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INCLUDES BMI'S FORECASTS

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Executive Summary

The latest Vietnam Oil & Gas Report from **BMI** forecasts that the country will account for 1.56% of Asia Pacific regional oil demand by 2015, while providing 4.13% of supply. Regional oil use of 21.42mn barrels per day (b/d) in 2001 reached an estimated 27.28mn b/d in 2010 and will rise to around 30.80mn b/d by 2015. Regional oil production was around 8.35mn b/d in 2001, and averaged an estimated 8.82mn b/d in 2010. It is set to increase slightly to 8.85mn b/d by 2015. Oil imports are growing rapidly, because demand growth is outstripping the pace of supply expansion. In 2001, the region was importing an average 13.07mn b/d. This total rose to an estimated 18.46mn b/d in 2010 and is forecast to reach 21.96mn b/d by 2015. The principal importers will be China, Japan, India and South Korea. By 2015 the only net exporter will be Malaysia.

In terms of natural gas, in 2010 the region consumed 493bn cubic metres (bcm), and demand of 647bcm is targeted for 2015. Production of an estimated 412bcm in 2010 should reach 548bcm in 2015, implying net imports rising from around 81bcm to 99bcm. This is thanks to many Asian gas producers being major exporters. Vietnam's estimated share of gas consumption in 2010 was an estimated 1.8%, while its share of production is put at 2.16%. By 2015, its share of gas consumption is forecast to be 2.78%, with the country accounting for 4.01% of supply.

Preliminary data suggest that the 2010 full year outturn was US$77.38 per barrel (bbl) for OPEC crude, which is expected to have delivered North Sea Brent and West Texas Intermediate (WTI) averages of around US$79.40/bbl. The **BMI** price target of US$77 was reached thanks to the early onset of particularly cold weather, which drove up demand for and the price of heating oil during the closing weeks of the year. The oil market is now in a bullish mood, in spite of the economic uncertainty facing the world in 2011.

Global GDP growth in 2011 should exceed 3%, but is unlikely to match the level seen in 2010. Slower economic expansion in China and Japan is set to undermine a potentially unchanged rate of growth in the US and eurozone. Oil prices seldom reflect underlying macroeconomic trends, but the case for surging energy demand and spiralling fuel costs is far from convincing. Ample oil inventories and increasing OPEC supply are likely to keep the price of crude in check – and we are sticking with our forecast of an average US$80/bbl for the OPEC basket.

Vietnamese real GDP growth in 2010 is assumed by **BMI** to have been 6.7%, with a forecast average annual 6.5% increase in 2011-2015. Exploration success has been on the rise in Vietnam, with a growing number of international oil companies (IOCs) teaming up with **PetroVietnam** and finding and developing hydrocarbon resources – particularly gas. We are assuming that oil and gas liquids production will have been 355,000b/d in 2010, peaking at 390,000b/d in 2011/12, before easing back to 365,000b/d by 2015. Beyond 2009, consumption is forecast to increase by around 5-7% per annum to 2015, implying demand

of 480,000b/d by the end of the forecast period. Gas production is forecast to increase from the estimated 2010 figure of 8.9bcm to 22.0bcm by 2015 – providing the basis for exports.

Between 2010 and 2020, we are forecasting a decline in Vietnamese oil production of 12.7%, with crude volumes peaking at 390,000b/d in 2011/12, before slipping to 310,000b/d by 2020. Oil consumption between 2010 and 2020 is set to increase by 78.1%, with growth beyond 2009 ranging from 5-7% per annum and the country using 652,000 b/d by 2020. Gas production is expected to rise from an estimated 8.9bcm in 2010 to 25.0bcm in 2020. With 215% demand growth, we see potential for exports midway through the period to turn into modest imports by the end of the period. Details of **BMI**'s 10-year forecasts which provide regional and country-specific projections can be found at the end of this report.

Vietnam now shares third place with China in **BMI**'s composite Business Environment (BE) league table, which reflects largely its strong upstream position. The country holds third place, behind India, in **BMI**'s updated upstream Business Environment ratings, with its ranking reflecting a reasonable resource position, better-than-average growth outlook, attractive licensing terms and an IOC-friendly competitive environment. There is a four-point gap between Vietnam and fourth-placed Papua New Guinea, and we believe Vietnam is safe from any near-term challenges. Vietnam shares ninth place with Pakistan in **BMI**'s downstream Business Environment ratings, reflecting its modest (but growing) refining capacity, above-average oil and gas demand growth outlook, and low level of retail site intensity.

SWOT Analysis

Vietnam Political SWOT	
Strengths	▪ The Communist Party government appears committed to market-oriented reforms, although specific economic policies will undoubtedly be discussed at the 2011 National Congress. The one-party system is generally conducive to short-term political stability. ▪ Relations with the US are generally improving, and Washington sees Hanoi as a potential geopolitical ally in South East Asia.
Weaknesses	▪ Corruption among government officials poses a major threat to the legitimacy of the ruling Communist Party. ▪ There is increasing (albeit still limited) public dissatisfaction with the leadership's tight control over political 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 within the one-party system.
Threats	▪ The slowdown in growth in 2009 and 2010 is likely to weigh on public acceptance of the one-party system, and street demonstrations to protest economic conditions could develop into a full-on challenge of undemocractic rule. ▪ Although strong domestic control will ensure little change to Vietnam's political scene in the next few years, over the longer term the one-party-state will probably be unsustainable. ▪ Relations with China have deteriorated over the past year as a result of 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, which could potentially cause wide-scale environmental damage.

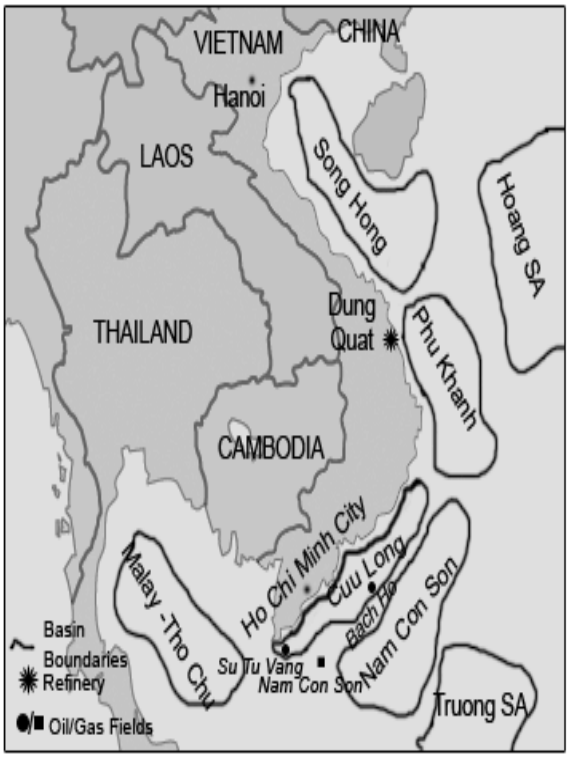
Vietnam Economic SWOT	
Strengths	▪ Vietnam has been one of the fastest-growing economies in Asia in recent years, with GDP growth averaging 7.6% annually between 2000 and 2009. ▪ The economic boom has lifted many Vietnamese out of poverty, with the official poverty rate in the country falling from 58% 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 continued 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 the 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	▪ Vietnam has a large, skilled and low-cost workforce, which has made the country attractive to foreign investors. ▪ Vietnam's location – its proximity to China and South East Asia, and its good sea links – makes it a good base for foreign companies to export to the rest of Asia and beyond. ▪ Proven natural gas reserves are estimated at 682bcm, but we see scope for a rise to an estimated 690bcm.
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. ▪ Vietnam remains one of the world's most corrupt countries. Its score in Transparency International's 2010 Corruption Perceptions Index was 2.7, placing it 22nd in the Asia Pacific region. ▪ Net crude oil exports peaked at 427,000b/d in 2004, and could turn into an import requirement of 121,000b/d in 2015, as new refineries come on stream.
Opportunities	▪ Vietnam is increasingly attracting investment from key Asian economies, such as Japan, South Korea and Taiwan. This offers the possibility of the transfer of high-tech skills and know-how. ▪ Vietnam is pressing ahead with the privatisation of state-owned enterprises (SOEs) and the liberalisation of the banking sector. This should offer foreign investors new entry points. ▪ Vietnam's first refinery, the US$2.5bn Dung Quat complex, started operations in Q109. Dung Quat will process at least 140,000b/d of locally produced and imported crude, producing diesel, gasoline, jet fuel, liquefied petroleum gas (LPG) and propylene. ▪ Amendments to Vietnam's Petroleum Law in 2000 paved the way for a more open and transparent licensing round scheme through which E&P projects would be offered to international investors.
Threats	▪ Ongoing trade disputes with the US, and the general threat of American protectionism, which 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. ▪ The cost of refinery projects is exceeding original forecasts.

Vietnam Energy Market Overview

According to the BP Statistical Review of World Energy, June 2010, Vietnam's proven oil reserves are 4.50bn bbl. The annual Oil & Gas Journal (OGJ) survey takes a much more cautious approach, suggesting just 600mn bbl of proven reserves at end-2010. Oil and liquids production is believed to have recovered to an estimated 355,000b/d in 2010. The offshore Nam Con Son and Cuu Long basins provide the bulk of the oil from about a dozen fields. Vietnam is a net exporter of crude oil. The country's first oil refinery became operational in Q109. Until the start-up, refined products imports had been in excess of 270,000b/d, with Singapore a major supplier of fuels to the country. Natural gas production is around 8.9bcm, building up steadily as domestic demand rises and infrastructure is established.

Vietnam's first refinery, the US$2.5bn Dung Quat complex, commenced operations in Q109. Dung Quat is processing at least 140,000b/d of locally produced and imported crude, producing diesel, gasoline, jet fuel, liquefied petroleum gas (LPG) and propylene. A large share of the flagship Bach Ho oil field's output has now been diverted to the new refinery.



However, low levels of demand for the plant's output in 2010 led to the refinery operating well below design capacity. Deputy Minister Nguyen Cam Tu in September 2010 said that only nine out of 11 Vietnamese fuel suppliers had bought products produced by the refinery in 2010, accounting for just 30-40% of its capacity. **Petrolimex**, the largest national fuel distributor, had been expected to buy 28% of Dung Quat's output, but had only bought 19%.

The government has earmarked Petrolimex for sale as part of its renewed privatisation drive. Without specifying a timeframe, Prime Minister Nguyen Tan Dung said that the state was to reduce its holding in Petrolimex to 75% to help balance the country's budget, local business newspaper Thoi Bao Kinh Te Vietnam reported.

Partial privatisation of Petrolimex, which controls more than 60% of the Vietnamese fuels market through its 6,000-plus network of petrol stations, can be seen as part of the wider liberalisation of the country's downstream segment.

Under government proposals announced in July 2009, Deputy Trade Minister Nguyen Cam Tu said that private Vietnamese companies would be allowed to import and sell refined products as long as they have adequate storage facilities and terminals. In addition, the draft measure permits oil product distributors to change pump prices by up to 7% if world crude prices rise by more than 12%, although the state would still intervene in the event of abnormal changes in world prices. Given the ongoing liberalisation of the Vietnamese downstream sector, these benefits may soon be made available to foreign private companies as well.

For Vietnam, oil will have accounted for an estimated 20.4% of 2010 primary energy demand (PED), followed by gas at 8.5%, coal at 18.6% and hydro-power with 4.3%. Direct burning of wood and waste materials contributes a further 48.5% to overall energy consumption. Regional energy demand is forecast to reach 5,496mn toe by 2015, representing 20.6% growth from the estimated 2010 level. Vietnam’s estimated 2010 energy market share of 1.84% is set to rise to 2.19% by 2015.

