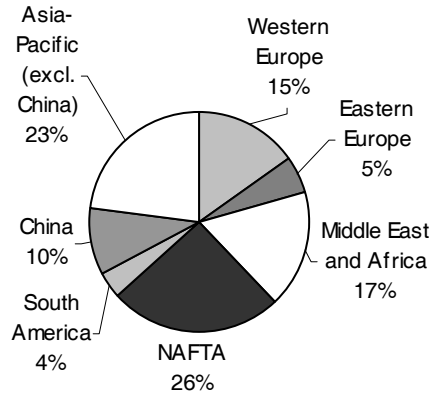
e/f = estimate/forecast. Source: BMI

BMI estimates that total global ethylene capacity amounted to around 132.7mn tonnes per annum (tpa) in 2008, with Asia Pacific representing 32.7% of installed capacity (China contributed 29% of Asian capacity) and North America 25.6%.

Although the Middle East and Africa are the largest source of oil and gas, the region contributed just 17.1% of total capacity. This is set to change over the medium to long term as new capacity comes online, with global capacity set to

Ethylene Capacities By Region

2009 Estimate

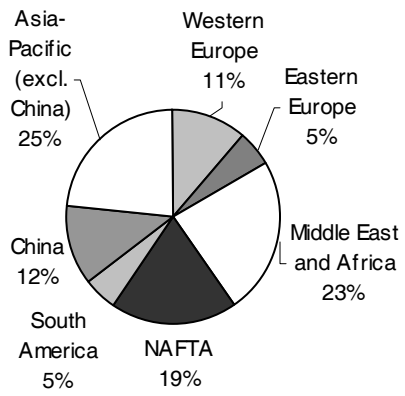


Source: BMI

reach 174.8mn tpa in 2014. The region's contribution to global capacity is forecast to rise from 11.8% in 2007 to 23.4% by 2014. This would be an increase of nearly one-third over 2009 levels, but is a downward revision of around 7mn tpa from our previous estimates, reflecting the impact of the recession and the financial crisis on some projects, particularly in Asia. Gulf countries are expected to account for around 20% of the world's ethylene production by 2010 compared to the current 8%. Some 50% of all new ethylene projects being developed in the world are located in the region. Saudi Arabia represents around 63% of total investment in the region, while Qatar comes second, with a 14% share. The Gulf Petrochemicals and Chemicals Association (GPCA) has forecast that the region will account for 40% of total global petrochemical production within 10 years, but has also warned that this would bring fresh challenges to the region's producers in terms of the need to secure more feedstock.

Ethylene Capacities By Region

2014 Forecast



Source: BMI

The upside of the economic slowdown is the halt and in some cases decline in the cost of petrochemicals plant construction, which had accelerated rapidly from 2002 to 2008 amid a construction boom in the Gulf region. A scarcity of raw materials, labour and engineering expertise has plagued the Gulf petrochemicals industry, leading to project schedule slippages. Some olefins complexes have seen costs increasing by nearly four-fold from 2002. A downturn in construction has freed up resources and given the petrochemical industry more negotiating leverage over costs of planned projects. On the downside, there is a danger in over-reliance on Asian markets, where growth is moderating as they expand their own domestic petrochemicals capacities, contributing to the risk of global over-capacity. The greatest uncertainties come from China, which is massively expanding capacity in 2010-2012, potentially leading to a decline in cracker operating rates to 80-85%, which is widely regarded as the break-even point for most petrochemicals producers. Gulf producers will be hoping that capacities in Europe and North America are crowded out of the market in order to provide further export opportunities.

China should see its share of the global total rise by 2.4 percentage points (pp), but the rest of the Asia Pacific region will only see a 0.3pp increase. Another region set to raise its global profile is South America, with significant new capacity set to come online in Brazil and Venezuela. Brazilian petrochemicals giant **Braskem** is seeking to dominate production in the region and become a serious player on the international petrochemicals market. The company is ramping up capacity, including a world-scale ethylene joint venture (JV) with **Pequiven** in Venezuela. South America's share of the global

total should rise from 3.9% to 5.5% due to an increase in capacity totalling 4.36mn tonnes per annum (tpa). However, the economic downturn led to a revision of investment programmes in South America with the JV to be delayed by two years to 2013-2014. **Dow Chemical** and **Petrobras** have also moved back their planned petrochemical projects by one year, to 2012 and 2013, respectively.

Feedstock Issues

With Saudi Arabia and Qatar in particular ramping up capacities with a number of world-scale projects, the feedstock will also shift. At present, naphtha represents 54% of feedstock for the world's crackers, with ethane providing a further 28%. **BMI** forecasts that by 2014 ethane will represent around 45% of total feedstock, which is derived largely from the gas fields in the Arabian Gulf. Access to cheap feedstock gives petrochemicals companies in the Arabian Peninsula and Iran an even greater cost advantage over producers elsewhere in the world, particularly in Europe and North America. Higher oil prices have led governments in the region to reinvest profits in constructing petrochemicals plants. By 2014 the Middle East and Africa will have more than twice the capacity of Western Europe. Saudi Arabia accounts for almost half the US$250bn committed to petrochemicals projects in the Middle East, excluding Iran. Due to this strong growth in capacity in the Gulf region, investors will be reluctant to expand capacity in North America and Western Europe. Even de-bottlenecking expansions could be abandoned due to concerns about feedstock costs and loss of competitiveness.

An increased use of ethane and expansion of capacity should help raise margins. Ethane costs just over a third of the cost of naphtha and cracking margins are 6.5% higher. Naphtha prices have risen in line with crude, which was reaching all-time highs by mid-2008. This caused ethylene contract prices to soar to over USc70 per pound (lb) in July 2008, a 47% year-on-year (y-o-y) increase. Average oil prices of US$60 per barrel (/bbl) or above make the Middle East the prime destination for investment, due to access to low-cost ethane. However, the sharp decline in oil prices towards the end of 2008 and into 2009 should give naphtha-fed crackers a boost in competitiveness.

Impact Of The Global Slowdown

The global slowdown is a cause for concern for the petrochemicals industry, which is carrying out large-scale capacity additions in 2009 and 2010, leading to a supply glut. Middle Eastern producers will be particularly affected as they are heavily reliant on exports, particularly to Asia. Saudi Arabian projects are already being delayed due to a lack of buyers for their products as well as the global financial crunch, although this is expected to be a short-term phenomenon. In the long term, with Middle Eastern capacity growth rising faster than Chinese import growth, producers are likely to reduce operating rates. In 2008, significant parts of China's polyolefins market were stagnating, and the situation was set to deteriorate further over 2009, putting pressure on olefins prices. Chinese ethylene self-sufficiency could top 60% by 2010, compared to 45% in 2006. The falling price of naphtha feedstock will also undermine the competitive advantage ethane-fed crackers in the Middle East rely on to penetrate new markets. The downturn is not likely to last beyond 2010, as Chinese demand is likely to accelerate, with a supply gap

exceeding 15bn tpa by 2020. Meanwhile, Chinese crackers are expected to struggle to find competitively priced sources of naphtha, bolstering the penetration of Middle Eastern producers in Asian markets.

Global olefins demand fell in 2008 due to the impact of the financial crisis from September of that year on consumer confidence. The situation was exacerbated by de-stocking throughout all petrochemicals product chains. Olefins demand fell by 3-4% in 2008 and growth in 2009 was largely flat. While a recovery is forecast from 2010, substantial new capacity is due to come onstream in the Middle East, taking advantage of low feedstock costs, and Asia. This is likely to keep crackers in the developed economies running at around break-even or even a loss. **BMI** estimates that in these markets crackers need to operate at 80-85% in order to break even. As a result, there is a distinct likelihood of ethylene capacity closures in the US and Europe over coming years with smaller units most likely to get axed.

Table: World Petrochemicals Capacities, 2009 ('000 tpa)

Product	Capacity
Ethylene	132,020
Propylene	79,870
Butadiene	12,620
High-density polyethylene (HDPE)	26,740
Low-density polyethylene (LDPE)	21,055
Linear low-density polyethylene (LLDPE)	32,055
Polyethylene terephthalate (PET)	20,345
Polypropylene (PP)	52,320
Polyvinyl chloride (PVC)	42,240
Polystyrene (PS)	12,000
Methanol	66,350
Ammonia	145,180
Urea	133,000

Source: BMI

Cracker utilisation rates will be determined by demand for downstream producers. Around 60-65% of ethylene is used in the production of polyethylene (PE), which is used in the production of film, packaging, household goods, containers, bags and pipes. A further 20-25% is used in the production of ethylene oxide (EO), most of which is used to make ethylene glycol (EG), the feedstock for polyethylene terephthalate (PET) or polyester as well as anti-freeze. The chlorination of ethylene produces ethylene dichloride (EDC), which is used to produce vinyl chloride monomer (VCM), the feedstock for polyvinyl

chloride (PVC), a polymer that is widely used in construction. Ethylbenzene (EB), the feedstock for styrene monomer (SM) which produces polystyrene (PS), acylonitrile-butadiene-styrene (ABS) and styrene butadiene rubber (SBR) is manufactured by reacting ethylene with benzene.

Global PE demand has been reasonably strong and growing ahead of GDP in most countries, including the US. The construction of new crackers in the Middle East is being accompanied by new export-oriented PE plants in the region, which benefit from access to competitively priced feedstock. High growth Asian markets such as China are also set to witness a rise in capacity along the product chain, helping them become more self-sufficient, competitive and bolstering growth in exports across the product chain. As substantial amounts of new capacity are coming onstream in emerging markets at a time of poor demand, PE producers in developed markets will be under pressure to reduce prices and less competitive plants are likely to close.

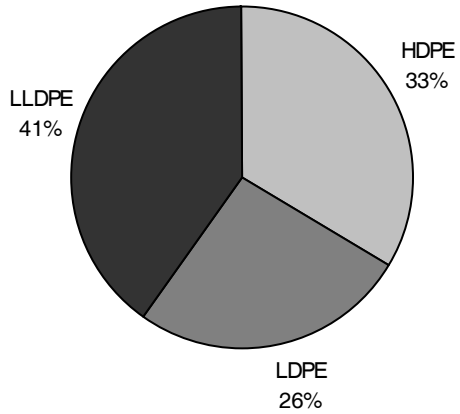
Polyethylene

Performance has varied across PE products, with linear low-density polyethylene (LLDPE) steadily eroding low density polyethylene (LDPE) market share as it allows lower gauges that can reduce costs for many applications while retaining tensile strength. The global market for LDPE is in a state of existential decline with the global recession simply hastening the trend, making the closure of plants in developed markets inevitable as LLDPE plants replace them in the emerging markets. Meanwhile, HDPE has continued to exhibit strong growth, albeit at a slower rate than LLDPE. By 2009, LLDPE accounted for 40.1% of global PE capacity, followed by HDPE (33.5%) and LDPE (26.4%). However, the PE market was hit hard by the financial crisis and its resulting impact on the economy. Polymer prices have plummeted as demand has diminished, purchasers withdrew from the market and producers destocked throughout the value chain.

Consequently, just as demand growth had exceeded GDP growth during the good times, the decline was sharper than the contraction in overall demand, falling by as much as 20% in 2009.