Transport is the biggest user of energy in the country, accounting for 38% of PED. Industry comes a close second with a 36% share. Other categories of consumer take the remaining 26% of energy. Energy demand has been rising steadily, by up to 13% per annum since the beginning of the last decade. Steel, construction materials manufacturing, pulp and paper, and fertiliser manufacturing are the sectors that consume the most energy. Road transportation makes up about 80% of total energy consumption in the transportation sector. The remaining 20% is used in marine/river ways, railway and air transportation.

Our projections suggest that, by 2015, Vietnam will be dependent on gas for 11% of PED. Direct burning of wood and waste should contribute 47% of energy consumed, with the share of oil down to 17%. Coal, at this point, should have a 21% market share, while hydro should have maintained its share to 4%.

Electricity generation in Vietnam is largely based on hydro, gas and coal. Hydro provides 43% and gas 34% of generated electricity. Coal accounts for 21% of generation, with oil claiming 3% of the power pie.

At the end of 2010, **BMI** calculations suggest that installed capacity will have risen to 16.5GW. In 2010, Vietnam will have generated an estimated 94TWh and consumed an estimated 90TWh of electricity. System losses and power industry usage are believed to have accounted for around 16.5TWh. Vietnam’s thermal generation in 2010 will have been an estimated 53.5TWh, or 0.87% of the regional total. By 2015, the country is expected to account for 1.15% of regional thermal generation.

Vietnam's Ministry of Industry and Trade (MoIT) has ordered local government to tighten investment in hydro-power plants. The MoIT has issued a directive to drop ineffective projects and projects that harm the country's environment. The ministry will review more than 800 small and medium sized hydro-power projects. The country currently has 1,021 hydro-power projects, with a combined capacity of 24.25GW, over 36 provinces and cities.

Vietnam has 150mn tonnes of coal, mostly anthracite. Production has increased dramatically in recent years (to 45mn tonnes in 2009), resulting in higher exports (primarily to Japan) and an increase in coal stockpiles. According to **BMI** calculations, electricity generating capacity at the end of 2010 will have reached at least 16.5 gigawatts (GW).

Global Oil Market Update

Chilling Out

BMI in September 2010 revised its oil price assumption for the year to US$77/bbl for the OPEC basket. Preliminary data suggest that the full-year outturn was US$77.38/bbl, which is expected to have delivered North Sea Brent and WTI averages of around US$79.40/bbl. Our price target was reached thanks to the early onset of particularly cold weather, which drove up demand for heating oil during the closing weeks of the year. The oil market is now in a bullish mood, in spite of the economic uncertainty facing the world in 2011.

Global GDP growth in 2011 should exceed 3%, but is unlikely to match the level seen in 2010. Slower economic expansion in China and Japan is set to undermine a potentially unchanged rate of growth in the US and eurozone. Oil prices seldom reflect underlying macroeconomic trends, but the case for surging energy demand and spiralling fuel costs is far from convincing. Ample oil inventories and increasing OPEC supply are likely to keep the price of crude in check – and we are sticking with our forecast of an average of US$80/bbl for the OPEC basket.

Some forecasters are more positive about prospects, with a few now warning of a US$100/bbl world. Although crude prices could well breach US$100/bbl in 2011, this should prove short-lived and could have damaging consequences for fuel use. Weather factors may continue to provide useful support in the first quarter, but this is unlikely to trigger a stock drawdown capable of maintaining the longer-term strength of distillate prices. US inventories as at December 24 2010 stood at 339.4mn bbl, or around 7.6% above the five-year seasonal norm, according to the US Department of Energy (DoE).

Table: Crude Price Assumptions 2011

	Q111e	Q211e	Q311e	Q411e	2011f
Brent (US$/bbl)	83.99	78.99	78.81	86.49	82.07
Urals – Med (US$/bbl)	83.01	77.57	77.45	86.28	81.08
WTI (US$/bbl)	86.68	78.47	77.98	85.13	82.06
OPEC basket (US$/bbl)	83.10	77.27	75.63	84.00	80.00
Dubai (US$/bbl)	82.63	75.75	75.50	83.26	79.28

e/f = estimate/forecast. Source: BMI.

The OPEC basket price peaked on Christmas Eve at almost US$91/bbl, dropped back to around US$89 as the year ended, but then rallied in the first few days of the new year. A 27-month high for international crude prices was reached in the first week of 2011 thanks to low temperatures and high expectations of demand later in the year.

Hedge funds and other investment groups have been backing a sustained rise in crude prices, with net long positions increasing by almost 5% during the last week of December 2010, according to the Commodity Futures Trading Commission (CFTC). This was apparently the biggest total recorded since June 2006. Net long positions have almost trebled since May 2010.

The US-based Energy Information Administration (EIA) said in its December 2010 monthly report that it expects the price of WTI crude oil to average about US$84/bbl in the winter period (October-March), a y-o-y gain of US$6. By the end of 2011, the EIA believes WTI will have reached US$89/bbl. The 2011 average will therefore be around US$86/bbl, compared with the **BMI** assumption of just over US$82/bbl. A number of investment banks are now assuming WTI averaging at least US$90/bbl during the year, based on a strengthening US and global economy and only limited supply growth.

The scope for oil consumption growth in 2011 will be relatively limited when compared with the recovery seen in 2010. Demand growth that looks to have reached 2.5% in 2010 could slow to just 1.4% this year. This is a similar view to that of the Paris-based International Energy Agency (IEA), which in December predicted a slowing of oil demand growth from 2.9% in 2010 to 1.5% in 2011. OPEC's last monthly report of 2010 also predicted oil demand increasing by just 1.4% in 2011.

Table: Global Oil Consumption (000b/d)

	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Africa	3,710	3,753	3,814	3,906	4,003	4,132	4,264	4,405
Middle East	6,864	7,146	7,404	7,698	7,973	8,230	8,442	8,699
NW Europe	13,545	12,964	13,021	13,051	13,097	13,204	13,197	13,177
N America	21,785	20,881	21,255	21,190	21,227	21,341	21,454	21,567
Asia/Pacific	25,994	26,343	27,277	27,852	28,530	29,298	30,057	30,803
Central/Eastern Europe	6,121	5,792	6,046	6,209	6,332	6,500	6,705	6,877
Latin America	7,724	7,631	7,770	7,865	8,017	8,174	8,322	8,455
Total	85,744	84,510	86,586	87,771	89,180	90,879	92,441	93,983
OECD	43,399	41,509	41,991	41,801	41,784	41,965	42,080	42,198
Non-OECD	42,345	43,001	44,594	45,970	47,396	48,914	50,361	51,785
Demand growth %	(0.32)	(1.44)	2.46	1.37	1.60	1.91	1.72	1.67
OECD %	(3.55)	(4.35)	1.16	(0.45)	(0.04)	0.43	0.27	0.28
Non-OECD %	3.23	1.55	3.71	3.08	3.10	3.20	2.96	2.83

e/f = estimate/forecast. Sources: Historical data, BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Higher fuel prices will result from the underlying crude price gains, removal of subsidies in high-growth regions and the inexorable rise in state taxation in parts of the developed world. As in 2008, this could trigger so-called 'demand destruction', which will be exacerbated by a widespread move towards fuel-efficient cars. A sustained increase in pump prices can only mean a weaker demand trend, even if the economy proves robust.

Once again, the pressure is off as far as OPEC is concerned. Worries in the third quarter of 2010 that overproduction would undermine prices have been swept aside. Talk of greater quota compliance has been forgotten and there is very little chance of a shift in 2011 output policy. Volumes can be expected to edge higher, which, with some non-OPEC supply growth, means little material change in the overall supply/demand balance and inventory positions.

Table: Global Oil Production (000b/d)

	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Africa	10,190	9,671	10,177	10,519	10,801	11,164	11,566	12,080
Middle East	26,229	24,406	24,956	25,221	25,553	25,966	26,576	27,240
NW Europe	4,912	4,657	4,438	4,288	4,040	3,833	3,693	3,503
N America	11,668	11,912	12,135	12,440	12,670	13,050	13,490	14,050
Asia/Pacific	8,689	8,568	8,817	9,000	9,085	9,174	9,029	8,847
Central/Eastern Europe	13,045	13,417	13,818	14,129	14,126	14,346	14,684	15,075
Latin America	9,857	9,749	10,019	10,171	10,227	10,603	11,139	11,681
OPEC NGL adjustment	4,600	4,660	5,260	5,870	5,969	6,111	6,303	6,555
Processing gains	2,084	2,290	2,200	2,230	2,275	2,320	2,366	2,414
Total	91,274	89,331	91,820	93,869	94,746	96,568	98,848	101,446
OPEC	35,568	33,076	33,994	34,429	35,007	35,845	36,971	38,445
OPEC inc NGLs	40,168	37,736	39,254	40,299	40,976	41,956	43,274	44,999
Non-OPEC	51,106	51,595	52,566	53,569	53,770	54,612	55,573	56,447
Supply growth %	1.55	(2.13)	2.79	2.23	0.93	1.92	2.36	2.63
OPEC %	3.15	(6.05)	4.02	2.66	1.68	2.39	3.14	3.99
Non-OPEC %	0.33	0.96	1.88	1.91	0.37	1.57	1.76	1.57

e/f = estimate/forecast. Sources: Historical data, BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

BMI is assuming greater price volatility in 2011, thanks to oscillating macroeconomic data, shifting investor sentiment and the impact of higher fuel costs on consumers. The market can support further price improvement, but a y-o-y gain of nearer 3-4% seems to us more likely than the 15%-plus seen last year – and predicted by some for 2011.

Table: Oil Price Forecasts To 2015

	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Brent (US$/bbl)	96.99	61.51	79.41	82.07	87.20	92.33	92.33	92.33
Urals – Med (US$/bbl)	94.49	61.04	78.45	81.08	86.15	91.22	91.22	91.22
WTI (US$/bbl)	99.56	61.68	79.34	82.06	87.19	92.32	92.32	92.32
OPEC basket (US$/bbl)	94.08	60.86	77.38	80.00	85.00	90.00	90.00	90.00
Dubai (US$/bbl)	93.56	61.69	78.11	79.28	84.24	89.19	89.19	89.19

e/f = estimate/forecast. All forecasts: BMI.

Table: Oil Product Price Forecasts To 2015

	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Gasoline								
Rotterdam Premium Unleaded	100.12	70.60	88.86	91.88	97.62	103.37	103.37	103.37
NY Harbour Unleaded	102.54	69.70	87.44	90.43	96.08	101.73	101.73	101.73
Singapore Premium Unleaded	102.64	70.21	88.26	89.69	95.30	100.91	100.91	100.91
Global average	101.77	70.17	88.18	90.67	96.33	102.00	102.00	102.00
Jet/Kerosene								
Rotterdam	126.61	70.81	90.95	93.97	99.85	105.72	105.72	105.72
NY Harbour	127.13	71.18	91.28	94.36	100.26	106.15	106.15	106.15
Singapore	121.11	69.99	90.02	91.40	97.11	102.82	102.82	102.82
Global average	124.95	70.66	90.75	93.24	99.07	104.90	104.90	104.90
Gasoil								
Rotterdam	122.62	68.74	88.98	91.92	97.67	103.41	103.41	103.41
Mediterranean	121.75	69.13	89.15	92.10	97.86	103.61	103.61	103.61
Singapore	119.53	69.01	89.26	90.64	96.30	101.97	101.97	101.97
Global average	121.30	68.96	89.13	91.55	97.27	103.00	103.00	103.00

e/f = estimate/forecast. Sources: 2000-2006 historical data: EIA. 2007-2009 historical data: IEA/OPEC. Forecasts: BMI.

Regional Energy Market Overview

Thanks to the rapid growth of China and India, the Asia Pacific region is highly significant in terms of oil and gas consumption. It has a rapidly expanding refining and petrochemicals system and is a key importer of LNG. The region features a number of important oil and gas producers but volumes are under pressure, resulting in rising imports.

Oil Supply And Demand

The Asia Pacific region remains critical in terms of the world oil demand outlook, given the lethargic nature of the OECD states. The role of China and India in particular is more significant than ever, and will continue to exert great influence over pricing trends. A major overhaul of Chinese and Indian fuel pricing and taxation may lead to a markedly different pattern of oil consumption in the region, although it is too early to assess the impact. Rising crude prices in 2010 tested the resolve of governments and their commitment to free market energy pricing.

Our estimates suggest 9.32mn b/d of Chinese oil consumption in 2010, up from 8.63mn b/d in the previous year. For 2011, the **BMI** demand forecast is 9.77mn b/d, representing an increase of 4.8%. We believe risk is on the upside, unless higher fuels pricing or government efforts to slow macroeconomic growth result in a more cautious approach to oil use.

We now see China's oil consumption rising to 11.48mn b/d by 2015, implying growth in 2010-2015 of 23.22%. By 2020, we are assuming demand of 13.31mn b/d. For the Asia Pacific region as a whole, we expect to see estimated demand of 27.28mn b/d in 2010 rise further to 27.85mn b/d in 2011, before reaching 30.80mn b/d in 2015. Of that increase, China accounts for around 58%. India is another major contributor to the robust trend. We are forecasting consumption rising from an estimated 3.27mn b/d in 2010 to 4.01mn b/d in 2015. Japan is now expected to see a 6.3% market contraction between 2010 and 2015 as a result of economic stagnation and energy-efficiency initiatives.

Supply trends in the region are unlikely to impress, although China's domestic production has tended to surprise on the upside. None of the key Asia Pacific producers has the ability to raise output appreciably, while some are faced with declining volumes and increased imports. For 2010, the region will have delivered an estimated 8.82mn b/d. From here, we head only modestly higher before a plateau is reached, with 9.17mn b/d forecast for 2013. By 2015, we expect the region to be pumping no more than 8.85mn b/d. An output decline is forecast in Indonesia (-10.8%). Thailand is expected to register a 16% volume decline, while India should deliver a useful 2010-2015 gain (13.5%). For the region as a whole, the estimated import requirement of 18.46mn b/d in 2010 is set to rise to 21.96mn b/d in 2015.

Table: Asia Pacific Oil Consumption (000b/d)

Country	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Australia	936	941	946	955	965	970	974	979
China	8,086	8,625	9,315	9,765	10,204	10,664	11,090	11,478
Hong Kong	294	286	293	305	314	322	328	335
India	3,071	3,183	3,265	3,365	3,533	3,710	3,858	4,013
Indonesia	1,314	1,344	1,364	1,398	1,433	1,462	1,491	1,521
Japan	4,846	4,396	4,400	4,250	4,150	4,100	4,100	4,125
Malaysia	476	468	485	505	515	525	536	547
Pakistan	389	414	418	429	437	446	455	464
Papua New Guinea	31	31	32	34	35	37	39	41
Philippines	265	265	270	278	287	297	307	316
Singapore	968	1,002	1,022	1,053	1,084	1,117	1,150	1,185
South Korea	2,287	2,327	2,370	2,355	2,345	2,350	2,355	2,350
Taiwan	1,037	1,014	1,024	1,045	1,066	1,087	1,109	1,131
Thailand	962	975	980	1,000	1,020	1,040	1,061	1,082
Vietnam	**334**	**345**	**366**	**384**	**403**	**427**	**453**	**480**
BMI universe	25,296	25,616	26,550	27,120	27,792	28,553	29,307	30,047
other Asia/Pacific	698	727	727	733	739	744	750	756
Regional total	25,994	26,343	27,277	27,852	28,530	29,298	30,057	30,803

e/f = estimate/forecast. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Regional oil use of 21.42mn b/d in 2001 will have reached an estimated 27.28mn b/d in 2010, then rises to around 30.80mn b/d by 2015. Vietnam will have accounted for an estimated 1.34% of 2010 regional consumption, with its market share expected to grow to 1.56% in 2015.

Table: Asia Pacific Oil Production (000b/d)

Country	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Australia	556	559	530	575	615	640	610	595
China	3,901	3,790	3,990	4,100	4,075	4,100	3,990	3,910
India	768	754	815	845	905	925	940	925
Indonesia	1,031	1,021	1,031	1,005	995	980	965	920
Japan	6	6	6	6	5	5	4	4
Malaysia	768	740	712	665	680	725	750	743
Pakistan	68	75	73	76	78	75	68	65
Papua New Guinea	38	38	32	33	36	35	34	32
Philippines	57	60	55	60	65	70	67	63
Singapore	na	na	na	na	na	na	na	na
South Korea	na	na	na	na	na	na	na	na
Taiwan	1	1	1	1	1	1	1	1
Thailand	321	330	345	355	335	318	302	287
Vietnam	**317**	**345**	**355**	**390**	**390**	**385**	**372**	**365**
BMI universe	7,794	7,681	7,913	8,077	8,144	8,224	8,068	7,877
other Asia/Pacific	896	887	905	923	941	951	960	970
Regional total	8,689	8,568	8,817	9,000	9,085	9,174	9,029	8,847

e/f = estimate/forecast; na = not applicable. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Regional oil production was around 8.35mn b/d in 2001, and will have averaged an estimated 8.82mn b/d in 2010. It is set to increase slightly to 8.85mn b/d by 2015. Vietnam in 2010 will have contributed an estimated 4.03% to regional oil; supply, with a market share of 4.13% forecast in 2015.

Oil imports are growing rapidly, because demand growth is outstripping the pace of supply expansion. In 2001, the region was importing an average 13.07mn b/d. This total will have risen to an estimated 18.46mn b/d in 2010, and is forecast to reach 21.96mn b/d by 2015. The principal importers will be China, Japan, India and South Korea. By 2015 the only net exporter will be Malaysia.

Oil: Downstream

Table: Asia Pacific Oil Refining Capacity (000b/d)

Country	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Australia	734	734	734	734	734	734	734	734
China	7,812	8,635	8,795	9,045	9,345	9,595	9,895	10,145
Hong Kong	na	na	na	na	na	na	na	na
India	2,992	3,574	4,000	4,180	4,180	4,180	4,180	4,540
Indonesia	1,068	1,106	1,106	1,406	1,406	1,406	1,556	1,856
Japan	4,650	4,621	4,621	4,621	4,500	4,350	4,350	3,950
Malaysia	515	524	550	550	550	550	720	720
Pakistan	286	286	286	400	400	400	650	650
Papua New Guinea	33	33	33	33	33	33	33	33
Philippines	273	265	265	265	265	265	265	465
Singapore	1,385	1,385	1,385	1,385	1,385	1,385	1,400	1,400
South Korea	2,712	2,712	2,712	2,712	2,850	2,850	2,850	2,850
Taiwan	1,197	1,197	1,197	1,197	1,197	1,309	1,309	1,309
Thailand	1,175	1,240	1,240	1,240	1,240	1,240	1,240	1,240
Vietnam	**na**	**140**	**140**	**140**	**140**	**140**	**340**	**540**
BMI universe	24,831	26,452	27,064	27,908	28,225	28,437	29,522	30,432
other Asia Pacific	438	438	438	438	438	438	438	438
Regional total	25,269	26,889	27,502	28,346	28,663	28,875	29,960	30,870

e/f = estimate/forecast; na = not applicable. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Refining capacity for the region was 21.85mn b/d in 2001, rising steadily to an assumed 27.50mn b/d in 2010. China and India will account for the bulk of additional capacity growth, with the region's total capacity forecast to reach 30.87mn b/d by 2015, therefore implying little need for net imports of refined products. Vietnam in 2010 will have had an estimated 0.51% of regional refining capacity and its market share is set to rise to 1.75% by 2015.

Gas Supply And Demand

Table: Asia Pacific Gas Consumption (bcm)

Country	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Australia	25.5	25.7	27.0	27.8	28.6	29.5	30.4	31.1
China	81.3	88.7	97.6	101.0	110.0	118.3	130.0	140.0
Hong Kong	2.6	2.5	2.7	2.8	3.0	3.2	3.4	3.6
India	41.3	51.9	55.0	67.2	76.3	85.5	97.7	105.0
Indonesia	33.3	36.6	38.1	39.6	41.4	43.1	45.7	48.4
Japan	93.7	87.4	88.5	88.8	89.0	89.3	89.6	89.8
Malaysia	33.6	31.5	32.0	32.9	33.3	33.8	34.7	35.2
Pakistan	37.5	37.9	38.0	39.0	41.0	42.0	43.5	44.8
Papua New Guinea	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Philippines	3.3	3.3	4.4	4.4	4.5	4.8	5.3	5.7
Singapore	9.2	9.7	10.0	10.5	11.0	11.8	12.7	13.7
South Korea	35.7	33.8	38.7	40.7	42.8	44.8	44.8	46.8
Taiwan	11.6	11.3	11.6	12.0	12.5	13.0	13.5	13.8
Thailand	37.4	39.2	40.0	42.0	44.0	46.0	48.3	50.7
Vietnam	**7.9**	**8.0**	**8.9**	**9.7**	**10.6**	**14.0**	**16.0**	**18.0**
Regional total	454.0	467.8	492.5	518.6	548.3	579.2	615.7	646.9

e/f = estimate/forecast. Source Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Table: Asia Pacific Gas Production (bcm)

Country	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Australia	38.3	42.3	50.0	60.0	62.0	62.0	70.0	81.0
China	80.3	85.2	86.0	87.1	88.0	89.0	89.5	90.0
India	30.5	39.3	45.0	50.0	57.0	60.0	70.0	73.0
Indonesia	69.7	71.9	76.0	86.0	85.0	85.0	82.0	80.0
Malaysia	64.9	62.7	70.0	72.0	75.0	75.0	80.0	85.0
Pakistan	37.5	37.9	38.0	39.0	40.0	41.0	42.0	42.0
Papua New Guinea	0.2	0.2	0.2	0.2	0.2	8.0	20.0	36.0
Philippines	3.3	3.3	4.4	4.4	4.5	4.8	5.0	5.3
South Korea	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4
Taiwan	0.7	0.7	0.7	0.7	0.6	0.6	0.4	0.4
Thailand	28.8	30.9	32.0	34.0	34.0	34.0	33.0	33.0
Vietnam	**7.9**	**8.0**	**8.9**	**9.7**	**10.6**	**15.0**	**20.0**	**22.0**
Regional total	362.7	383.0	411.7	443.5	457.4	474.8	512.3	548.1

e/f = estimate/forecast. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

In terms of natural gas, in 2010 the region is expected to have consumed 493bcm and demand of 647bcm is targeted for 2015. Production of an estimated 412bcm in 2010 should reach 548bcm in 2015, implying net imports rising from around 81bcm to 99bcm. This is thanks to many Asian gas producers being major exporters. Vietnam's estimated share of gas consumption in 2010 will have been an estimated 1.80%, while its share of production is put at 2.16%. By 2015, its share of gas consumption is forecast to be 2.78%, with the country accounting for 4.01% of supply.

Liquefied Natural Gas

Table: Asia Pacific LNG Exports/(Imports) (bcm)

Country	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Australia	20.2	24.2	23.0	32.2	33.4	32.5	39.6	49.9
China	(4.4)	(7.6)	(10.0)	(10.0)	(16.0)	(16.0)	(16.0)	(20.0)
India	(10.8)	(12.6)	(10.0)	(17.2)	(19.3)	(25.5)	(27.7)	(32.0)
Indonesia	26.9	26.0	27.9	34.2	38.6	36.9	31.3	26.6
Japan	(92.1)	(85.9)	(85.0)	(85.5)	(86.0)	(86.3)	(86.9)	(87.3)
Malaysia	29.4	29.5	32.0	32.0	32.0	35.0	35.0	40.0
Pakistan	na	na	na	na	1.0	1.0	1.0	1.0
Papua New Guinea	na	na	na	na	na	7.8	19.8	35.8
Singapore	na	na	na	na	na	(4.0)	(4.0)	(4.0)
South Korea	(36.6)	(34.3)	(38.1)	(40.2)	(42.3)	(44.4)	(44.4)	(46.4)
Taiwan	(10.9)	(11.8)	(10.9)	(11.4)	(11.9)	(12.4)	(13.1)	(13.4)
Thailand	na	na	na	na	2.0	(6.0)	(7.0)	(7.0)
Regional total	(78.3)	(72.5)	(71.0)	(65.9)	(68.6)	(81.4)	(72.4)	(57.0)

e/f = estimate/forecast; na = not applicable. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

By 2015, the leading gas importers will be Japan, China, India, South Korea, with Indonesia, Malaysia, PNG and Australia the principal net gas exporters. Asia is a thriving market for LNG trade, thanks to the distances between suppliers and consumers making pipeline routes too costly. China is continuing to sign up LNG purchase deals, and will become a major player in the regional LNG market. India's LNG import plans are in disarray, but the country is expected to increase purchases over the medium- to long-term. Recent major domestic gas discoveries should increase the country's near-term gas self-sufficiency. PNG plans to begin delivering LNG from two schemes by 2013/14.