Global PE Capacities By Product

2009 Estimate



Source: BMI

Polyvinyl Chloride

Up to 75% of PVC consumption is typically used in the construction industry, which means the PVC industry is heavily influenced by broader economic trends. The collapse in the housing market in many developed markets as well as a rapid slowdown in construction in China and the Middle East from H208 has therefore dealt a severe blow to PVC producers with **BMI** expecting the closure of smaller plants and

consolidation due to a sustained slump in the market. On top of high chlorine prices and in the face of a rapid growth in Chinese output, **BMI** warns that many PVC plants will operate at below capacity in the medium term, and at a loss due to global over-capacity.

Polystyrene

In the PS segment, the rising price of benzene in line with rising oil prices has raised the cost of production, while rising capacity has put pressure on PS prices. Global PS demand totaled 10.8mn tonnes in 2008, while capacity was just under 12mn tpa, with over-capacity around 10%. The situation has worsened as a result of the financial crisis and economic recession, despite an easing of oil prices since mid-2008. Up to 3.4mn tpa of PS capacity could come onstream in the next five years with most capacity due to come onstream in China. Due to rising prices, PS faces increasing competition with PP, although at the same time it has gained market share from acrylonitrile-butadiene-styrene (ABS). The main growth market is in building insulation. In developed markets, PS capacity has been steadily cut over the past decade and there are few plans for new capacity over the medium-term. If oil prices fall to low levels, naphtha cracking rates could increase, thereby increasing benzene availability pushing down costs.

Polyethylene Terephthalate

PET is manufactured through the esterification reaction between purified terephthalic acid (PTA) and monoethylene glycol (MEG) which create a basic ester that is polymerized, extruded, cut into chips and then processed to form the PET resin. Nearly all PTA output and around half of MEG is devoted to PET production. As such, the performance of the PET market directly affects PTA production. More than 60% of PET is used for the production of synthetic fibres, known commonly as polyester, with most of the rest used for bottle production. As a fibre, PET is used in clothing, tyre manufacturing and textiles. As a light-weight, strong and clear plastic, PET bottle resin has grown in importance. PET film is used in electronics and packaging.

Global demand growth is being led by China, which is ramping up capacities in order to remain self-sufficient. **BMI** estimated the global PET market at around 30mn tonnes in 2008 and could reach up to 40mn tonnes by 2015, by which time the Chinese market could represent two-thirds of global polyester consumption, compared to around half in 2005. According to **BMI**'s projections, global PET production capacity is set to rise from 20mn tpa in 2008 to 30.5mn tpa by 2015, mostly in China, an increase of more than 50%. However, we also project that demand will rise by only one-third over the same period, leading to a threat of over-capacity in a market that is already close to saturation. The growth in Asian capacity is a particular concern, with low-cost Chinese producers likely to sell their excess production on the global market, thereby depressing prices.

Polypropylene

BMI estimates that global PP capacity totalled 53mn tpa in 2009, with the US as the world's largest PP producer, with 17% of capacity, followed by China with 13%. Western European producing markets

contributed 19.4%, while the Middle East – despite its immense resources – represented just 8.2%. **BMI** research indicates that the global landscape is set to radically shift over the next five years as demand and supply to shift eastwards due to growth in developed markets.

Global demand for PP has been running on average at 7.5% over the past decade, well above global average economic growth. **BMI** estimates global PP demand at 48mn tonnes in 2008, while global PP capacity was around 52mn tpa, giving a total capacity utilisation rate of 92%. As with all petrochemicals commodities, the level of growth in China and India has been largely responsible for the pace of PP demand growth. However, rising PP prices mean they are catching up with PE prices, leading to a slackening in demand growth momentum. Nevertheless, PP consumption is set to exceed 50mn tonnes in 2010 and could reach 80mn tonnes by 2016, making it the world's largest polyolefins market. China is now the world's largest PP consumer, with **BMI** projecting that demand will reach 11.8mn tonnes in 2010, one-third more than in 2006. This is likely to lead to a deficit of over 1mn tonnes.

Most new capacity will come onstream in 2009-2012, causing a temporary decline in capacity utilisation to no less than 85%. In 2008 alone **BMI** estimates the amount of added capacity at over 4mn tpa, with a further 5mn tpa in 2009-2010. According to **BMI** forecasts, China will contribute 24% of the 14.3mn tpa of PP capacity that is due to come online worldwide between 2008 and 2013. The whole of Asia will represent just under half the additional capacity, while the Middle East will add a further 25%, largely due to the developments in Saudi Arabia. China is to become the world's biggest PP producing country.

Capacity expansion is occurring during a period of economic downturn, leading to excess capacity. We expect PP producers in the Middle East and Asia to firm up their positions on the global market, exporting their surpluses to the detriment of Western European and North American producers, which are unlikely to bring significant new capacity online over the coming years. **BMI** analysis indicates that profitability in Western Europe and North America will come under attack from cheap imports and these regions will struggle to maintain their competitiveness on export markets. **BMI** forecasts a net decline in PP capacity in these areas, with producers mothballing or closing older, smaller and less efficient plants of capacities under 200,000tpa and focusing their attention on increasing capacity at larger sites.

Production is shifting east, following the pattern of demand. **BMI** expects modest declines in US capacity over the next five years. US producers are set to devote an increasing proportion of output to the domestic market as exports come under pressure from new capacity in the Middle East and Asia. Net US exports are likely to fall to zero by 2012. The main challenge for the US is over-reliance on propylene derived from fluid catalytic cracker units in refineries. As refinery capacity is unlikely to keep up with the growing demand for propylene feedstock, PP producers are expected to be forced to look to other sources to sustain output. **BMI** forecasts that US demand will reach around 9.0mn tpa in 2009, an 18% rise over 2005 levels, leaving a net surplus of around 1.5mn tpa for export.

In Western Europe **BMI** estimates show that the recovery in PP demand slowed considerably from 2005 to 2008 as the region's economy slowed. Demand growth is set to be stronger in Central and Eastern European markets over the next five years, although outside Russia no significant extra PP capacity is set to come online. This trend could lead to the EU becoming a net PP importer over the next five years. Producers are already closing PP plants and are focusing attention on removing bottlenecks and expanding their other facilities.

The stagnation in production in Europe and North America and slower demand growth rates are in stark contrast to the surging Chinese market, which we predict to be increasingly self-sufficient. China is the world's largest PP consumer, and **BMI** projects that demand will reach 11.8mn tonnes in 2010, one-third more than in 2006. This is likely to lead to a deficit of over 1mn tonnes. However, the addition of 4mn tpa of PP capacity in 2008-2011, with other projects in the pipeline, should help contain growth in imports.

BMI forecasts that China will represent 23.8% of the 14.3mn tpa of PP capacity due to come online worldwide between 2008 and 2012. The whole of Asia will represent just under half the additional capacity, while the Middle East will add a further 23.7%, largely due to developments in Saudi Arabia. There are no plans for additional capacity in the US, giving China the opportunity to become the world's biggest PP producing country. Most of the contribution to capacity expansion in the Americas will be in Brazil, with 2.38mn tpa due to be added over the next five years.

PP projects have faced delays in the Middle East. The opening of **PetroRabigh**'s 700,000tpa PP plant in Saudi Arabia was moved from Q408 to Q109, while the Sharq and Yansab complexes, which have a large amount of associated PP capacity, were also moved to 2009. Other PP plants due to come online in the country in 2009 included a 250,000tpa expansion of **Saudi Polyolefins**' plant at Al-Jubail. Also at Al-Jubail, the **Al-Waha Petrochemical** JV between **LyondellBasell** and **Sahara Olefins** is due to add an extra 460,000tpa of PP.

PP producers face significant risks. A stronger than expected slowdown in Chinese growth could lead to a glut in supply, driving prices down and forcing less competitive operations out of business. Margins would also be put under pressure by sustained high oil prices, which would keep the price of propylene at high levels. A combination of over-capacity and rising costs of raw materials could lead to the reduction of PP capacity in developed markets.

A significant constraint facing the industry is the tightening of the propylene market as production of the monomer outstrips refinery output. Cuts in refinery throughput during the course of the global economic downturn will make this constraint more evident. As a result, some PP producers are considering plans to build plants dedicated to propylene production. While feedstock prices are set to rise, Chinese and Middle Eastern producers are managing to bring down prices of end products, leading to pressures on margins, particularly for producers in the developed world. The only way producers from the regions will be able

stay afloat is to corner niche markets with innovative products, requiring greater technical sophistication than currently offered by plants in emerging markets. Efficiency in the manufacturing process also needs to be improved and markets developed. At the same time, energy and transportation prices are high, although these will ease with the decline in oil prices.

Global Oil Products Price Outlook

Tanks Still Brimming

Global product markets lost more ground in September, thanks to continuing distillate stock building and the narrowing of the gasoline crack spread. Refiners were again obliged to trim operating levels as margins contracted. Margins for West Texas Intermediate (WTI) crude at the US Gulf Coast halved in September. European refinery performance improved as a result of precautionary run cuts. The Rotterdam Brent margin widened in September by almost 50% to US$3.92 per barrel (bbl). Sadly, Singapore refinery profitability came under increased pressure and a continuation of Asia Pacific's margin weakness bodes ill for downstream investment.

Casting a long shadow over the oil market is the excessive stock position, with refined product inventories in particular forming a barrier capable of blocking further price appreciation. Early October saw US stockpiles of distillate fuel, including heating oil and diesel, climb to their highest level since January 1983, according to US Energy Department data. Gasoline inventories also jumped to 214.4mn bbl as refiners boosted output. While there are indications that gasoline consumption trends have stabilised in the US, there is no evidence of such an improvement in distillate demand.

US refiners such as **Valero Energy** and **Sunoco** have been cutting throughputs more aggressively than at any time since the early 1980s, even though a cold winter is being predicted. Temporary plant closures appear to be spreading, and maintenance activity either brought forward or extended. Refiners fear that even low temperatures will not provide a sufficiently large demand boost to drain overflowing storage tanks. The margin for producing heating oil and diesel may decline by more than one-third by January 2010, according to **Energy Security Analysis**.

The Energy Department predicts that heating costs in winter 2009/10 will fall 8% across the US, even as the north east is faced with potentially frigid weather. February 2010 futures contracts in early October showed that the premium of heating oil to crude oil will average US$5.00-5.50/bbl in January 2010, down from the recent US$8.10/bbl. A year ago the future crack spread for heating oil was almost US$20.00/bbl.

An El Niño weather system in the Pacific Ocean may push down temperatures in the US north east in Q110, predicted independent weather forecaster **Commodity Weather Group** in a late September 2009 report. Without an unusually cold US winter, distillate stocks are more than ample and could provide a constant drain on market strength. Having said that, US heating oil futures reached a seven-week high in

early October on speculation that colder weather predicted for the rest of the month would boost demand for home-heating fuel.

In early October the Energy Department predicted that US demand for distillate fuels could fall more than 8% in 2009, with a decline to just 3.62mn barrels per day (b/d), the biggest setback since 1980. There was enough heating oil and diesel in the US as of early October to last more than 50 days, with stocks up by one-quarter in the first nine months of 2009, or by almost 34mn bbl to around 172mn bbl. It will require a drop of more than 52mn bbl, or 30%, by the end of March to bring supplies down to the five- year average.