Business Environment Ratings

Asia Pacific Region

The regional Business Environment ratings incorporate several industry-specific elements and a more sophisticated approach to political and economic risk assessment. The scoring matrix is broken down into upstream and downstream segments, providing a more detailed analysis of the growth outlook and market conditions for both major elements of the oil and gas industry.

The Asia Pacific region comprises 15 countries, including all key OECD and non-OECD states. The strength of energy demand growth remains the main positive factor in the region, with oil and gas output growth potential only moderate. Oil demand growth for the period from 2010 to 2015 ranges from a negative 6.3% for Japan to a positive 52.3% in Papua New Guinea, with gas consumption rising between 1.5% and 108.3% across the region.

State involvement in the oil and gas industry is generally high and the regulatory framework relatively poor in comparison with other key regions. The political and economic environment varies, depending on market maturity. However, the overall trends in most areas are improving. Japan stands out as being particularly weak in terms of demand growth, while Indonesia suffers from supply growth deterioration and reserves decline. India and China remain the most important countries, and here we expect to see improvements all round in terms of the overall business environment.

Composite Scores

Composite business environment scores are calculated using the average of individual upstream and downstream ratings. As in the previous quarter, Australia and Taiwan occupy the top and bottom slots. The combined scores are 69 points and 27 points respectively, out of a possible 100. India is a potential longer-term challenger for first place, ahead of China and Vietnam, with an eight-point lead over both. All three have the long-term potential to catch the more mature Australia. At present, India has the edge with a score of 66 points, compared with China and Vietnam's 58 points. Vietnam is well placed to make further gains, as its small energy market develops rapidly. PNG and Malaysia are strong mid-field contenders, but there is little to choose between Pakistan, the Philippines, Japan and Indonesia. All should remain ahead of South Korea, Hong Kong and Taiwan at the foot of the table.

Table: Regional Composite Business Environment Rating

	Upstream Rating	Downstream Rating	Composite Rating	Rank
Australia	82	55	69	1
India	66	67	66	2
China	49	67	58	3=
Vietnam	**64**	**52**	**58**	**3=**
Papua New Guinea	60	48	54	5
Malaysia	58	49	53	6=
Philippines	55	51	53	6=
Japan	45	60	52	8=
Indonesia	49	55	52	8=
Pakistan	52	52	52	8=
Singapore	42	59	51	11
Thailand	46	54	50	12
South Korea	36	57	46	13=
Hong Kong	42	50	46	13=
Taiwan	17	38	27	15

Source: BMI. Scores are out of 100 for all categories, with 100 the highest.

Upstream Scores

While Australia and Taiwan are the best and worst performers in this segment, the overall pecking order is quite different from that for combined scores. India is again clear of Vietnam, with a lead of two points. Vietnam itself is four points clear of PNG, which has crept ahead of Malaysia. China is pulling away from Thailand and should ultimately challenge for a higher position. Thailand and Japan are closely matched, as are Indonesia and China – with both lagging Pakistan. The bottom half of the table continues to be dominated by the resource-poor countries, namely Korea, Singapore, Hong Kong and Taiwan.

Table: Regional Upstream Business Environment Rating

	Rewards			Risks				
	Industry Rewards	Country Rewards	Rewards	Industry Risks	Country Risks	Risks	Upstream Rating	Rank
Australia	70	100	78	100	82	94	82	1
India	71	55	67	65	55	62	66	2
Vietnam	**71**	**55**	**67**	**65**	**41**	**57**	**64**	**3**
Papua New Guinea	55	65	58	80	41	67	60	4
Malaysia	61	50	58	55	62	57	58	5
Philippines	55	45	53	65	49	59	55	6
Pakistan	40	70	48	75	38	62	52	7
Indonesia	48	45	47	60	47	56	49	8=
China	53	35	48	55	47	52	49	8=
Thailand	24	75	37	80	43	67	46	10
Japan	10	65	24	100	82	94	45	11
Singapore	10	55	21	100	75	91	42	12=
Hong Kong	10	55	21	100	74	91	42	12=
South Korea	13	25	16	90	69	83	36	14
Taiwan	10	10	10	10	77	33	17	15

Source: BMI. Scores are out of 100 for all categories, with 100 the highest. The Upstream BE Rating is the principal rating. It comprises two sub-ratings 'Rewards' and 'Risks', which have a 70% and 30% weighting respectively. In turn, the 'Rewards' Rating comprises Industry and Country Risks, which have a 75% and 25% weighting respectively. They are based on the oil and gas resource base/growth outlook and sector maturity (Upstream) and the broader industry competitive environment (Country). The 'Risks' rating comprises Market Risks and Country Risks, which have a 65% and 35% weighting respectively and are based on a subjective evaluation of licensing terms and liberalisation (Market) and the industry's broader Country Risk exposure (Country), which is based on BMI's proprietary Country Risk Ratings. The ratings structure is aligned across the 14 Industries for which BMI provides Business Environment Ratings methodology, and is designed to enable clients to consider each rating individually or as a composite, with the choice depending on their exposure to the industry in each particular state. For a list of the data/indicators used, please consult the appendix.

Vietnam Upstream Rating – Overview

Vietnam holds third place, behind India, in **BMI**'s updated upstream Business Environment ratings, with its ranking reflecting a reasonable resource position, better-than-average growth outlook, attractive licensing terms and an IOC-friendly competitive environment. There is a four-point gap between Vietnam and fourth-placed Papua New Guinea, and we believe Vietnam is safe from any near-term challenges.

Vietnam Upstream Rating – Rewards

Upstream Market: On the basis of upstream data alone, Vietnam is actually the equal most attractive state in the Asia Pacific region, above Australia and alongside India. A particularly high score is awarded for the gas output growth prospects, which are the second best in the region. The oil reserves-to-production (RPR) ratio is the region's highest, with the gas RPR not much less so.

Country Structure: Influencing Vietnam's equal second position alongside India in the Rewards section is its relatively attractive country rewards rating, where it has the equal sixth highest score (with Hong Kong, Singapore and India). The state has substantial ownership via PetroVietnam and licensing deals. However, the number of non-state operators in the upstream segment is above average for the region, with direct access for IOCs better than the regional norm.

Vietnam Upstream Rating – Risks

Industry Risks: Vietnam is ranked equal 11th in the Risks section of our ratings, alongside Malaysia. Its industry risks rating is equal ninth with India and the Philippines. In Vietnam's case, it is held back by the still significant state ownership of companies/assets.

Country Risks: Vietnam's broader country risks environment is a weak point, with the country ranked equal 13th, with PNG. The highest and only impressive score is for long-term policy continuity, but Vietnam has significantly lower scores for corruption and rule of law, while a lack of physical infrastructure provides further operational risks for private companies.

Downstream Scores

Not surprisingly, the less mature downstream oil and gas markets of regional heavyweights China and India lead to their domination of this segment, driven by strong demand growth, refining capacity expansion and potential to expand fuels retail infrastructure. China shares first place with India, but both are comfortably ahead of Japan and Singapore. Australia and Indonesia are closely matched, followed by Thailand. There is little to choose between Pakistan, the Philippines and Vietnam. Taiwan continues to occupy the bottom slot, well behind PNG and Malaysia.

Table: Regional Downstream Business Environment Rating

	Rewards			Risks				
	Industry Rewards	Country Rewards	Rewards	Industry Risks	Country Risks	Risks	Downstream Rating	Rank
China	72	74	73	45	67	54	67	1=
India	64	76	67	65	65	65	67	1=
Japan	40	66	47	100	77	91	60	3
Singapore	46	50	47	100	69	87	59	4
South Korea	37	66	44	100	69	88	57	5
Australia	33	62	41	100	73	89	55	6=
Indonesia	61	50	58	45	50	47	55	6=
Thailand	48	54	49	75	50	65	54	8
Pakistan	53	44	51	65	40	55	52	9=
Vietnam	**58**	**40**	**53**	**45**	**53**	**48**	**52**	**9=**
Philippines	43	52	46	70	58	65	51	11
Hong Kong	29	46	33	100	74	90	50	12
Malaysia	48	40	46	45	71	55	49	13
Papua New Guinea	40	42	41	75	51	65	48	14
Taiwan	39	28	36	20	72	41	38	15

Source: BMI. Scores are out of 100 for all categories, with 100 the highest. The Downstream BE Rating is the principal rating. It comprises two sub-ratings 'Rewards' and 'Risks', which have a 70% and 30% weighting respectively. In turn, the 'Rewards' Rating comprises Industry and Country Risks, which have a 75% and 25% weighting respectively. They are based on the downstream refining capacity/product growth outlook/import dependence (Downstream) and the broader socio-demographic and economic context (Country). The 'Risks' rating comprises Market Risks and Country Risks which have a 60% and 40% weighting respectively and are based on a subjective evaluation of regulation and liberalisation (Market) and the industry's broader Country Risk exposure (Country), which is based on BMI's proprietary Country Risk Ratings. The ratings structure is aligned across the 14 Industries for which BMI provides Business Environment Ratings methodology, and is designed to enable clients to consider each rating individually or as a composite, with the choice depending on their exposure to the industry in each particular state. For a list of the data/indicators used, please consult the appendix.

Vietnam Downstream Rating – Overview

Vietnam now shares ninth place with Pakistan in **BMI**'s downstream Business Environment ratings, reflecting its modest (but growing) refining capacity, above-average oil and gas demand growth outlook, and low level of retail site intensity.

Vietnam Downstream Rating – Rewards

Downstream Market: On the basis of downstream data alone, Vietnam actually ranks fourth in the region, behind Indonesia. This is a result of the country's region-leading scores for oil and gas demand growth, and the top score for retail site intensity. GDP per capita expansion is second highest in Asia.

Country Structure: Vietnam ranks fourth, ahead of Pakistan, in the Rewards section, but its country rewards rating takes joint 13th place in the region with Malaysia. The state has considerable downstream asset control. The industry is not yet competitive, with very few private companies operational. Vietnam has the 11th highest score in terms of the downstream regulatory environment.

Vietnam Downstream Rating – Risks

Industry Risks: Vietnam is ranked 13th in the Risks section of our ratings, behind Pakistan. Its equal 11th place score for industry risks reflects the level of state involvement and regulation, putting the country alongside Malaysia, China and Indonesia.

Country Risks: Its broader country risks environment is below the regional average, ranking Vietnam 11th out of the 15 Asian states, ahead of PNG. The score for short-term policy continuity is the high point, but the rule of law and legal framework have particularly low scores. Vietnam fares well with its short-term economic growth risk, but physical infrastructure and short-term economic external risk contribute to an overall poor showing.

Business Environment

Legal Framework

Vietnam has a two-tier court system, with courts of first instances and courts of appeal. The court system consists of the Supreme Court, the provincial People's Courts and the district People's Courts. 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.

Most of the legal documents in force relating to business were issued in the early 1990s under market-led reform programmes. However, Vietnam rewrote almost all of its laws and regulations affecting commercial activity and judicial procedures between 2002 and 2006. Despite some progress in protecting intellectual property rights, the overall legal system in Vietnam is regarded as excessively cumbersome.

Vietnam's judicial system lacks transparency, and there are widespread concerns about the independence of the judiciary. Both local and foreign firms prefer to resort to arbitration or other non-judicial means as a result of weaknesses in the judicial system – there is a general lack of confidence that the judiciary is capable of interpreting and enforcing the law.

Vietnam's legal system remains underdeveloped and, largely, biased against foreign entities. The court system provides inadequate redress for commercial disputes while contracts are difficult to enforce, particularly if a party is non-Vietnamese. Foreigners also see the commercial arbitration system as weak. When disputes arise, foreign investors tend to try to negotiate or include dispute resolution procedures in their contracts – however, even these are far from failsafe.

Foreign and domestic arbitral awards are legally enforceable in Vietnam since it acceded to the New York Convention on the Recognition and Enforcement of Foreign Arbitral Awards in 1995. Local courts must respect awards rendered by a recognised international arbitration institution. However, this provides no assurance that contracts will be honoured. Non-judicial means are therefore frequently used to enforce debt obligations.

Firms generally avoid the judicial system because the process is lengthy and expensive, decisions are considered arbitrary and enforcement mechanisms are ineffective. Smaller companies rely on personal relationships while larger foreign companies may make use of their access to government to ensure contract enforcement.

The 2006 Uniform Enterprise Law has allowed foreign investors to form any type of company instead of only limited liability companies. In general, foreign companies and the private sector are at a disadvantage compared with state-owned companies in terms of access to land, which is still viewed as

the property of 'the people'. Legislation has, however, progressively enhanced the status of private investors in recent years. The 1992 constitution granted stronger land rights to individuals, including rights over commercial and personal property. Private land use rights (LURs) may now be granted for up to 50 years. Since July 1 2004, the Land Law has allowed local private companies with long-term LURs to lease land to foreign investors.

The enforcement of intellectual property rights (IPRs) is wholly inadequate, with widespread pirating of products, particularly software, music and videos. The requirements of WTO accession mean that the government will have to beef up IPR protection substantially. In July 2006, a new Intellectual Property Law came into effect, designed to clarify the responsibility of government agencies charged with protecting IPRs, though doubts remain over the effectiveness of its implementation. The police service is generally slow to act on administrative orders where trademarks have been infringed. Often violators will seek to extract a payoff in compensation for ceasing the infringement. The US State Department has, therefore, despite improvements in the enforcement of IPRs in 2008, kept Vietnam on its 2009 'Special 301 Report' watch-list of countries with inadequate protection of IPRs.

Investors see official corruption as one of the biggest hindrances to running a business in Vietnam. Joint ventures with state-owned enterprises are particularly prone to corruption and abuse, though surveys indicate that while corruption affecting businesses is quite prevalent the amounts involved are usually quite small. However, rapid economic growth provides opportunities for graft to grow more quickly than government systems evolve. Vietnam scored 2.7 out of 10 in Transparency International's 2010 Corruption Perceptions Index, placing it in joint 116th place among the 178 countries surveyed.

One of the best tools in restricting opportunities for corruption has been the expansion of the 'One-Stop Shop' (OSS) network – single agencies that deal with applications for a range of activities, including construction permits, LUR certificates, business registrations and approvals for local and foreign investments.

The Law on Corruption Prevention and Control was passed by the National Assembly in November 2005. A central anti-corruption steering committee was established in 2006, comprising representatives from the government, the National Assembly, state procurator, court and police. The committee is headed by the prime minister, and has the authority to suspend ministers and chairs of people's committees and people's councils if suspected of wrongdoing. The committee discovered 584 cases of alleged corruption, involving close to 1,300 people, in 2007. Among the most noteworthy convictions of corrupt officials was that of former deputy trade minister Mai Van Dau, who was handed a 14-year prison term in March 2007 for accepting bribes in return for export licences.

Japan and Vietnam have established a joint committee for fighting corruption concerning the use of Japan's official development assistance (ODA) in Vietnam, after two Ho Chi Minh City officials were

convicted of accepting bribes from a Japanese firm in September 2009. Japan and Vietnam have also worked on a joint initiative to improve regulations on bidding, purchase and implementation of all ODA projects.

The burden of red tape is amplified by the overlapping of government approvals. Vietnam ranks poorly in the length of time it takes to close a business. It can take about five years to close a business, compared with an average of 3.4 years in East Asia and Pacific and 1.5 years in OECD states.

Infrastructure

Vietnam's physical infrastructure rating is 59.1, placing the country in 78th place in our rankings. The country's inadequate infrastructure has become a major grievance for foreign investors and may thus impair future FDI. Our communications rating for Vietnam stands at 59.9, but is set to improve as the government, thanks to development assistance from international donors, is investing heavily in constructing new roads, railways, ports and power plants. These projects include the US$33bn 1,600km high-speed railway currently being planned – thanks to Japanese funding – between Hanoi and Ho Chi Minh City, which will cut travel time to less than 10 hours when completed.

As an example of progress already made, more than 90% of rural households now have electricity, compared with just over 50% 10 years ago. Rapid industrialisation of the economy has, however, seen power demand increase by 15-17% per annum, outpacing the expansion of capacity. Vietnam is estimated to have produced 69.7bn kWh of electricity in the first 10 months of 2009, up 12.3% from a year earlier, according to the General Statistics Office. It has been estimated that Vietnam needs to build 124 new power plants between 2006 and 2010, adding a total capacity of roughly 36,000MW, to satisfy demand. Several ongoing construction projects of power plants have been hit by delays – due to slow land clearance, delayed equipment supplies and poor contractor performance – and power blackouts and brownouts are therefore likely to remain a problem. Our electricity access rating for Vietnam stands at 58.3, placing Vietnam in 49th place in our rankings.

Foreign direct investment (FDI) has also helped to improve Vietnam's telecommunications system, with foreign groups investing heavily in fanning out 3G telecom and broadband networks over the most populous parts of the country.

Labour Force

Vietnam's large, well educated and inexpensive labour force remains one of the country's chief attractions to foreign investors. The labour pool is increasing by up to 1.5mn a year, while wage costs are still low compared with other countries in the region, although wage growth has picked up pace in recent years. The General Statistics Office estimated the number of employed at 45.0mn in 2008. The unemployment rate is expected to remain between 5% and 6% in 2010.

Vietnam's reform-driven economic growth has resulted in a restructuring of the labour market, with a shift away from agricultural employment to non-farm employment. The General Statistics Office estimated that farmers constituted 52% of the workforce in 2008, with close to 21% working in industry and construction, and close to 27% working in the service sector.

Managerial talent and skilled workers are generally in short supply, which has the effect of raising costs. The expanding financial sector is particularly plagued by labour shortages and was said to be in need of tens of thousands of skilled personnel by 2010. Foreign companies are becoming increasingly troubled by an excessive turnover of qualified workers, which is driving up salaries for skilled personnel. Foreign companies have previously been the prime choice of Vietnamese professionals as they pay 14% more than domestic firms on average, according to a 2007 survey by human resources consultancy **Navigos Group**. Working for domestic firms is, however, becoming increasingly popular as they are currently closing the salary gap with foreign firms.

Labour shortages and a sharply progressive income tax system have pushed up the costs for skilled personnel. Vietnam has, on the other hand, maintained its cost advantage in manufacturing wages. The Japan External Trade Organisation (JETRO) found in a survey in November 2006 that monthly salaries for ordinary workers ranged from US$87-198 around Hanoi in northern Vietnam and from US$122-216 in Ho Chi Minh City in the southern Mekong delta region. This can be compared with an average salary for workers in Thailand of US$164 per month and between US$134 and US$446 in China's Guangzhou province, the source of much of Chinese manufacturing output. Although wages are rising – by 19.5% between April 2007 and March 2008, according to Navigos – we believe Vietnamese labour is still very competitively priced, in particular after the imposition of the Chinese Labour Contract Law on January 1 2008, which is estimated to have raised labour costs in China by between 5% and 40% and which has prompted many South Korean and Taiwanese firms to consider moving factories to Vietnam.

The regulatory burden in Vietnam's labour market has traditionally been high, but is easing over time. In 2003, legislation was introduced that allowed foreign companies to recruit staff directly, as long as they provide government agencies with a list of recruited workers. However, the requirement to use employment service agencies continues to apply to branches and representative offices of foreign companies.

One of the main regulatory burdens is the social protection system, which imposes a compulsory social insurance contribution scheme in which employers must pay in 15% of their salary, with employees proving 5%. Regulations for hiring workers are significantly more onerous than the East Asia and Pacific average. Whereas the hiring cost is 17% of the salary in Vietnam, it is only 5% in Thailand, for example. The imposition of the Chinese Labour Contract Law on January 1 2008 has, however, made many foreign companies view Vietnamese labour market regulation more favourably.

Employers are required by law to establish labour unions within six months of setting up, and these must be members of the Vietnam General Confederation of Labour. While most factories have trade unions, many of these do not operate in practice. Trade unions are more active in the public sector, and only one-third of foreign companies have collective agreements with their workforces.

Vietnam does not have a bad industrial relations record. There were about 650 wildcat strikes in 2008, up from 541 in 2007. Most strikes were at foreign-invested firms in the textiles and apparel sector, despite working conditions often being better at these firms than at SOEs. Most strikes have resulted from legal or contractual breaches, including failure to pay wages and benefits, failure to pay social insurance contributions, and failure to pay severance pay at termination.

The sharp uptrend in consumer price inflation, especially of essential goods such as food, fuel and housing, prompted increased labour unrest in late 2007 and early 2008 as workers demanded higher wages. The increasingly pressed economic conditions for labourers prompted tens of thousands of workers to go on strike in Ho Chi Minh City and Dong Nai province in January 2008. Lower inflation and tougher labour market conditions have dampened strike action in 2009. The latest available figures from Vietnam's national trade union showed there were 46 wildcat strikes in Q109, compared with 113 cases in Q108.

The government has raised the monthly minimum wage rate for workers at foreign-invested enterprises from VND920,000-1,200,000 (US$51-67), dependent on economic zone, to VND1,000,000-1,340,000 (US$55-74) from January 1 2010. The 13-15% imposed increases were lower than the 20-38% increase in the minimum wage rate for state- and domestic-employed workers to VND730,000-980,000 (US$40-55). This follows the government's roadmap to introduce a universal minimum pay rate for all enterprises by 2012.

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 pledges amounted to US$18.9bn in January-October 2009, down 72.9% compared with the same period in 2008. Actual FDI disbursements were estimated at US$8bn in the same period, down 12.1% y-o-y.

The rising levels of official development assistance (ODA) pledged by multilateral donors – which hit a record US$5.4bn in 2008 – 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 (BCCs), 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 FDI, and have a reputation among foreign investors of causing regulatory and financing problems.

Foreign portfolio investment is permitted only 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 (IZs) and high-technology zones (HTZs) attract tax and other incentives, and offer a ready-made operational infrastructure that 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 more than 100 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 for 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.

Tax Regime

Since 2003, corporate tax has been charged at a unified rate for both domestic firms and foreign investors. From the start of 2005, a self-assessment regime has been in effect. The previous tax audit system has been superseded by a tax investigation system.

Corporate tax: The main corporate tax rate is 25%, but firms involved in prospecting, exploration and mining of petroleum, gas and other rare and precious natural resources are subject to rates from 32% to 50%. Resident firms are taxed on global income. Non-resident firms are taxed only on Vietnamese-sourced income. A surtax of 10- 25% is charged progressively on income from land use rights.

Individual tax: The National Assembly passed Vietnam's first-ever personal income tax bill on November 20 2007. The bill, which became effective on January 1 2009, replaces a previous system in which expatriates and domestics were taxed at different levels. The new bill provides a common set of

rules for individuals resident in Vietnam for 183 days or more in a 12-month period. However, the bill is also applicable to those having a permanent residence in Vietnam, a definition that includes a rented house. How this paragraph will be interpreted is still unclear, but could extend tax liabilities to expatriates and locals who reside in Vietnam for fewer than 183 days per year. The new bill stipulates that personal income is to be taxed at a rate between 5% and 35%, with a personal allowance of VND48mn (US$2,800) and an additional allowance of VND19mn (US$1,120) per dependent. As such, the new bill reduces the highest marginal tax level applicable to expatriates from 40% to 35%. A new feature in the bill compared with previous legislation is that it covers non-employment income such as interest, dividends, capital gains on real estate and securities investment.