Gasoil stockpiles in Europe's Amsterdam-Rotterdam-Antwerp (ARA) area are also plentiful, amounting to almost 22mn bbl as of October 8, according to Netherlands-based consultant **PJK International**. The preceding four weeks had seen a welcome 4.6% decline from the previous record level. However, diesel and fuel oil demand remains extremely weak.

The volume of refined products in floating storage, largely distillates, off north west Europe and the Mediterranean had grown to about 50mn bbl as of the end of September, up from the end-August level of around 40mn bbl, the International Energy Agency (IEA) said in its October *Oil Market Report* (OMR).

In spite of better economic conditions, the trends towards higher fuels taxation and the overhaul of subsidies in some developing countries mean that a sustainable recovery in demand is far from certain. In spite of evidence that US drivers may be migrating back to less fuel-efficient vehicles, the major shifts in patterns of consumption resulting from vehicle ownership changes are unlikely to be reversed simply because pump prices are temporarily lower. The move in Europe away from gasoline and towards diesel is expected to continue for a while longer, in spite of steep price differentials. However, advances in small petrol engine technology may mean these more economical units bring to an end the love affair with diesel.

Over the longer term, expansion of the oil refining system is still needed, particularly as market growth is likely to accelerate as the world pulls clear of recession/depression. However, refining margins look set to remain under pressure. Coupled with weaker upstream economics and modest profits in fuels retailing, the downturn in refining profitability means that both international and national oil companies may re-examine investment plans. The downstream oils market needs to see continued high level spending in new crude distillation capacity, improved plant upgrading capability and better storage/distribution logistics. There will inevitably be reduced capital expenditure if industry earnings and cash flow remain under pressure. This can only result in the market tightening once again as demand picks up – with a return to extreme price volatility and generally higher fuel prices.

Revised Forecasts

During Q309, **BMI** estimates that the global wholesale price for premium unleaded gasoline will have been US$76.56/bbl. This compares with US$69.89 in the second quarter of 2009. During the three quarters to September the price has ranged from a monthly low of US$49.33 in January 2009 to the June 2009 level of US$79.87/bbl. Gasoline prices in Q309 are down 40.2% from US$127.92 Q308.

For Q409 we now forecast an average global gasoline price of US$71.19/bbl, a decline of 7.0% from the previous quarter, but a y-o-y decline of almost 41% from the US$120.63/bbl seen a year earlier. For the whole of 2009, the **BMI** assumption for gasoline is an average US$67.46/bbl, with the price having peaked in June. The overall y-o-y fall in 2009 gasoline prices will be 33.7%.

Table: Oil Product Price Assumptions, Q108-Q409 (US$/bbl)

Gasoline	**Q108**	**Q109**	**Q209**	**Q309e**	**Q409f**
Rotterdam Premium Unleaded	54.96	50.67	71.46	79.12	69.60
NY Harbour Unleaded	57.84	51.18	69.51	74.83	72.95
Singapore Premium Unleaded	56.32	54.80	68.70	75.72	71.01
Global average	56.37	52.22	69.89	76.56	71.19
Jet/kerosene					
Rotterdam	79.66	56.45	67.52	75.98	79.51
NY Harbour	81.95	58.44	66.57	74.64	75.34
Singapore	74.73	55.45	66.54	74.08	70.93
Global average	78.78	56.78	66.87	74.90	75.26
Gasoil					
Rotterdam	77.89	55.19	64.72	74.61	90.14
Mediterranean	78.40	55.85	65.22	74.79	90.75
Singapore	70.25	53.19	66.15	74.15	82.33
Global average	75.52	54.74	65.37	74.52	87.74

e/f = estimate/forecast. Source: BMI

Jet prices averaged US$74.90/bbl in Q309, using the composite for New York, Singapore and Rotterdam. The annual decrease was 48.6%, with jet exceeding the decline in gasoil prices. The monthly low during the previous six months was US$53.75 in February 2009, with the price reaching US$77.19/bbl in June 2009. For Q409 we assume an average global jet price of US$75.26, a quarter-on-quarter (q-o-q) rise of 0.5% and a y-o-y fall of 4.5%. For 2009 the annual level is forecast to be US$68.45/bbl. This compares with US$124.95/bbl in 2008.

In Q309 gasoil averaged US$74.52/bbl, based on a composite global price. This is a y-o-y fall of 46.9% over Q308, illustrating a recession-induced relative weakening of diesel versus gasoline. Our revised Q409 forecast is for global gasoil at an average US$87.74, a q-o-q increase of 17.7%. The seasonal effect and likely rise in year-end crude prices are set to have limited impact on gasoil prices as a result of the unusually large inventory position. For 2009 as a whole, the **BMI** forecast is for an average price of US$70.59/bbl, assuming a monthly high of US$94.09/bbl in December. The full-year outturn is a 41.8% fall from the 2008 level.

Table: Oil Product Prices, 2007-2014 (US$/bbl)

Gasoline	2007	2008	2009f	2010f	2011f	2012f	2013f	2014f
Rotterdam Premium Unleaded	75.75	100.12	67.71	96.11	98.43	104.22	104.22	104.22
NY Harbour Unleaded	78.75	102.54	67.12	97.51	99.87	105.74	105.74	105.74
Singapore Premium Unleaded	74.98	102.64	67.56	93.81	96.08	101.73	101.73	101.73
Global average	76.49	101.77	67.46	95.81	98.12	103.90	103.90	103.90
Jet/kerosene								
Rotterdam	81.13	126.61	69.87	99.16	101.56	107.53	107.53	107.53
NY Harbour	82.48	127.13	68.75	99.88	102.29	108.31	108.31	108.31
Singapore	79.17	121.11	66.75	92.69	94.93	100.51	100.51	100.51
Global average	80.93	124.95	68.45	97.24	99.59	105.45	105.45	105.45
Gasoil								
Rotterdam	77.02	122.62	71.16	101.01	103.44	109.53	109.53	109.53
Mediterranean	77.69	121.75	71.65	104.10	106.62	112.89	112.89	112.89
Singapore	77.03	119.53	68.95	95.75	98.06	103.83	103.83	103.83
Global average	77.24	121.30	70.59	100.29	102.71	108.75	108.75	108.75

f = BMI forecast. Source: 2000-2006 historical data: EIA; 2007-2008 historical data: IEA

In 2008 naphtha was the weakest performer of the major refined products, gaining 31% to US$87.40/bbl during the year. In Q309 naphtha averaged an estimated US$64.80, compared with US$110.80/bbl in Q308 and US$54.70 in Q209. **BMI** puts the average naphtha price in 2009 at US$52.66/bbl, down 39.7% from the previous year's level.

Looking further ahead, we see gasoline prices recovering to US$95.81/bbl in 2010, rising further to US$98.12 in 2011 and stabilising around US$103.90/bbl from 2012. The price of jet is forecast to average US$97.24/bbl in 2010 and US$99.59 in 2011, before levelling out at US$105.45/bbl from 2012. Gasoil is expected to rebound to US$100.29 in 2010, reaching a plateau of US$108.75/bbl from 2012.

Emerging Asia Petrochemicals Overview

China dominates the Asian petrochemicals sector, accounting for a large bulk of capacity and with plans for further expansion under its 11th Five-Year Plan, which started in April 2006. The size of the Chinese market and its rapid growth in demand for petrochemicals is pushing up Asian ethylene feedstock prices and causing supply problems throughout the region. To address this, Chinese ethylene production is scheduled to reach 10.85mn tpa by 2010, with seven major ethylene projects capable of producing 6.2mn tpa of ethylene in progress, including an increase in the total production capacity of existing ethylene plants by 4.38mn tpa. The largest projects involve leading petrochemicals majors, particularly **Shell**. The chief risk factor for the Chinese petrochemical sector is the rapid rise in global petrochemicals investment, which is leading to high demand for engineering contractors, particularly in the Middle East. This could create bottlenecks in the Chinese petrochemical industry, further exacerbating the problem of feedstock shortages throughout Asia and pushing up prices.

While Shell has concentrated its investments in China, Dow Chemical is turning its attention to India, which has greater unrealised potential for expansion. Foreign companies have yet to take part in large-scale Indian projects such as cracker development due to the relatively small scale of operations. The Indian government has placed petrochemicals at the heart of its development strategy with the creation of a number of petrochemicals zones. Nevertheless, despite strong levels of economic growth, expansion in the Indian petrochemical industry is proceeding at a slower rate than China. Two Indian corporations dominate around 70% of the Indian market: **Reliance Industries Ltd** (RIL) and **Indian Petrochemical Corporation Ltd** (IPCL). Plans are in place to construct its second integrated oil refinery in the Jamnagar Special Economic Zone, adjacent to its existing oil refinery in Gujarat. Dow Chemical is funding the zone's petrochemicals production. Meanwhile, the state-owned oil refiner **Indian Oil Corporation Ltd** (IOCL) is expanding into the petrochemicals sector with the construction of **Haldia Petrochemicals** and plans for further petrochemicals operations in West Bengal, Orissa and Haryana. Private industrial conglomerates such as the **Tata Group** are also planning to enter the petrochemical sector.

The growth in demand for feedstock from China and India is proving to be a serious problem for petrochemicals industries in smaller emerging Asian economies. For example, the Philippines aims to move away from its petrochemical industry's dependency on imported feedstock, but progress has been slow and the sector has been burdened by failed projects and high levels of corporate debt, as well as cheaper and more competitive imports. Planned developments, including a new naphtha cracker at Batangas, expected to be operational in 2008, will see ethylene capacity of 320,000tpa and polymer production capacity of 1.16mn tpa by 2011. However, this will not be enough to satisfy local demand, and the Philippines will remain dependent on imports. Indonesia is also a significant net importer of basic petrochemicals as a result of setbacks in its new facility and expansion projects since the 1997 Asian financial crisis. Rising feedstock prices are also depressing profit margins and affecting competitiveness.

A petrochemicals national strategy developed by the local industry, the government and Japanese investors, published in March 2007, envisages that over 50% of national ethylene demand will be met by imports up until 2010. The **Chandra Asri Petrochemical Centre** (CAPC) expanded ethylene capacity to 620,000tpa and propylene capacity to 279,000tpa in 2007 to cope with demand, but **Indo Olefin Petrochemical**'s 800,000tpa ethylene project is unlikely to go ahead due to a lack of financial backing.

Malaysia's petrochemicals industry is growing and is supported by its well-developed oil and gas sector. According to the Third Industrial Master Plan (IMP3) (2006-2020) for the petrochemicals industry, the Malaysian government is planning to develop Bintulu (Sarawak), Gurun (Kedah), Tanjung Pelepas (Johor) and Labuan into new petrochemical zones. The government is also planning to focus on realising the full potential of the existing petrochemical zones. The plan would require total investment of around MYR34bn (US$9.32bn) over the next 15 years. The petrochemicals industry is expected to remain a key contributor to Malaysia's manufacturing sector. Chemical Market Associates (CMA) forecasts Malaysia's average annual growth rate for PE and PP during 2004-2009 to be 7% and 6.5%, respectively.