Indirect tax: Main VAT rate is 10%. A 5% rate is charged on some goods, including computers and accessories, construction, machinery, chemicals, coal and metallurgy products. The following attract a zero VAT rate: exported goods and software and services exported to firms in export processing zones. Registration is obligatory for businesses. VAT taxation is also subject to an ongoing revision by the National Assembly.

Capital gains: Usually taxed as income at corporate rate. Gains by foreign investors on the transfer of an interest in a foreign or Vietnamese enterprise attract a 25% tax. Gains by individuals on the transfer of a home or on land-use rights are taxed progressively up to 60%.

Security Risk

Vietnam is generally a very safe country for foreign residents and travellers. Petty street crime is rising in the major cities, but there have been very few serious offences against foreigners reported. Unexploded mines and ordnance are a continuing hazard, particularly in central Vietnam and along the Laos border.

The poor standard of roads and other public infrastructure is also a safety risk, as is the poor level of driving which makes traffic accidents one of the most prominent health risks for both foreigners and nationals.

Industry Forecast Scenario

Oil And Gas Reserves

We are using the most recent estimate of 4.50bn bbl for Vietnam's proven oil reserves, as published in the BP Statistical Review of World Energy, June 2010. This stands in stark contrast to the 600mn bbl estimate provided by the end-2010 OGJ survey. We are assuming a further rise in reserves towards 4.70bn by 2012, thanks to an upsurge in activity and success in the upstream oil segment. PetroVietnam expects to find up to 110mn barrels of oil equivalent (boe) between 2011 and 2015, with partner companies such as **Soco International** and **Premier Oil** set to make useful contributions through recent oil finds. Gas exploration, particularly in the northern basins, is still in early stages. Gas reserves are estimated at 682bcm, but we see scope for a rise to an estimated 690bcm in 2011.

Two discoveries were announced in Vietnam in September 2010. The **Hoang Long Joint Operating Company** (HLJOC), a joint venture involving PetroVietnam and Soco hit hydrocarbon reserves in south eastern Vietnam while Malaysia's **Petronas Carigali** discovered oil and gas in northern Vietnam.

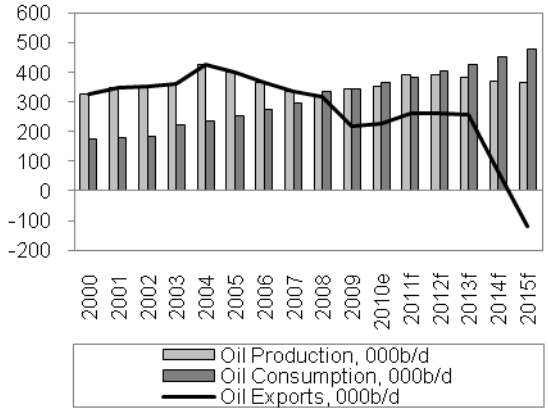
The HLJOC announced that its Te Giac Den (TGD)-2X appraisal well encountered hydrocarbons at a depth of about 4,450 metres (m). Soco is targeting about 100mn bbl of probable reserves (P50) for the TGD-2X well. The Petronas oil and gas discovery was made further north. The well is located in blocks 102 and 106 in the Song Hong Basin and initial estimates suggest it could produce 6,300b/d.

Oil Supply And Demand

Oil consumption was an estimated 366,000b/d in 2010 and is forecast to grow by around 5-7% per annum over the next several years. Having historically lacked refineries, Vietnam has not been able to consume its own crude, instead exporting virtually all production and importing refined oil products, a situation that changed when the country opened its first refinery in Q109. The oil demand growth rate can be expected to accelerate as the energy economy develops on the back of the country's first oil refinery. By 2015, we expect oil demand to average 480,000b/d.

Vietnamese Oil Production, Consumption And Exports

2000-2015



f = forecast; Source: Historical data – BP Statistical Review of World Energy June 2010; forecasts – BMI

Oil production in 2010 will have been an estimated 355,000b/d, having rebounded after four years of decline. From here, volumes should be trending higher in 2010/2011, although we see downside risk from our current estimate if there is no early recovery at the Su Tu Vang field.

The main oil producing area is offshore the southern coast: the mature Cuu Long Basin, and the less explored, deeper Nam Con Son Basin. The biggest new development in recent years has been the Su Tu Vang (Golden Lion) field, which came onstream in October 2008, reaching 65,000b/d by early-2009. In October 2009, however, output collapsed to 35,000b/d without officials providing explanation. Su Tu Vang's decline has severely damaged Vietnam's hopes of postponing the fall in national production. The second largest recent field launch is the Rang Dong-Phuong Dong development, which has been producing around 37,000-38,000b/d since August 2008.

Russia- and Japan-backed **VRJ Petroleum** in January 2008 confirmed a commercial oil discovery off the Vietnamese coast that is capable of entering production in 2010/11. According to a statement from the joint operating company, production could be sustained for up to 25 years at a rate of 15,000-20,000b/d. **Vietsovpetro** also operates the Rong field, which is in block 9-1 and is adjacent to VRJ's discovery. The proximity to Rong means that VRJ can work together with Vietsovpetro and use its infrastructure.

A subsidiary of PetroVietnam in November 2009 said that it expects the Te Giac Trang (White Rhinoceros) field to produce around 40,000b/d by Q311. Vietnam Business News reported on November 12 that PetroVietnam's technical subsidiary **Petroleum Technical Services Corp** (PTSC) had started construction of the production facilities at the field on November 11. Building work should be completed by July 2011.

Even with the recent new finds, there is limited scope for Vietnamese oil output growth to 2015, with output unlikely to exceed 390,000b/d and expected to slide towards 365,000b/d by the end of the forecast period. This suggests that net crude oil exports peaked at 427,000b/d in 2004, and could turn into net imports of 121,000b/d in 2015, as refineries come on stream and consume domestic and foreign crude supplies.

Gas Supply And Demand

Natural gas production is on the rise, although so far there is limited domestic demand and infrastructure. Over the near to medium term, gas consumption should move in line with rising gas supply. Medium-term, a growing supply surplus implies meaningful regional gas exports by pipeline, if infrastructure projects proceed. Over the longer term there are plans to import gas in the form of LNG as power demand grows beyond domestic supply capabilities. We believe Vietnam has the potential to boost gas production to 22bcm by 2015, with limited further long-term growth available.

PetroVietnam has said that it plans to spend US$1.3bn on building a second gas pipeline from the Nam Con Son Basin to southern Vietnam, according to state media reports. The planned US$1.3bn pipeline would transport gas 400km from blocks 05.1 and 05.2 in the Hai Thach and Moc Tinh project to land, from where it would be sent to power plants in the Phu My district of the Ba Ria-Vung Tau province. Planned capacity is 6bcm. The new pipeline would boost onshore gas supply by 30-40%, according to PetroVietnam's general director, Phung Dinh Thuc, to 10-11bcm per year.

Gas discoveries in south-western Vietnam have encouraged the construction of pipelines to feed the rapid expansion of the country's power generation capacity, particularly at the Phu My complex. Vietnam is also boosting the use of associated gas production. As well as the existing Nam Con Son pipeline, there is a pipeline transporting associated gas from the Bạch Ho and Rang Dong oil fields to Phu My. In August 2009, PetroVietnam also said that it was planning to build a 398km gas pipeline to transport gas from a field offshore the south-west coast to power plants in the city of Can Tho at a cost of US$1bn. The company said that the pipeline would have a capacity of 5.8-6.6bcm and would be constructed by Russo-Vietnamese JV Vietsovpetro, although it was not specified which field would supply the gas.

Another pipeline carrying associated gas came onstream in June 2009, connecting the Vang (Lion) group of fields in Block 15-1 to the south-east of the country. At full capacity, the pipeline will be able to transport 1.1bcm.

In March 2010, **Chevron** signed a deal with PetroVietnam to build a pipeline from its operated offshore assets in the Cuu Long Basin to southern Vietnam. Under the deal, Chevron, PetroVietnam and **PTTEP** of Thailand will spend US$1bn to build the 400km pipeline, which will be the longest in the country. The pipeline will run from production platforms about 250km off the coast to power plants in Can Tho City, with offshoots supplying power and fertiliser plants throughout the south-western region. The pipeline will have carrying capacity of 6.4bcm a year.

The total cost of the Vietnam Gas Project is estimated at US$4.3bn and Chevron expects to begin production in 2014, two years behind the original schedule, with output potentially reaching 5.1bcm per annum. While the initial volumes have been earmarked for local industrial customers, Chevron is proposing to construct an interconnector to Malaysia and Thailand, an option highlighted in PetroVietnam's press release on the Can Tho pipeline deal.

Refining/Oil Products Trade

Once completely reliant on oil product imports, Vietnam is embarking on a large-scale development of its refining industry, which should practically eliminate net imports by the end of 2010. While not all of the proposed refining projects will go ahead, once the government grants its final approval the centralised nature of decision-making in Vietnam means subsequent stages tend to proceed at a rapid pace.

Vietnamese refining is of particular interest to companies from Asia's more developed economies such as Japan, South Korea and Taiwan. Faced with stagnating fuel demand and a supply glut in their own countries, these companies view Vietnam as a strong potential market for fuel products.

Vietnam's first refinery, Dung Quat, came onstream in February 2009. Dung Quat is refining at least 6.5mn tonnes per annum (tpa) of oil (140,000b/d) and producing an estimated 3mn tonnes of diesel, 1.8mn tonnes of gasoline and 400,000 tonnes of jet fuel, among other products such as LPG and propylene. Ultimate crude distillation capacity could be as high as 148,000b/d, according to some third-party estimates.

Originally intended to process imported crude, Dung Quat is now being fed with domestically produced valuable sweet blends, mainly from the flagship Bach Ho field, thereby reducing oil export potential. To secure alternative supplies for the refinery, and maximise the revenues from the premium Bach Ho blend by exporting the crude, PetroVietnam has been holding talks with a number IOCs to make Dung Quat compatible with sour blends of foreign crude. In January 2009, PetroVietnam announced that it would invest US$1bn to build a desulphurisation unit at Dung Quat by 2011 to enable the processing of foreign crude.

On the back of Dung Quat's successful commissioning, Vietnam is pushing ahead with the expansion of its refining industry. Currently at least five new refining projects are being considered by domestic state companies and foreign investors. In January 2010, PetroVietnam said that its experience at Dung Quat convinced it that only refineries of more than 200,000b/d are worth its while. This means that no state funding will be available to smaller refining projects. Smaller projects, however, could still be pursued by private companies, both domestic and foreign.

PetroVietnam is currently involved in two more large refining projects. The first is the 200,000b/d Nghi Son plant. It is being developed in partnership with Japan's **Idemitsu Kosan** and **Mitsui Chemicals** and **Kuwait Petroleum Corporation** (KPC). FEED was completed in late-2009.

Idemitsu Kosan has announced that the final investment decision (FID) on the Nghi Son refinery has been delayed till March 2011, as it is recalculating the project's costs. The projected start of the refinery has been delayed to 2014 from its earlier planned start in December 2013.

The third refinery due on stream is the Long Son project. The 200,000b/d plant is due to become operational in 2014-2015. **Technip**, along with Japanese engineering company **JGC Corporation**, has been awarded a US$5bn contract by PetroVietnam to construct the Long Son refinery. Once complete, the refinery's capacity will be more than 200,000b/d of oil. The agreement awaits finalisation.

Taiwan's **Formosa Heavy Industries** in September 2009 announced that it received preliminary government approval to build a US$12.5bn refining and petrochemical complex in the Vung Ang Economic Zone. The project has planned capacity of 300,000b/d.

In July 2008, Petrolimex and **China Petroleum and Chemical Corporation** (Sinopec) announced plans to build an oil refinery in the country's central Khan Hoa province. The 200,900b/d facility will produce LPG, gasoline, kerosene, diesel, polypropylene, benzene and some other products. The plant should come onstream in 2013, according to the government. Preliminary investment capital of VND4.4-4.8bn (US$260,000-280,000) has been committed to the project.

Japan's largest oil refiner, **JX Holdings**, has been chosen by PetroVietnam for two refining projects in Vietnam worth about US$8.95bn, the Nikkei business daily reported on June 29 2010. According to the Nikkei report, JX chairman, Shinji Nishio, told Dinh La Thang, chairman of PetroVietnam's board, that JX would enter into a JV agreement with Vietnam's state-run oil company to build two refinery projects. The first project is the US$1.1bn expansion of the Dung Quat refinery to about 170,000b/d. JX will reportedly also take part in the construction of the Long Son refinery.

Revenues/Import Costs

The value of crude exports, assuming an OPEC basket oil price of US$80.00/bbl in 2011, US$85.00/bbl in 2012, and an average of US$90.00/bbl in 2013-2015, would fall from an estimated US$7.71bn in 2011 to an import bill of US$3.98bn by 2015. However, medium-term refinery timing remains very uncertain.

Table: Vietnam Oil And Gas – Historical Data And Forecasts

	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Proven Oil Reserves, mn barrels	4,730	4,500	4,500	4,600	4,700	4,650	4,557	4,466
Oil Production, 000b/d	317	345	355	390	390	385	372	365
Oil Consumption, 000b/d	334	345	366	384	403	427	453	480
Oil Refinery Capacity, 000b/d	0	140	140	140	140	140	340	540
Crude Oil Exports, 000b/d	317	219	229	264	264	259	66	(121)
Oil Price, US$/bbl, OPEC Basket	94.1	60.9	77.4	80.0	85.0	90.0	90.0	90.0
Value of Crude Oil Exports, US$mn (BMI base case)	10,885	4,865	6,467	7,709	8,191	8,508	2,168	(3,975)
Value of Petroleum Exports, US$mn (BMI base case)	10,885	4,865	6,467	7,709	8,191	8,861	3,579	(2,564)
Value of Crude Oil Exports, constant US$50/bbl – US$mn	5,785	3,997	4,179	4,818	4,818	4,727	1,205	(2,208)
Value of Crude Oil Exports, constant US$100/bbl – US$mn	11,571	7,994	8,359	9,636	9,636	9,454	2,409	(4,417)
Value of Petroleum Exports, constant US$50/bbl – US$mn	5,785	3,997	4,179	4,818	4,818	4,923	1,988	(1,424)
Value of Petroleum Exports, constant US$100/bbl – US$mn	11,571	7,994	8,359	9,636	9,636	9,845	3,977	(2,849)
Refined Petroleum Products Imports, 000b/d	334	219	240	258	277	301	147	-6
Proved Gas Reserves, bcm	557	682	682	690	670	660	650	630
Gas Production, bcm	7.9	8.0	8.9	9.7	10.6	15.0	20.0	22.0
Gas Consumption, bcm	7.9	8.0	8.9	9.7	10.6	14.0	16.0	18.0
Gas Imports, bcm	na	na	na	na	na	1.0	4.0	4.0
Value of Gas Imports, US$mn (BMI base case)	na	na	na	na	na	353	1,411	1,411
Value of Gas Imports, constant US$50/bbl – US$mn	na	na	na	na	na	196	784	784
Value of Gas Imports, constant US$100/bbl – US$mn	na	na	na	na	na	392	1,568	1,568

e/f = estimate/forecast; na = not applicable. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Other Energy

Power consumption is expected to increase from an estimated 90TWh in 2010 to 149TWh in 2015. After power industry usage and transmission losses, there is scope for a supply shortfall of 6TWh by 2015 if generation grows at no more than our assumed average annual rate of 10.6% (2010-2015). There is, however, a real risk of persistent electricity shortages if the power industry cannot deliver adequate new capacity as demand soars.

According to the Master Plan Development for the Power Sector of Vietnam, the electricity sector needs total investment of around US$79.9bn to 2025. Around US$52bn of this amount will be invested in power generation and the rest in the electricity transmission and distribution network.

In 2010, Vietnamese power generation is put at an estimated 94.1TWh, having grown an assumed 10% from the 2009 level. **BMI** is forecasting an average 10.6% annual increase to 156.5TWh between 2010 and 2015. Vietnam's thermal generation in 2010 is an estimated 53.5TWh, or 0.87% of the regional total. By 2015, the country is expected to account for 1.15% of regional thermal generation.

Deputy Prime Minister Hoang Trung Hai in March 2009 gave his consent to the plan to develop Quynh Lap power centre in the central province of Nghe An, according to Intellasia. The generating hub will have an estimated capacity of 2.4GW. The Ministry of Industry and Trade will assist Nghe An's provincial People Committee on how to guide investors on thermal power projects in the power centre.

Coal-fired generation will have accounted for 20.7% of the country's total generation in 2010, according to **BMI** estimates. We expect the fuel's market share to be at least 21.1% by 2015, firing an estimated 33TWh at the end of the forecast period. Vietnamese coal consumption is forecast to increase from an estimated 10.9mn toe to 18.5mn by 2015. This equates to a rise in demand from 16mn to 28mn tonnes of hard coal.

In recent years, Vietnam has started to promote the construction of new coal-fired power plants to diversify energy sources and utilise domestic supplies. State-run **EVN** has outlined plans to build 17 new coal-fired power stations by 2020.

Itaco, Vietnam's industrial park developer, is to invest US$7.8bn in a coal-fired power plant and port facility. In an interview with Reuters, Itaco's president, Dang Thi Hoang Yen, said the plant and port would be located in the country's southern province of Kien Giang. Construction on the project is scheduled to have begun in 2010, with the plant originally expected to be operational in 2013. This may have now slipped to 2014, although current project status is uncertain. Once operational, the plant will supply electricity to industrial users located at Itaco's industrial parks, such as the Tan Tao Industrial Park in Ho Chi Minh City. Once these power needs are met, Itaco will sell any surplus power to EVN.

Toyo Ink Group, a Malaysian print ink producer, announced in September 2007 that it plans to invest more than US$1bn in constructing a power plant in Vietnam. Reuters quoted a report from Dau Tu that stated that the plant will have a capacity of 1,200MW and will be constructed in the Kien Luong district in the southern Vietnamese province of Kien Giang. Toyo Ink will have 100% ownership of the plant, which will be powered by coal. However, the region of Kien Giang is far from Vietnam's main coal-producing areas in the north of the country, so the new plant will import the fuel instead of using Vietnamese coal.

PetroVietnam announced in May 2009 that the construction of the Long Phu power complex had begun on a 409-hectare site in the Long Duc commune, Soc Trang province. The designed capacity of the Long Phu complex is expected to be 4.4GW. The US$1.4bn project includes construction of three coal-fired thermo power plants and other related infrastructure. PetroVietnam proposes to start the operation of the first turbine with targeted capacity of 600MW at the end of 2013.

In May 2009, **JAKS Resources** signed a Memorandum of Understanding (MoU) with the Vietnamese government for the construction and operation of the Hai Duong thermal power station. It has since formed a JV with Chinese company **China Huadian** for the IPP in Hai Duong Province. The JV will undertake the project on a build, operate, transfer (BOT) basis. Two 600MW coal-fired units will be built. Work should have started in 2010 and the first two units are to come on line in 2015.

Vietnam in January 2010 approved **Vinh Tan 3 Energy Joint Stock Company** (VTEC) to develop the country's biggest coal-fired power project. VTEC said that the 2GW scheme will be located in southern Binh Thuan province. The project, worth US$2.5bn, will be developed on a BOT basis. Construction is expected to start in late 2011 and the plant is likely to come online in 2014-2015. The company will use imported coal for the project.

In August 2009, Japanese companies **Sojitz** and **Toshiba** were jointly awarded an JPY11bn (US$115mn) order by Vietnamese state-owned **Vietnam Construction and Machinery Installation** (LILAMA) to supply two 600MW steam-turbine generators for the Vung Ang 1 coal-fired power plant, located in Ha Tinh Province. The turbine generators are expected to be delivered in phases by November 2011 and the power plant is expected to become operational in 2012.

Chinese equipment manufacturer **Shanghai Electric Corporation** (SEC) was in October 2009 awarded a US$1.38bn contract by EVN to build a coal-fired power plant in Binh Thuan province. Under the terms of the contract, SEC will provide engineering, procurement and construction services for the 1.24GW Vinh Tan 2 plant. The power plant, scheduled to come online in 2013, will supply electricity to the country's southern region.

Japanese trading house **Sumitomo Corporation** in November 2009 signed an MoU with the government of Vietnam for the construction and operation of a multi-billion dollar coal-fired power plant. According to the terms of the MoU, Sumitomo will hire local contractor **Hanoi Investment Industrial Construction Joint Stock Co.** (Hanoinco) to build the power plant, which will be fitted with next-generation technology to minimise emissions. The plant will have a capacity of 1.32GW and the estimated cost is JPY200bn (US$2.5bn). The power plant will be located in the province of Khanh Hoa. Press reports cite a Sumitomo spokesperson who said that the company aimed to sign the final contract in the summer of 2010, begin construction in 2011, and bring the power plant online by 2015. It will have the rights to operate the power plant for 25 years.

A US$1.75bn coal-fired power plant will be built by a consortium led by **China Southern Power Grid** and will be located in southern Vietnam's Binh Thuan province. The first of the plant's two generators is scheduled to come online in 2014, with each generator to have a capacity of 600MW.

Construction of the first thermal power plant in southern Vietnam began in August 2010 in Binh Thuan province's Tuy Phong district. The Vinh Tan 2 coal-fired power station will cost VND23trn (US$1.2bn), and has a design capacity of 1.24GW. It will have two 622MW turbines, with consumption of about 3mn tonnes of coal per annum. The plant is expected to have an annual production capacity of 7.2TWh, after becoming fully operational in June 2014.

Vietnam has taken the first step towards ratifying a decision to build two nuclear power plants in the country. The National Assembly in November 2009 approved the resolution calling for the construction of the plants and, pending further clarification, the resolution will be submitted to Prime Minister Nguyen Tan Dung for final approval.

The Department of Industry and Trade in Ninh Thuan province has announced the locations of two new 4GW nuclear power plants, reports Intellasia. The first will be in Vinh Truong Commune, Thuan An Dist on a 502 hectare site, with the first of four turbines operational in 2020 and the fourth in 2024. The second plant will be located in Vinh Hai Commune in Ninh Hai Dist on a 514 hectare site and the whole plant should be operational in 2025.

In January 2006, the prime minister of Vietnam signed Decision No.01/2006/QD-TTg on the approval of a strategy to apply nuclear energy for peaceful purposes by 2020, which aims to build and develop a nuclear technology industry.

Vietnam and Japan have signed an agreement whereby Japan will aid Vietnam in its quest for nuclear power. Japan joins a number of other countries that have already offered nuclear assistance to Vietnam. According to World Nuclear News, the agreement was signed in Hanoi by Do Huu Hao, Vietnam’s vice-minister of industry and trade, and Masashi Nakano, Japan’s vice-minister of economy, trade and

industry, on May 15 2008. Under the agreement Japan will help plan Vietnam’s nuclear power strategy, provide education and help formulate nuclear safety regulations.

Vietnam and Russia have agreed, in principle, to cooperate on the construction of Vietnam's first nuclear power plant according to reports. Though there has been no formal agreement yet, Russia's **Rosatom** is reportedly the selected contractor for the project. Rosatom will conduct a feasibility study for the power plant, AsiaOne reported, citing Japanese news source Nikkei. If Rosatom spearheads this initiative then it is highly likely that **Atomstroyexport**, Russia's state owned nuclear power plant builder, will be responsible for the construction. It has further been reported that a consortium of Japanese companies including Toshiba, **Mitsubishi Heavy Industries** and **Hitachi** were hoping to be named preferred contractors for the power plant.