While the Philippines and Indonesia are struggling in an increasingly competitive environment, Thailand is pressing ahead with its plans to double petrochemicals capacity over the next five years. However, new plants will have to satisfy environmental regulations which will be introduced in 2009, or the petrochemical industry's growth potential will be severely curtailed. The focus of investment is Map Ta Phut, which will contain a US$1.7bn ethane cracker producing 1mn tpa of ethylene to feed PE plants at the complex to be opened in Q409. A second cracker with a capacity of 1.7mn tpa of ethylene and propylene is also planned. Thailand's PTT Chemical is partnering with Dow Chemical, **Siam Cement** and **Toyo Engineering** to develop the complex, which will make the country a significant supplier of synthetic resins.

Elsewhere in Indo-China, Vietnam is showing little interest in developing its petrochemicals sector. Vietnam has little capacity for domestic production of either ethylene or the basic polymers derivatives PE and PP, and its main thrust of development is in fertiliser production for domestic use.

Table: Asian Ethylene Projects

Company	Location	Country	Start-up	Capacity (tpa)
PetroChina	Lanzhou	China	Late 2006	360,000
PetroChina	Daqing	China	2007/2008	320,000
PetroChina	Dushanzi	China	2008	1,000,000
PetroChina	Fushun	China	2008	860,000
Sinopec, BASF *	Nanjing	China	2009	150,000
Sinopec	Tianjin	China	2010	1,000,000
Sinopec	Zenhai	China	2010	1,000,000
Sinopec	Guangzhou	China	2010	1,000,000
PetroChina	Chengdu	China	2010	800,000
Sinopec, Aramco, ExxonMobil	Fujian	China	2010	800,000
Sinopec, KPC	Guangdong	China	2010	1,000,000
Shide, SABIC †	Dalian	China	2010	1,000,000
Sinopec †	Shanghai	China	na	1,000,000
Sinopec	Wuhan	China	na	800,000
YNCC	Yeochun	South Korea	November 2006	350,000
LG Daesan	Daesan	South Korea	2007	210,000
Lotte Daesan	Daesan	South Korea	2008	350,000
Formosa Petrochemicals	Mailiao	Taiwan	Q107	1,200,000
CPC	Kaohsiung	Taiwan	2010	1,200,000
IOC	Panipat	India	2009	800,000
ONGC	Mangalore	India	2010	1,100,000
OIC	Paradip	India	2011	2,950,000
Haldia Petrochemicals	Haldia Extra	India	Q108	140,000-168,000
Siam Cement	Map Ta Phut	India	2010	800,000
SP Chemicals	Phu Yen	Vietnam	2012	1,500,000
ExxonMobil *	Singapore	Singapore	Q406	75,000
Royal Dutch Shell	Singapore	Singapore	2009/2010	800,000
ExxonMobil †	Singapore	Singapore	na	na
Seibu Oil	Yamaguchi	Japan	End-2009	25,000

** Expansion, capacity refers to addition; † At planning stage; na = not available. Source: Reuters*

Vietnam Market Overview

Vietnam has a poorly developed petrochemicals industry. Despite being South East Asia's third-largest crude oil producer with output estimated at 390,000b/d, Vietnam still imports most of its oil product needs due to the lack of adequate refining facilities. This is primarily due to the increasing demand for feedstock expected in the petrochemicals sector, especially for products such as urea fertilisers, polyester and fibre. In the battle for chemicals industry-related foreign direct investment (FDI), the country continues to lose out to neighbouring countries, notably China. The number of oil refining and petrochemicals projects is increasing in Vietnam, as the government aims to reduce exports of crude oil and imports of petroleum products and petrochemicals.

According to recent estimates, Vietnam imports about 1mn tpa of olefins and demand is growing at a rate of 10% per annum.

Regulatory Structure

The laws and regulations of the Socialist Republic of Vietnam apply to all contracts. However, in the absence of a specific Vietnamese law or regulation governing any matter that may be raised, the relevant provisions of international law or Generally Accepted International Petroleum Industry Practices (GAIPIP) apply, provided that such international law and GAIPIP are not contrary to the fundamental principles of Vietnamese laws. The Vietnamese oil and gas industry is well regulated and elaborate arrangements have been made to ensure transparency in dealings between the companies and the government.

When a newly promulgated law or policy adversely affects legitimate interests to which investors are entitled before the new law or policy takes effect, investors are guaranteed either entitlement to the preferences stated in their investment certificates or application of one or more of the following measures:

- Continued enjoyment of the existing rights and preferences;
- Deduction of losses from taxable income;
- Adjustment of the objectives of the project;
- Consideration for compensation in some necessary cases.

Since 2001 Vietnam has reaffirmed its commitment to economic liberalisation and international integration. It is implementing structural reforms needed to modernise the economy and develop more

competitive, export-driven industries. The US-Vietnam Bilateral Trade Agreement and Vietnam's membership in the ASEAN Free Trade Area (AFTA) have led to rapid changes in Vietnam's trade and economic regime. The nation's exports to the US doubled in 2002 and again in 2003. The country joined the WTO in January 2007, following a decade-long negotiation process. This is expected to provide an important boost to the economy and is likely to ensure the continuation of liberalising reforms. The accession allows Vietnam to take advantage of the phase-out of the Agreement on Textiles and Clothing, which eliminated quotas on textiles and clothing for WTO partners. Vietnam has affected strong monetary and fiscal policies to stem high inflation.

Industry Trends And Developments

Table: Vietnam's Petrochemicals Projects

Product	Company	Location	Capacity, tpa	Completion date
Ethylene	Long Son Petrochemical	Long Son	1,100,000	2013
Propylene	PetroVietnam	Dung Quat	260,000	2009
Propylene	Long Son Petrochemical	Long Son	550,000	2013
Propylene	Nghi Son Refinery & Petrochemical	Nghi Son	150,000	2013 (under study)
Benzene	Nghi Son Refinery & Petrochemical	Nghi Son	150,000	2013 (under study)
Paraxylene	Nghi Son Refinery & Petrochemical	Nghi Son	480,000	2013 (under study)
PP	Nghi Son Refinery & Petrochemical	Nghi Son	150,000	2013 (under study)
PP	PetroVietnam	Dung Quat	150,000	2010
PVC	Long Son Petrochemical	Long Son	330,000	2012
PET	PetroVietnam	Nghi Son	130,000	2010 (under study)

Source: BMI

In 2009 Vietnam had no oil refining capacity and was a net exporter of crude oil while refined products imports were in excess of 270,000b/d. Vietnam's first refinery, the US$2.5bn Dung Quat complex, is scheduled to commence operations in Q209, refining 130,000b/d to produce diesel, gasoline, jet fuel, LPG and propylene. In January 2008, Vietnam announced that it intends to maintain exports of its own crude oil and rely on lower-quality imported crude to supply the Dung Quat facility.

Vietnam's central Phu Yen Province has licensed a joint venture (JV) of UK-based **Techno Star Management** (51%) and Russia's **Telloil** (49%) to build an 80,000b/d plant in Dong Hoa district. If the US$1.7bn Vung Ro project goes ahead, it will become the first wholly foreign owned refinery in Vietnam. An official from the Phu Yen Planning and Investment Department said the Vung Ro oil refinery should become operational in 2012.

A Singaporean company is apparently planning to build an oil refinery complex with investment of US$1.2bn the central Phu Yen province. Under a Memorandum of Understanding (MoU) signed between the **SP Chemicals Company** and the provincial People's Committee on March 30 2008, the refinery with annual capacity of 30,000b/d is expected to come into operation in 2012.

According to reports in early 2009, **Methanex** was considering Vietnam as a location in the oil and gas producing province of Ba Ria Vung Tau for a methanol complex. The units would have 1.6mn tpa

methanol production capacity, representing a quarter of Methanex's total. However, amid the global economic downturn, the plans appeared to have been put on hold.

In April 2009 Siam Cement announced that it was delaying a petrochemical joint venture with PetroVietnam indefinitely due to the economic downturn. The US$3.77bn project was to be delayed by two years to 2015, but the joint venture partners warned that it could be postponed until 2018 if there was no medium-term improvement in the economy and financing continued to be a problem. The **Long Son Petrochemical Company** project was to include a naphtha cracker that would produce 1.65mn tpa of olefins, a chlor-alkali plant with combined capacity of 280,000tpa, 400,000tpa vinyl chloride monomer and 1.45mn tpa of polyolefins. However, in November 2009, Siam Cement, Qatar Petroleum, PetroVietnam and Vinachem signed an agreement to build a US$3.5-4.0bn petrochemical complex in Vietnam. PetroVietnam and Vinachem will hold 29% stake in the project to be located at Long Son Island near Ho Chi Min City, and the remaining 71% stake will be held by SCG, QP and a trading firm. QP will provide feedstock for the project, reports add.

In May 2009, SP Chemicals cancelled plans to build a US$1.5bn petrochemical complex in Vietnam, citing unfavourable market and economic conditions. The complex would have been built at Hoa Tam and was to have featured a naphtha cracker with capacity for 800,000tpa of ethylene. The Vietnamese government had approved the project in 2007 and it was due to come online in early 2014. The Chinese government's stimulus plan has made redundant the company's plan to feed its downstream plant in Jiangsu province from Vietnam as feedstock supply from within China is expected to exceed demand over the next 10 years. SP Chemicals may not find it feasible to invest in Phu Yen to produce intermediate products to be shipped to China, as they would be readily available in China.

The other major petrochemicals development is the Nghi Son Petrochemical Refinery Complex which is set to be built in the Nghi Son Economic Zone, in Thanh Hoa Province. Groundwork began in May 2008 with major construction work due to start in April 2010 and completion by end-2013. The US$5.8-6.2bn complex includes 200,000b/d of crude refining capacity, feeding downstream plants with capacities of 150,000tpa propylene, 150,000tpa benzene, 480,000tpa paraxylene and 150,000tpa PP. Combined aromatics capacity at the Nghi Son complex will be 980,000tpa and will supply Mitsui Chemical's operations in Indonesia, Singapore and Thailand. The project is a JV between PetroVietnam (25.1%), **Kuwait Petroleum International** (KPI) (35.1%) and the Japanese companies **Idemitsu Kosan Corp** (IKC) (35.1%) and **Mitsui Chemicals Inc** (MCI) (4.7%), which was agreed in April 2008. The Japan Bank for International Co-operation (JBIC) is providing a loan for 70% of the project's initial capital.

In November 2009, PetroVietnam commenced propylene shipments from its newly commissioned oil refinery at Dung Quat. The 140,000b/d refinery was commissioned in early 2009, but it suffered a broken valve in a fluid catalytic cracker. The refinery is also designed to produce 150,000tpa of propylene, which

PetroVietnam plans to sell to Marubeni until PetroVietnam builds a 150,000tpa polypropylene facility at the site, under a contract signed in 2008.

In September 2009, Taiwan's Formosa Heavy Industries received an approval from the government to build a US$12.47bn petrochemical and oil refinery project in Vung Ang Economic Zone. The project is to have capacity of 300,000b/d of oil and 16mn tpa of petrochemicals. No further details have been provided. The company is constructing a US$7.9bn steel project in the same zone.

Business Environment

Asia Petrochemicals Business Environment Ratings

With little domestic petrochemicals activity, Vietnam is at the bottom of **BMI**'s Asia Petrochemicals Business Environment Rankings with 31.1 points, down 5.4 points since 2009. The deterioration in the country's score is related to the cancellation and postponement of petrochemicals projects as well as negative risk associated with long-term external and financial factors. There is no likelihood of a significant increase in the country's score and it is likely to remain at the bottom of the league until world-scale complexes come online. Risk factors also need to improve, particularly in relation to most areas of the economy and the government's regulation of downstream industries.

Table: Asia Pacific Petrochemicals Business Environment Ratings

	Limits of potential returns			Risks to realisation of returns				
Country	Petrochemicals market	Country structure	*Limits*	Market risks	Country risk	*Risks*	Petrochemicals rating	Rank
Japan	76.7	90.1	*81.4*	80.0	76.6	*80.2*	80.2	1
South Korea	80.0	76.6	*78.8*	65.0	77.0	*73.4*	77.5	2
Singapore	60.0	90.8	*70.8*	90.0	82.9	*85.0*	75.0	3
China	86.7	65.6	*79.3*	55.0	66.3	*62.9*	74.4	4
Taiwan	70.0	76.6	*72.3*	65.0	73.3	*70.8*	71.9	5
Malaysia	53.3	68.8	*56.6*	80.0	72.0	*74.4*	63.4	6=
Thailand	66.7	59.6	*58.7*	80.0	72.0	*74.4*	63.4	6=
Australia	40.0	90.7	*57.7*	75.0	70.0	*71.5*	61.9	8
India	73.3	38.1	*61.0*	70.0	55.6	*59.9*	60.7	9
Indonesia	46.7	39.8	*44.3*	50.0	46.7	*47.7*	45.3	10
Philippines	30.0	51.2	*37.4*	75.0	51.5	*58.5*	43.7	11
Vietnam	**10.0**	**44.5**	***22.1***	**60.0**	**48.6**	***52.0***	**31.1**	**12**

Scores out of 100, with 100 highest. Source: BMI

Limits Of Potential Returns

Petrochemicals Market

The development of a competitive petrochemicals sector is likely to spur further growth in the petroleum sector as well as generate additional revenue for the country. The present capacities of petrochemicals facilities are very low; the government is inviting private investment to develop the petroleum and

petrochemicals sector. In a bid to attract investments and boost the economy, the government is setting up industrial complexes and improving infrastructure. However, Vietnam is starting from a low base and it will take until 2013 at the least for it to become a world-scale petrochemicals producer. In this category, Vietnam scores just 10.0 points, down 10.0 points since 2009 due to the delay in the Long Son petrochemicals complex.

Country Structure

The government is supportive of trade and is taking measures to increase trade. Financial infrastructure is underdeveloped and investments are needed to turn it into a world-class support system for trade and industry. Bureaucracy, corruption and red tape are rampant, leading to delays in existing projects and hindrances in new projects. The state of infrastructure in Vietnam is improving as it transforms into an attractive destination for foreign investors. Vietnam scores 44.5 points in this category.

Risks To Realisation Of Returns

Market Risks

In an attempt to increase private investment in the sector and limit PetroVietnam's role as a dominant player, the government is looking to privatise parts of the state-owned company. The regulations are favourable to foreign investors, but are sometimes overruled by political interests. Vietnam scores 60.0 points in this category.

Country Risk

The Communist Party of Vietnam is expected to maintain a strong grip on the country. Vietnam has, to a certain extent, been able to overcome poverty, which has plagued it for long, and as of now poverty levels are lower than those of China, India and the Philippines. The authorities have regulated monetary and fiscal policies to stem high inflation. But a major area of concern is the impending current account deficit that may arise due to the rising import demand, fuelled by rising affluence among customers. In order to solve this problem, the state has been trying to produce more competitive, export-driven industries. The export of crude oil and electronics to countries such as Japan and the US has also added to the economic pace. However, this growth may be curtailed if expansion in Vietnam's biggest export market, the US, remains sluggish. In this category, Vietnam scores 48.6 points, due to deterioration in the country's long-term financial and external risk scores.

Vietnam's Business Environment Outlook

Vietnam's large and inexpensive workforce remains its largest attraction for foreign investors, although there is an increasing occurrence of foreign direct investment (FDI) projects aimed at tapping the country's growing consumer market. There is still a large degree of state intervention in the economy, but the government has been gradually moving towards a market economy since 1986, with World Trade

Organization (WTO) accession in 2007 being the greatest achievement so far. The country's decrepit infrastructure continues to be an impediment for many foreign investors, but we see this as a diminishing problem because the government is investing heavily in new roads, railways and ports.

Latest Developments

The Vietnamese government announced on January 21 that oil production taxes will go up by 2% with immediate effect. This raises the overall level to 10% for projects producing 20,000-50,000 barrels per day (b/d) and 6-8% for smaller fields. The slowdown of the country's manufacturing industry and the falling price of oil exports could force the government to resort to further industry taxation and may have a downside impact on our Business Environment Ratings. Considering that the industrial and petroleum sector accounts for 45% of the country's foreign investment, any loss of investor interest in Vietnam's oil industry could have serious long-term consequences.

The Vietnamese government agreed to the establishment of Industrial Relations Centres in mid-February 2009 in an effort to address labour disputes. Foreign investors have claimed that labour disputes are hindering business and thus impairing foreign direct investment inflows. The number of labour strikes in Vietnam has risen from 139 in 2003 to 649 in the first eight months of 2008, with the majority of strikes occurring at foreign-invested enterprises. The Industrial Relations Centre will aim to resolve differences regarding wage levels, excessive overtime hours, unpaid social insurance and other disputes between employers and employees.

Vietnam's President Nguyen Minh Triet received a delegation of Russian dignitaries in Hanoi on February 4 2009, stating his hopes that a cordial relationship between the two countries would bring tangible benefits in a wide range of sectors. Professor Vladimir Zaznobin from St. Petersburg University led a team of Russian scientists and entrepreneurs on a visit to Vietnam to gain a better understanding of the legal system and consider investment and development opportunities. President Triet visited Russia in October 2008 to sign a series of economic agreements with his Russian counterpart, Dmitry Medvedev, who predicted that annual bilateral trade with Vietnam would increase from US$1.0bn in 2007 to US$3.0bn in the coming years.

Vietnam's Ministry of Transport and Communications disclosed estimates that it will require close to US$60bn to 2020 to fund road infrastructure projects. The government is diverting many resources to the construction of roads - and especially expressways - but with weaker growth forecast for the next two years, efforts are rising to entice the private sector to fund the gap. Accordingly the Transport and Communications Ministry is reviewing a series of policies aimed at attracting more private investors, especially in the construction of new expressways.

A Vietnamese delegation led by Prime Minister Nguyen Tan Dung visited the United Arab Emirates on February 14, with companies from the two countries signing a number of important business deals. Two-way trade between Vietnam and the UAE has increased from US$67mn in 2003 to US$527mn in 2008 and UAE businesses are active in a number of construction projects in Vietnam. Government officials signed agreements on investment promotion and protection as well as the establishment of a joint committee to avoid double taxation of investors.

Philip Mayer, head of the EU team of delegates in negotiations for a free trade agreement (FTA) between the EU and ASEAN stated in February that the EU is now ready to negotiate bilaterally with individual ASEAN members, among them Vietnam, about the prospects of a bilateral FTA. This comes after FTA negotiations between ASEAN and the EU, now in their second year, have exposed limitations in the region-to-region approach, according to Mayer. EU countries exported more than US$7bn worth of goods to Vietnam in 2008 while importing US$10.6bn worth of Vietnamese goods, second only to Vietnamese exports to the US.

Foreign Investment Policy

Increased FDI is an integral part of Vietnam's ambitious economic expansion plans, and with ratings agencies pushing their grades higher, the country looks like a solid investment destination, especially for manufacturing. FDI in 2008 has been estimated at US$62bn more than triple the US$20.3bn recorded in 2007 and we believe it will remain at roughly the same level in 2008, in spite of the growing imbalances in the economy.

The rising levels of official development assistance (ODA), which hit a record of US$5.4bn for 2008, pledged by multilateral donors are also important, but have been outpaced by inflows from foreign private sources over the last five years. But, as the country tries to transform from a centralised to a more market-oriented economy, the investment framework is still poorly developed in many areas, with bureaucracy and a lack of transparency cited among major problems.

Despite ambitious targets for foreign investment as an important source of fuel for economic expansion plans, a number of barriers to investment remain. An opaque legal system, an inflexible financial system, corruption, a lack of regulatory transparency and consistency, a ponderous bureaucracy and complex land purchase rules are among areas criticised by foreign investors.

The government has been introducing and amending legislation in an effort to remedy these perceived shortcomings.

Key legislation includes:

- The Law on Foreign Investment (1989), which has been amended several times to make FDI more attractive.

- Government decree 24 of 2000, which carries a pledge to avoid expropriation and guarantees the right to repatriate profits. It also outlines the government's intention to treat private and state sectors equally.

- A revised bankruptcy law and a Law on Competition, both passed by the National Assembly in 2004, in a bid to improve the FDI climate. Fully-owned foreign banks are now allowed to compete on an equal footing with domestic banks.

- The Vietnamese legal code is currently in a state of flux and the authorities are drafting a unified legal framework for the conduct of business. A new Common Investment Law and a Unified Enterprise Law came into effect in July 2006, as did a new Intellectual Property Law designed to clarify the responsibility of government agencies charged with protecting IPRs, but doubts remain over the effectiveness of its implementation.

The main forms of foreign investment are:

- Joint venture (JV) agreements, under which foreign and domestic firms share capital and profits.

- Business Cooperation Contracts (BCC), which allow a foreign company to carry out business in cooperation with a Vietnamese firm through capital investment and revenue sharing, but without gaining right of establishment or ownership.

- Wholly Foreign-Owned Enterprises are becoming more common, especially those involving industrial production for export.

- Build-operate-transfer (BOT) agreements are the least common form of foreign direct investment, and have a reputation among foreign investors of providing regulatory and financing problems.

- Foreign portfolio investment is only permitted in small quantities, with aggregate foreign ownership of listed companies capped at 49%. Foreign ownership of banks is capped at 10% per investor, and 30% in aggregate. Moreover, many of the shares listed on the Ho Chi Minh City Stock Exchange (HSCE) are too illiquid to attract foreign investors.

- Investments in export processing zones (EPZs), industrial zones (IZ) and high-technology zones (HTZs) attract tax and other incentives, and offer a ready made operational infrastructure, which may be difficult to arrange outside.

EPZ investments carry 10-12% profit tax. The first established was the Tan Thuan zone near Ho Chi Minh City in 1991, where over a hundred manufacturers currently operate. A number of others have since been built, though they have not been as successful as hoped, partly because all produce from EPZs must be exported.

IZs are for use by firms in construction, manufacturing, processing or assembly of industrial products, often food processing and textiles production. IZ firms pay a 10% profit tax and get refunds if profits are reinvested. IZ firms may produce for the domestic market as well as the export market

Most FDI into Vietnam comes from North East Asia, notably Taiwan, South Korea, Japan and China/Hong Kong. Canada and the US are the largest non-Asian FDI sources. Leading sectors for FDI are manufacturing, other industry and oil and gas.

Foreign Trade Regime

Although high tariffs, customs bureaucracy and legal inadequacies have provided significant trade barriers, the opening up of Vietnam'' economy has been accompanied by concrete measures to meet the requirements of the WTO and other international trade organisations. Vietnam has committed to bound tariff rates (or legal ceilings) on most products ranging from zero to 35%. Reductions in most bound rates from 17.4% on average in 2007 to 13.6% are to be phased in gradually.

Vietnam became a member of the WTO in January 2007. A bilateral trade agreement with the US in effect since December 2001 has substantially lowered tariffs on US industrial and agricultural products, removed non-tariff barriers on US service providers and eliminated barriers to US exports in key areas such as pharmaceuticals and petroleum products.

Vietnam is a member of the Association of South East Asian Nations (ASEAN) - with Brunei, Philippines, Indonesia, Laos, Myanmar, Malaysia, Singapore, Thailand, and Cambodia - as well as the linked ASEAN Free Trade Area (AFTA). Vietnam is thus party to negotiations on free trade agreements (FTAs) being conducted by ASEAN, such as talks with the European Union, China, Australia and New Zealand.

Vietnam is, in addition, in, or preparing for, talks over FTAs with Chile and Japan.

Import tariffs are high by regional standards, averaging 16.8% in 2006 according to the WTO. Vietnam

will continue to dismantle tariffs in a bid to meet its WTO accession goals, although some key sectors remain protected.

Vietnam has agreed to comply with ASEAN's Common Effective Preferential Tariff (CEPT) scheme on manufactured goods within the ASEAN region, which calls for rates to be brought down to the 0%-5% range.

The legislation providing the framework for the trade regime is 1998's Law to Amend the Import and Export Tariffs Law. However, given the ASEAN and WTO requirements the tariff structure is in a constant state of flux at present. To reduce the rising costs of a range of products, Vietnam in October 2007 cut import tariffs by between 30% and 60% on many food and dairy products.

Industry Forecast Scenario

The global financial crisis and economic slowdown has dealt a severe blow to Vietnam's plans to expand its petrochemical industry. Concerns have mounted over the strength of the markets the new petrochemicals complexes were designed to serve, while joint venture partners have struggled to secure multi-billion dollar financing they need. Currently, the Vietnamese petrochemical industry is unable to satisfy domestic demand, let alone serve as a production base for China. By 2009, it had no cracker units and downstream units were relatively small with most capacity concentrated in PP and PVC production.

In 2009, PetroVietnam was constructing a petrochemical complex in the Dung Quat economic zone, which was due to come online in Q110 with capacity to produce 260,000tpa propylene feedstock for a 150,000tpa PP plant. The Nghi Son Refinery and Petrochemical complex is scheduled to come online in 2013 with capacities of 150,000tpa of propylene, benzene and PP each and 480,000tpa of paraxylene. Also due to come online is the Long Son Petrochemical complex with capacities of 1.1mn tpa of ethylene, 550,000tpa of propylene, 400,000tpa of VCM, 330,000tpa of PVC and 1.45mn tpa of polyolefins. However, the Long Son project, which is backed by Siam Cement and PetroVietnam, has been delayed by at least two years to 2015. SP Chemicals has also cancelled plans for a US$1.5bn complex, including a cracker with ethylene capacity of 800,000tpa, citing unfavourable market and economic conditions. The Nghi Son complex could go the same way, although by end-2009 the joint venture partners appeared to be still on board. It includes capacities of 150,000tpa of propylene, 150,000tpa of benzene, 480,000tpa of paraxylene and 150,000tpa of PP and is scheduled to come onstream in 2013.

Table: Vietnam's Petrochemicals Sector, 2007-2014

	2007	2008	2009f	2010f	2011f	2012f	2013f	2014f
Oil production, '000 b/d	340	390	400	400	390	390	385	na
Oil consumption, '000 b/d	298.1	327.9	354.1	375.4	397.9	421.8	447.1	na
Oil exports, '000 b/d	340	390	283	283	273	246	106	na
Gas production, bcm	7.7	10	12	15	17	20	22	na
Gas consumption, bcm	7.7	10	12	15	17	20	22	na
Oil refinery capacity, '000 b/d	0	0	130	130	130	160	310	na
PP capacity, '000 tpa	0	0	0	150	150	150	300	300
PVC capacity, '000 tpa	320	320	320	320	320	320	320	320

f = BMI forecast; na=not applicable/available. Source: Petrovietnam, BMI

The failure of petrochemicals projects has dealt a major blow to Vietnam's industrialisation efforts. The complexes would supply key industries in the country, notably the automotive and consumer goods packaging sectors, as well as exporting products to other South East Asian markets. The country's per capita plastic consumption is also set to grow fast as a result of strong economic growth. The other concern is the impact of increased Asian petrochemicals capacities over 2009 and 2010 on product prices, particularly in a climate of slackening demand growth.

Macroeconomic Outlook

Double Dip Now Our Core Scenario

With Vietnam's balance of payments yet again approaching breaking point, we expect a sharp tightening of fiscal and monetary policy in 2010, which will see real GDP growth dip to 4.4% from an expected 5.1% in 2009. This will raise criticism of economic policy at the 11th National Congress in January 2011, but we expect the market reform agenda to be maintained.

We have shifted our Vietnam growth outlook from expecting a gradual economic recovery in 2010 to a double-dip scenario with real GDP expansion dipping from an expected 5.1% in 2009 to 4.4% in 2010. This is based on our expectations that fiscal and monetary policy will have to be tightened sharply in early 2010 in order to rein in the widening trade deficit and halt inflationary pressures. Our outlook for Vietnam has much in common with that for China. However, while the policy aims of the respective governments are similar, we view the macroeconomic concerns in Vietnam as more alarming, at least in the short term, as Hanoi's fiscal and monetary resources are considerably more limited.

As a consequence, we find it likely that the inevitable shift towards tighter monetary and fiscal policy will come earlier in Vietnam than in China. Indeed, while Hanoi's fiscal and monetary stimulus has helped economic growth recover from a low of 3.1% y-o-y in Q109 to 5.2% in Q309, it has also been a key factor, in our view, behind a considerable widening of the trade deficit over the same period to US$1.9bn in October. While the return to positive growth in G3 markets in H209 and 2010 should give some support to Vietnamese exports, we believe a continuation of the current accommodative policy would lead to a further widening of the trade deficit.

With Vietnam's foreign exchange reserves in Q409 estimated to be below the three months of imports seen as a minimum, we believe drastic policy action will be needed to avoid a balance-of-payments crisis. This will include:

- A downward adjustment of the dong towards our VND19,000/US$ end-2009 forecast, from VND17,862/US$ on November 6 2009, to stem the outflow of US dollars through the trade channel.

- A hiking of policy rates to uphold public confidence in the dong, stem capital outflows, and contain upward pressure on inflation through higher import prices. We are now expecting 500bps of hikes in 2010, bringing the Vietnam base rate from 7.00% in November 2009 to 12.00%.

- A reduction of the fiscal deficit from VND118trn (US$6.6bn), or 7.2% of GDP, to VND105trn (US$5.9bn), or 5.7% of GDP, in 2010 on the back of reductions in both current and capital expenditure growth.

Implications for Growth

We expect the fiscal and monetary tightening to lead to a double dip in growth after the tentative rebound seen in the last three quarters of 2009. We are expecting real GDP growth to come in at 4.4% in 2010, as weak growth in G3 markets will weigh on exports and prevent a marked improvement in net exports in spite of the devaluation of the dong.

This will mean that the slowdown in domestic demand will be harder felt. With inflation expected to average roughly 9.0% in 2010, we expect government consumption to decrease by 3.5% in real terms, which will shave 0.3 percentage points (pp) off headline growth. A more marked effect will be coming from a slowdown in private consumption growth as credit conditions are tightened. We expect private consumption growth (in real terms) to slow to 2.3% from an expected 4.9% in 2009 and 9.2% in 2008. This should see the contribution to growth from private consumption decrease to 1.6pp in 2010 from 3.3pp in 2009 and a massive 6.0pp in 2008.

We are, on the other hand, expecting an increase in the contribution from gross fixed capital formation from 0.4pp to 1.1pp as FDI disbursements, down 12.1% y-o-y to US$8bn in January-October 2009, recover and state-and aid-financed projects gather pace. However, the precarious state of the property market, where activity and prices have been supported by the loan-subsidy programme, is a risk to this forecast. While only a minority of property purchases is financed through bank lending, higher interest rates should still have an impact on the market and on commercial and residential construction.

Policy Rebalancing Needed At 2011 Party Congress

We expect the slowdown in growth in 2009 and 2010 to make economic policy the main matter of debate during the Communist Party of Vietnam (CPV)'s 11th National Congress scheduled for January 2011. The macroeconomic rollercoaster ride experienced in recent years has raised criticism against Prime Minister Nguyen Tan Dung, the most important proponent of economic reform, from more conservative members in the Politburo. We believe the mainstay of the CPV is still behind Nguyen's reform agenda, meaning that there will be no drastic shift in the socio-economic development strategy for 2011-2016.

However, we expect measures to be taken to achieve greater macroeconomic stability, including a reduction of official growth targets, a shift in monetary policy towards inflation targeting and increased

exchange rate flexibility. This is likely to come at a cost to economic growth in the short term, and we are consequently forecasting real GDP growth of 5.5% and 6.0% in 2011 and 2012, respectively, as the global economic environment is expected to be less conducive than in the 2003-2007 boom years. A failure to take a decision on rebalancing economic policy would, on the other hand, mean a high risk of a continuation of macroeconomic volatility as expressed in Vietnam's score of 43.8 out of 100 in our short-term economic risk ratings.

Table: Vietnam – Economic Activity 2007-2014

	2007	2008e	2009f	2010f	2011f	2012f	2013f	2014f
Nominal GDP, VNDbn [1]	1,144,015	1,478,695	1,628,770	1,825,075	2,053,255	2,288,455	2,562,686	2,855,653
– US$bn [1]	71.1	89.8	85.7	96.1	108.1	123.7	138.5	154.4
Real GDP growth, % change y-o-y [1]	8.5	6.2	5.1	4.4	5.5	6.0	6.8	6.9
GDP per capita, US$ [1]	835	1035	974	1077	1195	1350	1492	1640
Population, mn[2]	85.6	86.8	88.0	89.2	90.4	91.6	92.8	94.1
Industrial production index, % y-o-y, average [3]	16.7	14.9	6.8	10.0	12.0	14.0	14.0	14.0
Unemployment, % of labour force, end of period [3]	4.6	5.0	5.5	5.5	5.0	4.5	4.0	4.0

e/f = BMI estimate/forecast. Source: [1] IMF (General Statistics Office); [2] IMF; [3] General Statistics Office.

Company Monitor

PetroVietnam

The state company is on Vietnam's privatisation list, although timing is uncertain and the nature of the process has yet to be defined. An industry partner as a strategic investor would be good for PetroVietnam, but there is just as likely to be an IPO for financial investors. Meanwhile, the company is partnering major international oil companies (IOCs) in upstream projects and should shortly begin its first major downstream ventures with the two refinery schemes. Investment demands are high and the state group's financial resources are being stretched by the heavy demands for cash, but it has been able to arrange financing on acceptable terms.

PetroVietnam is responsible for oil and gas exploration and production (E&P), storage, processing, transportation, distribution and related services. The company operates alone or in partnership with IOCs under joint operating company (JOC) contracts, similar to a PSC, in which a Vietnamese legal entity acts as an agent on behalf of the contracting parties, with each party contributing staff to the operating company. However, the state firm said in October 2004 that it would offer IOCs the chance to operate through PSCs, enabling foreign investors to take over sole operatorship of a field. The Vietsovpetro JV accounts for the bulk of the country's crude production, operating Blocks 09-1 and 05-2, site of the White Tiger, Dragon and Dai Hung fields.

PetroVietnam was placed under the control of the Industry Ministry in June 2003, following construction delays with the Dung Quat oil refinery and the exit of its Russian partner Zarubezhneft in December 2002.

The firm appears to be slowly undergoing privatisation. Rumours of a privatisation have been circulating for some time but it is unclear as to how this would come about. Recent auctions of various subsidiaries suggest the company aims to selectively privatise its assets, keeping the strongest profit generators under state-control while oil prices and profit margins remain so high.

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Key Statistics

- Revenues (Nine months ended September 30 2007): VND143trn (US$8.8bn)
- No of employees: 19,000
- Year established: 1975

Key Personnel

- Chairman: Dinh La Thang
- President & CEO: Dr Tran Ngoc Canh
- Executive Vice President: Nguyen Dang Lieu
- Executive Vice President: Hoang Van Hoan
- Executive Vice President: Tran Hien

Latest Developments

PetroVietnam sought government approval in September 2008 to sell part of Vietnam's first oil refinery to foreign investors. The company has been talking to several companies, such as India's Essar Oil, Royal Dutch Shell, Russian oil firms Zarubezhneft and Rosneft, over selling an undisclosed number of shares in the US$2.5bn state-owned refinery, which is due onstream in February 2009.

Vietnam's first refinery is being built at Dung Quat, in Quang Ngai province, 850km south of Hanoi. A consortium comprising France's Technip, Japan's JGC and Spain's Technicas Reunidas is building Dung Quat, which is expected to begin operations in early 2009. Downstream units have propylene capacity of 260,000tpa and PP capacity of 150,000tpa.

Vietnam is also seeking foreign investors to help build its second crude oil refinery. PetroVietnam is sending a delegation of senior officials to the US in order to gauge potential investment interest, with talks to be held in Houston, Texas. IOCs will be permitted to own at least 70% of the new refinery, a significant shift from the country's previous stance. The new Nghi Son refinery project, to include a petrochemicals facility, will cost an estimated US$3bn, with start-up targeted for 2010 – which means partners must be lined up quickly. Media reports suggest that Vietnam is looking at companies based in the US, Japan and Russia. According to PetroVietnam officials, Mitsubishi and Idemitsu Kosan have separately expressed interest in a partnership with PetroVietnam.

To be located about 200km south of Hanoi in Thanh Hoa province, the Nghi Son refinery is expected to have a processing capacity of 140,000b/d. It will be processing crude imported from the Middle East, and its petroleum and chemical products will be sold domestically. Similarly for the 130,000b/d Dung Quat refinery, 20,000b/d of crude will be imported from the Middle East, while PetroVietnam will supply the remaining feedstock. The feasibility study conducted by PetroVietnam suggests that the project has a break-even period of 12-15 years.

PetroVietnam is also part of a US$3.5-4.0bn joint venture proposal with Thailand’s Siam Cement Group (SCG) subsidiaries Vina SCG Chemicals (VSCG Chem) and Thai Plastic and Chemicals (TPC), and Vietnam National Chemical Corporation (Vinachem). In August 2008, the Industrial Zones Authority issued an investment license for the

establishment of the Long Son Petrochemical Company joint venture, which will construct and operate the Southern Vietnam Petrochemical Complex project at the Long Son Petroleum Industrial Zone. The complex would consist of a naphtha cracker with capacity for 1.65mn tpa of olefins and a chlor-alkali plant with capacity of 280,000tpa, as well as plants with capacity for 1.45mn tpa of polyolefins, 330,000tpa of ethylene dichloride and 400,000tpa of vinyl chloride monomer. The chlor-alkali, EDC, and VCM plants are scheduled to come online in 2011 and the cracker and polyolefin units are set to start up in 2013.

The other major petrochemicals development is the Nghi Son Petrochemical Refinery Complex which is set to be built in the Nghi Son Economic Zone, in Thanh Hoa Province. Groundwork began in May 2008 with major construction work due to start in April 2010 and completion by end-2013. The US$5.8-6.2bn complex includes 200,000b/d of crude refining capacity, feeding downstream plants with capacities of 150,000tpa propylene, 150,000tpa benzene, 480,000tpa paraxylene and 150,000tpa PP. Combined aromatics capacity at the Nghi Son complex will be 980,000tpa and will supply Mitsui Chemical's operations in Indonesia, Singapore and Thailand. The project is a joint venture between PetroVietnam (25.1%), Kuwait Petroleum International (KPI) (35.1%) and the Japanese companies Idemitsu Kosan Corp (IKC) (35.1%) and Mitsui Chemicals Inc (MCI) (4.7%), which was agreed in April 2008. The Japan Bank for International Co-operation (JBIC) is providing a loan for 70% of the project's initial capital. In July 2008, the UK's Foster Wheeler Energy announced that it had been awarded the FEED contract for the complex. The FEED work is expected to be concluded by end-2009.

Vinachem

Vinachem (Vietnam) is a national chemicals holding company operating 42 subsidiaries. Its main chemicals products are fertilisers, rubber products, basic chemicals, pesticides, detergents, paints and plastics, petrochemicals and industrial gases.

Subsidiaries include Microbiological Chemicals Industry, which produces paints, glues, thinners and pesticides; Vietnam Pesticide; Bien Dien Fertilisers, which produces mixed nitrogen, phosphorus and potassium (NPK) fertilisers; Southern Basic Chemicals, which supplies basic organic chemicals including caustic soda, hydrochloric acid, phosphoric acid and liquid chlorine; and Paints and Plastics, which manufactures paints, heavy duty coatings, PP and PE bags (from imported PP and PE), PVC pipes and other plastics and packaging products.

Vinachem also operates 12 JVs with foreign companies including ICI Paints Vietnam, in which the firm owns a 30% stake through Microbiological Chemicals Industry and which has a paints production capacity of 9mn litres per annum. Others include Procter and Gamble Vietnam, a JV with household products multinational Procter and Gamble producing detergents, toilet soaps, shampoo and toothpaste, and in which Vinachem has a 7% stake; and TPC Vina Plastic and Chemicals, a JV between Vinachem (15%), Vietnam Plastic (15%) and TPC, which has a PVC production capacity of 80,000tpa.

Financial Highlights And Future Plans

Ha Bac Fertiliser and Chemical Co was officially established as a one-member limited liability company in Bac Giang city, with a total chartered capital of VND352bn (US$22mn).

Vietnam will restructure affiliates under Vinachem and sell more shares in eight of its equitised firms to raise funds for its projects from 2007 to 2010. Vinachem is likely to equitise the Van Dien Phosphate Fertilizer Co and the Lam Thao Super Phosphate and Chemical Co. In 2008, Vinachem will equitise Binh Dien and Mien Nam (Southern) fertiliser companies, transforming them into holding companies. Between 2009 and 2010, it will restructure welding technology companies, Vietnam Apatite Co. and Ha Bac Fertilizer Co. Vinachem will set up two joint stock companies, DAP and Chemical Finance Co, with majority stakes.

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- Web: www.vinachem.com.vn

Key Statistics

- Total revenue (H106): VND6.9trn (US$430.92mn)
- Year established: 1995

Key Personnel

- Chairman: Do Quang Chieu
- President and CEO: Dr Do Duy Phi

Petronas

Malaysia's state energy group has a lot to gain from its involvement in Vietnam. The two countries are close neighbours, share similar geology and upstream prospects, and have the potential for close co-operation in oil and gas supply. Petronas has therefore built a string of businesses ranging from upstream oil to petrochemicals that cements its relationship with PetroVietnam and makes it a preferred partner for new energy initiatives. Vietnam could become one of the most important elements of the Petronas international strategy.

Malaysian state-owned energy concern Petronas has a 50% interest in Phu My Plastics & Chemicals, which operates a 100,000tpa PVC plant. Other shareholders in the plant are PetroVietnam Gas (43%) and Tramatsuco (7%). Petronas also operates JVs that import, store, bottle, distribute and market liquid petroleum gas in Vietnam. It also holds interests in oil blocks and oil exploration projects in the country.

In June 2008, Petronas launched its LPG bottling plant in Dong Nai Province, Vietnam, which was acquired from ExxonMobil (Unique) Vietnam Co. Ltd. in September 2005. The plant, Petronas' second LPG facility in Vietnam, marks its entry into the country's southern LPG retail market. Petronas also operates the Thang Long LPG JV in collaboration with PetroVietnam that imports, stores, bottles, distributes and markets LPG in Vietnam.

Also in June 2008 Petronas announced a JV with PetroVietnam for oil and gas exploration off Vietnam's northern coast. The two oil firms will invest nearly US$58mn in a drilling campaign at block 103 and block 107, about 100km off the country's northern coast. Petronas has a 45% stake in the project while PetroVietnam's exploration arm, PVEP, holds the remaining 55%. Another PetroVietnam and Petronas JV announced an oil discovery at a block off Vietnam's southern coast. Tests at that block, coded 02/97, showed an oil flow of 4,700b/d, indicating the commercial value of the field.

In April 2006 Petronas, together with its JV partner Chevron, was awarded a deepwater exploration block offshore Vietnam, the company's first deepwater acreage in the country. The PSC for Block 122 was signed in Hanoi. Block 122 covers an area of about 6,981sq km in Vietnam's Phu Khanh Basin, and is located in water depths of between 50m and 2,500m. Under the terms of the PSC, equal partners

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Key Statistics

- Year established: 1991

Petronas and Chevron commit to acquire, process and interpret 3,000km of 2D seismic data, reprocess 2,000km of seismic data and drill one exploratory well in the Block during the first three of the PSC's seven-year exploration period. Chevron is the operator of the Block. The partners expect to complete their proposed work programme for the Block within the PSC's first three years, after which they will decide whether to proceed with the remaining phases of the exploration period. The latest PSC marks an important milestone for Petronas in its exploration activities in Vietnam, particularly in the deepwater area. Apart from Block 122, Petronas has interests in six other blocks in Vietnam. Petronas operates one of the six blocks, while the remaining five are under joint operation with various partners.

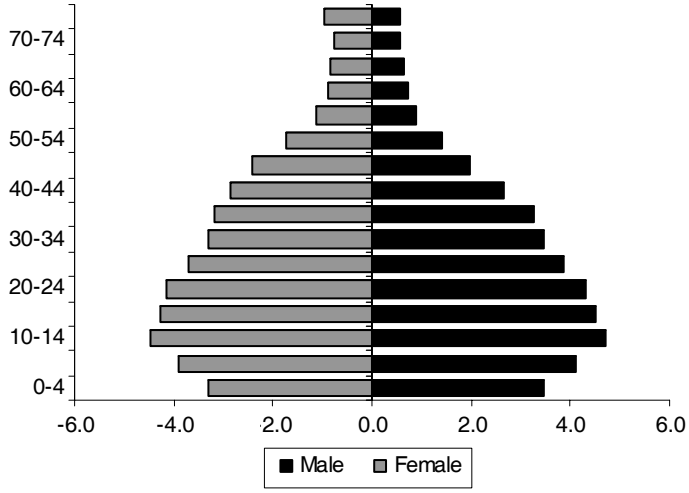
Assets include offshore Blocks 1 and 2, which contain the Ruby, Emerald and Topaz field, with the Ruby field starting up production in late 1998. The company's other producing field is Cai Nuoc in Block 46, which is operated by Canada's Talisman Energy. Exploration interests include stakes in Blocks 10, 11.1, 01/97, 02/97 and 46/02.

In addition, the Malaysian group has a 50% interest in the Phu My Plastics & Chemical Company Ltd, which operates a 100,000 tpa PVC plant. Other shareholders in the plant are PetroVietnam Gas Co (43%) and Tramatsuco (7%).

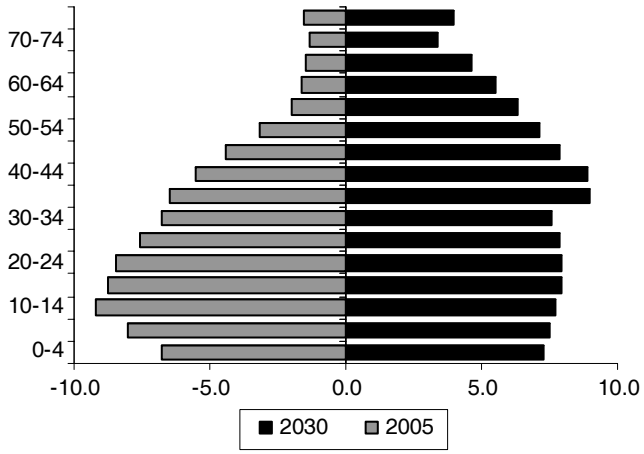
Country Snapshot: Vietnam Demographic Data

Section 1: Population

Population By Age, 2005 (mn)



Population By Age, 2005 And 2030 (mn, total)



Source: UN Population Division

Table: Demographic Indicators, 2005-2030

	2005	2010f	2020f	2030f
Dependent population, % of total	34.1	29.9	30.4	31.2
Dependent population, total, '000	28,318	26,225	30,950	34,499
Active population, % of total	65.8	70.0	69.5	68.7
Active population, total, '000	54,650	61,263	70,706	75,927
Youth population*, % of total	28.8	25.0	23.4	20.3
Youth population*, total, '000	23,972	21,887	23,807	22,508
Pensionable population, % of total	5.2	4.9	7.0	10.8
Pensionable population, total, '000	4,346	4,338	7,143	11,991

*f = forecast. * Youth = under 15. Source: UN Population Division*

Table: Rural/Urban Breakdown, 2005-2030

	2005	2010f	2020f	2030f
Urban population, % of total	26.7	29.4	34.7	41.8
Rural population, % of total	73.3	70.6	65.3	58.2
Urban population, total, '000	22,509	26,395	35230	46,123
Rural population, total, '000	61,729	63,323	66426	64,306
Total population, '000	84,238	89,718	101,656	110,429

f = forecast. Source: UN Population Division

Section 2: Education And Healthcare

Table: Education, 2002-2005

	2002/03	2004/05
Gross enrolment, primary	98	93
Gross enrolment, secondary	73	75
Gross enrolment, tertiary	10	16
Adult literacy, male, %	na	93.9
Adult literacy, female, %	na	86.9

Gross enrolment is the number of pupils enrolled in a given level of education regardless of age expressed as a percentage of the population in the theoretical age group for that level of education. na = not available. Source: UNESCO

Table: Vital Statistics, 2005-2030

	2005	2010f	2020f	2030f
Life expectancy at birth, males (years)	68.4	69.9	74.2	75.8
Life expectancy at birth, females (years)	72.4	73.9	78.4	80.0

Life expectancy estimated at 2005. f = forecast. Source: UNESCO

Section 3: Labour Market And Spending Power

Table: Employment Indicators, 1999-2004

	1999	2000	2001	2002	2003	2004
Employment, '000	38,120	38,368	39,000	40,162	41,176	42,316
– % change y-o-y	3.1	0.6	1.6	2.9	2.5	2.7
– male	19,029	19,292	19,744	20,356	20,959	21,649
– female	19,091	19,076	19,257	19,807	20,217	20,666
— female, % of total	50.0	49.7	49.3	49.3	49.1	48.8
Unemployment, '000	909	886	1,107	871	949	926
– male	439	468	458	398	402	410
– female	470	418	650	473	547	517
– unemployment rate, %	2.3	2.2	2.7	2.1	2.2	2.1

Source: ILO

Table: Consumer Expenditure, 2000-2012 (US$)

	2000	2007e	2008e	2009f	2010f	2012f
Consumer expenditure per capita	110	265	301	368	386	427
Poorest 20%, expenditure per capita	49	119	136	166	174	192
Richest 20%, expenditure per capita	243	587	668	815	855	946
Richest 10%, expenditure per capita	316	763	868	1,060	1,112	1,230
Middle 60%, expenditure per capita	85	206	235	286	301	332
Purchasing power parity						
Consumer expenditure per capita	556	1,196	1,297	na	na	na
Poorest 20%, expenditure per capita	250	538	583	na	na	na
Richest 20%, expenditure per capita	1,231	2,649	2,872	na	na	na
Richest 10%, expenditure per capita	1,600	3,444	3,734	na	na	na
Middle 60%, expenditure per capita	433	931	1,009	na	na	na

e/f = BMI estimate/forecast. na = not available. Source: World Bank, Country data; BMI

Methodology

How We Generate Our Industry Forecasts

BMI's industry forecasts are generated using the best-practice techniques of time-series modelling. The precise form of time-series model we use varies from industry to industry, in each case being determined, as per standard practice, by the prevailing features of the industry data being examined. For example, data for some industries may be particularly prone to seasonality, meaning seasonal trends. In other industries, there may be pronounced non-linearity, whereby large recessions, for example, may occur more frequently than cyclical booms.

Our approach varies from industry to industry. Common to our analysis of every industry, however, is the use of vector autoregressions. Vector autoregressions allow us to forecast a variable using more than the variable's own history as explanatory information. For example, when forecasting oil prices, we can include information about oil consumption, supply and capacity.

When forecasting for some of our industry sub-component variables, however, using a variable's own history is often the most desirable method of analysis. Such single-variable analysis is called univariate modelling. We use the most common and versatile form of univariate models: the autoregressive moving average model (ARMA). In some cases, ARMA techniques are inappropriate because there is insufficient historic data or data quality is poor. In such cases, we use either traditional decomposition methods or smoothing methods as a basis for analysis and forecasting.

It must be remembered that human intervention plays a necessary and desirable part of all our industry forecasting techniques. Intimate knowledge of the data and industry ensures we spot structural breaks, anomalous data, turning points and seasonal features where a purely mechanical forecasting process would not.

Chemicals And Petrochemicals Industry

Plant Capacity

The ability of a country to produce basic chemical products depends on domestic plant capacity. The number and size of ethylene crackers determines both a country's likely output, and also its relative efficiency as a producer. We therefore examine:

- Stated year-end capacity for key petrochemicals products, mainly ethylene, but also propylene, polypropylene, polyethylene and so forth. Government, company and third-party sources are used;

- Specific company and/or government capacity expansion projects aimed at increasing the number and/or size of crackers and downstream processing facilities.

Chemicals Supply

A mixture of methods is used to generate supply forecasts, applied as appropriate to each individual country:

- Basic plant capacity and historic utilisation rates. Unless a company imports chemicals products for domestic re-sale, supply is expected to be governed by production capacity;
- Underlying economic growth trends. The chemicals industry is highly cyclical. Strong domestic or regional demand should be met by increased supply and higher plant utilisation rates;
- Third-party projections from national and international industry trade associations.

Chemicals Demand

Various methods are used to generate demand forecasts, applied as appropriate to each individual country:

- Underlying economic growth trends. The chemicals industry is highly cyclical. Strong domestic or regional demand is expected to require larger volumes of either domestically produced or imported olefins (ethylene, propylene), polyolefins (PE, PP) or downstream products;
- Trends in end-user industries. Strong demand for motor vehicles, construction materials, packaging products and pharmaceuticals imply rising demand for basic chemicals;
- Government/industry projections;
- Third-party forecasts from national and international industry trade associations etc.

Cross Checks

Whenever possible, we compare government and/or third party agency projections with the reported spending and capacity expansion plans of the companies operating in each individual country. Where there are discrepancies, we use company-specific data, such as physical spending patterns ultimately determine capacity and supply capability. Similarly, we compare capacity expansion plans and demand projections to check the chemicals balance of each country. Where the data suggest imports or exports, we check that necessary capacity exists or that the required investment in infrastructure is taking place.

Business Environment Ratings

BMI's Petrochemicals Business Environment Rating has three objectives. First, we have defined the risks rated in order to accurately capture the operational dangers to companies operating in this industry globally. Second, we have, where possible, identified objective indicators. Finally, we have used **BMI**'s proprietary Country Risk Ratings (CRR) in a nuanced manner in order to ensure that only the aspects most relevant to the industry have been included. Overall, the ratings system – which integrates with those of all industries covered by **BMI** – offers an industry-leading insight into the prospects/risks for companies across the globe.

Conceptually, the ratings system divides into two distinct areas, with the indicators included in each area stated below:

Limits Of Potential Returns

Evaluation of sector's size and growth potential in each state, and also broader industry/state characteristics that may inhibit its development.

Risks To Realisation Of Returns

Evaluation of industry-specific dangers and those emanating from the state's political/economic profile that call into question the likelihood of anticipated returns being realised over the assessed time period.

Indicators

The following indicators have been used. Overall, the rating uses three subjectively measured indicators, and 41separate indicators/datasets.

Table: Petrochemicals Business Environment Indicators And Rationale

Limits to potential returns	Rationale
Market structure	
Cracker capacity, current year	Objective measure of sector size
Cracker capacity, 2011	Forecast of sector development
Downstream capacity, current year	Objective measure of domestic demand
Country structure	
Financial infrastructure	Rating from BMI's Country Risk Rating (CRR) to denote ease of obtaining investment finance. Poor availability of finance will hinder company operations across the economy
Trade bureaucracy	Rating from CRR. Low trade restrictions are essential for this export-based industry
Physical infrastructure	Rating from CRR. Given size of manufacturing units, sector development requires strong supporting power/water/transport infrastructure

Risks to potential returns	
Market risk	
Industry regulatory environment	Subjective evaluation against BMI-defined criteria. This indicator evaluates predictability of operating environment
Country risk	
Structure of economy	Rating from CRR, to denote health of underlying economic structure, including 7 indicators such as volatility of growth; reliance on commodity imports, reliance on single sector for exports
Long-term external economic risk	Rating from CRR, to denote vulnerability to external shock – principal cause of economic crises
Long-term external financial risk	Rating from CRR, to denote vulnerability of currency/stability of financial sector
Institutions	Subjective rating from CRR, to denote strength of bureaucracy and legal framework. Also evaluates level of corruption
Long-term political risk	Rating from CRR, to denote strength of political environment

Source: BMI

Weighting

Given the number of indicators/datasets used, it would be wholly inappropriate to give all sub-components equal weight. Consequently, the following weight has been adopted.

Table: Weighting Of Indicators

Component	Weighting
Limits of potential returns	70%, of which
Petrochemicals market	65%
Country structure	35%
Risks to realisation of returns	30%, of which
Market risk	30%
Country risk	70%

Source: BMI