China Guangdong Nuclear Power Company (CGNPC) signed a letter of intent (LoI) with Vietnam to develop what was supposed to be its first nuclear power plant in February 2009. CGNPC is the second largest nuclear power plant construction company in China. According to Bloomberg, the proposed plans include the construction of a 2GW power plant in Ninh Thuan Province.

An estimated 40TWh of hydro-electric demand in 2010 is forecast to reach 61TWh by 2015, with its share of the Asia Pacific hydro market rising from 4.06% to 4.73% over the period. There is environmental resistance to new large-scale hydro-power facilities, but small-scale projects are likely to proceed. **BMI** is predicting that hydro-power generation by 2014 will account for 39% of total generation.

The 13.5MW Muong Kim hydro-power plant in September 2010 began generating commercial electricity and was connected with the national power grid. The plant is located in Ho Bon Commune, Mu Cang Chai District of the Yen Bai province. Muong Kim is the fifth hydro-power plant in the Yen Bai province that has been completed and has become operational.EVN will spend about US$194.7mn on the construction of 37 small-scale hydro-electric power stations in the northern provinces bordering China. Of these, 10-13 stations, with a maximum capacity of 5MW each, will be built in the bordering districts of Lai Chau, Lao Cai, Ha Giang and Lang Son provinces.

Vietnam will get two new hydro-power plants in the central province of Quang Nam. The Vietnam News Agency (VNA) reported on May 13 2008 that the government approved the construction of two new hydro-power plants, Dak Di 1 and Dak Di 2, with capacities of 16MW and 12MW respectively. The total cost for the project is estimated at US$36.4mn, and construction commenced in the first quarter of 2009. VNA reports that **Cuu Long Power Engineering and Consulting Co** will be the main investor, although no further information on the company is available.

The Asian Development Bank (ADB) has announced that it will provide a US$196mn loan for a hydro-power project in Vietnam. The 156MW Song Bung 4 hydro-power plant will require a total investment of

US$267.3mn and funding is set to come not only from the ADB but also the Vietnam Development Bank and **Vietnam Electricity**. The plant is to be located on the Song Bung River in the Quang Nam province. An ADB press release states that the venture will be the first hydro-electric project in Vietnam to receive funding from a multilateral financing institution. The plant is expected to be completed in 2013. The project will also include the construction of a 35km, 220kV transmission line to the Thanh My in Nam Giang district.

According to Intellasia, four commercial banks – **Agribank**, **Bidv**, **Vietcombank** and **PG Bank** – have promised jointly to offer syndicated credit of VND2.6trn (US$0.15bn) to the EVN for its Ban Chat hydro-power project. Agribank will fund VND1.5trn (US$0.09bn) in a loan term of 13 years. The 220MW Ban Chat power plant is one of EVN's vital projects in 2009, with total cost estimated to be VND8.6trn (US$0.49bn).

Vietnamese authorities have cancelled seven hydro-electric plant projects in Kon Tum Province, according to Viet Nam News. The cancellation was due to low profitability and the detrimental impact of the plants on the environment. Plans for plants on a smaller scale will be considered in the future.

Vietnam is rich in renewable energy resources. Renewable energy resources suitable for electricity generation include solar, biomass, wind and geothermal. Total capacity of geothermal is estimated at 200MW. Wind, solar and biogas are relatively abundant. About 75% of Vietnam's population live in rural areas with about 8.5% of households in these regions having no access to electricity. Direct burning of wood and waste dominates primary energy demand, but is currently not used in the generation of electricity.

According to a survey by the World Bank in 2009, Vietnam has the potential to produce more wind power along its coast than Thailand, Laos or Cambodia. The central provinces of Ninh Thuan and Binh Thuan are especially prolific according to a survey by the government of Vietnam, cited in a report by United Press International. The government has set a target for renewable energy to account for 5% of total electricity production in the country by 2025.

In August 2010, the Vietnamese government gave its approval in principle to the construction of a 200MW wind power project in Binh Thuan Province, according to the Saigon Times. The scheme, the largest of its type in Vietnam, is to be developed by **Saigon Invest Group** and is expected to cost about US$440mn. At present, Binh Thuan's provincial government has approved 12 wind power projects around the province, with total generated capacity of some 2GW.

Vietnam started building its first wind farm in the Mekong Delta in September 2010. The 500 hectare wind farm will have an estimated output of 0.3TWh, via 66 turbines of 1.5MW, a 22/110 kilovolt (kV) transformer station and a 15km power line with a capacity of 110 kilowatts (KW). The country has

approved the plans of EVN to build a wind power plant in the province of Ninh Thuan. The power plant will have an estimated capacity of nearly 30MW. The Ministry of Planning and Investment is to work with the Danish government and other sponsors to raise funds for the project.

Table: Vietnam Other Energy – Historical Data And Forecasts

	2008	2009	2010e	2011f	2012f	2013f	2014f	2015f
Coal reserves, mn tonnes	150	150	150	150	150	150	150	150
Coal production, mn tonnes	41.0	45.0	46.0	45.0	42.0	41.2	40.3	39.5
Coal consumption, mn toe	8.5	10.6	10.9	12.6	14.5	15.1	16.8	18.5
Thermal power generation, TWh	47.1	49.8	53.5	60.1	67.3	72.0	80.0	87.0
Hydro-electric power generation, TWh	32.0	36.0	40.0	43.0	45.0	50.0	55.0	61.0
Electricity generation, TWh	79.2	85.6	94.1	104.5	116.0	127.6	142.2	156.46
Hydro-electric energy consumption, TWh	32.0	36.0	40.0	43.0	45.0	50.0	55.0	61.0
Primary energy consumption, mn toe	65.8	73.1	80.4	88.0	97.7	106.0	115.5	123.6

e/f = estimate/forecast. Source: Historical data: BP Statistical Review of World Energy, June 2010/BMI. All forecasts: BMI.

Key Risks To Forecast Scenario

There is clearly risk associated with Vietnam's oil production level, but the demand outlook is also unpredictable and there is relatively little chance of a dramatic change in oil export volumes over the near term. There is a major risk associated with refinery start-ups, as timing is critical in terms of products imports and crude exports. Gas exports have been factored in for the end of the forecast period, but these are dependent on field development and pipeline construction. At a US$50/bbl oil price, Vietnam's 2015 crude import costs would be approximately US$2.21bn, while a US$100/bbl oil price would result in costs of US$4.42bn.

Long-Term Energy Outlook

Details of **BMI**'s 10-year forecasts, which provide regional and country-specific projections, can be found at the end of this report. Between 2010 and 2020, we are forecasting a decline in Vietnamese oil production of 12.7%, with crude volumes peaking at 390,000b/d in 2011/12, before slipping to 310,000b/d by 2020. Oil consumption between 2010 and 2020 is set to increase by 78.1%, with growth beyond 2009 ranging from 5-7% per annum and the country using 652,000 b/d by 2020. Gas production is expected to rise from an estimated 8.9bcm in 2010 to 25.0bcm in 2020. With 215% demand growth, we see potential for exports midway through the period to turn into modest imports by the end of the period.

Oil And Gas Infrastructure

Oil Refineries

After successfully bringing the 140,000b/d Dung Quat facility onstream – Vietnam's first refinery – the country is pushing ahead with the expansion of its refining industry. Currently at least five new refining projects are being considered by domestic state companies and foreign investors. In January 2010, PetroVietnam said that its experience at Dung Quat convinced it that only refineries of more than 200,000b/d are worth its while. This means that no state funding will be available to smaller refining projects. Smaller projects, however, could still be pursued by private companies, both domestic and foreign.

Dung Quat Refinery

Vietnam's first refinery, the US$2.5bn Dung Quat complex in the central province of Quang Ngai, came onstream in February 2009. Built by Technip of France, Dung Quat is now refining at least 6.5mn tpa of oil (140,000b/d) and producing an estimated 3mn tonnes of diesel, 1.8mn tonnes of gasoline and 400,000 tonnes of jet fuel, among other products such as LPG and propylene. Ultimate crude distillation capacity could be as high as 148,000b/d, according to some third-party estimates.

PetroVietnam has been holding talks with a number of IOCs to make Dung Quat compatible with sour blends of foreign crude. In February 2009, PetroVietnam's chairman, Dinh La Thang, told the Dau Tu newspaper that he has been approached by several IOCs, including European major **Royal Dutch Shell**, India's **Essar** and South Korea's **SK Energy**, which had expressed interest in the project.

In January 2009, PetroVietnam announced that it would invest US$1bn to build a desulphurisation unit at Dung Quat by 2011 to enable the processing of foreign crude. Dinh mooted in early January 2009 that it could sell up to 49% of Dung Quat in return for a supply/upgrade contract. This is significantly above the 30% currently allowed by the law. PetroVietnam is also involved in large heavy oil projects in Venezuela, which it hopes will supply its new refineries.

In June 2010 Nikkei reported that Japan's **JX Holdings** had been tapped by PetroVietnam to carry out a US$1.1bn expansion to the Dung Quat facility that would see its capacity raised to about 170,000b/d.

Long Son Refinery (Under Construction)

The Long Son project in the southern province of Ba Ria-Vung Tau is a proposed 200,000b/d plant costing around US$7-8bn and due to become operational in 2014-2015. Although initially the project was set up as a JV between PetroVietnam and **Petróleos de Venezuela** (PdVSA), Venezuela officially withdrew from the project in October 2009 owing to financial difficulties, forcing Vietnam to look for other investors.

Nghi Son Refinery (Planned)

PetroVietnam itself is involved in another large refining project, namely the 200,000b/d Nghi Son plant in the northern province of Thanh Hoa. Vietnamese JV **Nghi Son Refinery & Petrochemical** has started offering bidding documents for the contract to build the plant, according to a February 2010 article by state-owned media outlet Dau Tu.

The Nghi Son refinery project, the country's second, was initiated in April 2008 when PetroVietnam entered into a consortium with Japan's Idemitsu and Mitsui Chemicals and Kuwait's KPC. The refinery, to be built in the northern province of Thanh Hoa, is expected to have a capacity of 200,000b/d. Idemitsu and KPC will each hold 35.1% stakes, PetroVietnam 25.1% and Mitsui Chemicals 4.7%.

Idemitsu announced in September 2010 that it had delayed a final investment decision (FID) on the project until 2011, as it was re-evaluating the project’s costs. As a result, the planned project start date has been pushed back from December 2013 to 2014.

Vung Ang Refinery (Proposed)

Taiwan’s Formosa Heavy Industries in September 2009 announced that it received preliminary government approval to build a US$12.5bn refining and petrochemical complex in the Vung Ang Economic Zone in the northern Nghe An province. The project has a planned capacity of 300,000b/d. According to the Vietnam Economic Review, the government’s final approval is contingent on Formosa’s investment in a large port in the area. The refinery’s proximity to the Nghi Son project is also reportedly a concern for the authorities.

Van Phong Refinery (Proposed)

In July 2008, Petrolimex announced plans to build an oil refinery in the country’s central Khan Hoa province. The US$4.5bn facility, known as Van Phong, will have the capacity to process 10mn tpa, equal to some 200,900b/d, and will produce LPG, gasoline, kerosene, diesel, polypropylene, benzene and some other products. Petrolimex’s partner in the venture is Sinopec. Crude oil for the facility will be imported from either Singapore or the Middle East.

The government in December 2008 agreed in principle to permit Petrolimex to build the Van Phong refinery, and asked Petrolimex to carry out a feasibility study for the project. The plant is expected to come onstream in 2013, according to the government, which intends to take a stake of less than 30% in the facility. Preliminary investment capital of VND4.4-4.8bn (US$260,000-280,000) has been committed to the project.

Oil Storage Facilities

To boost energy security, Prime Minister Nguyen Tan Dung approved a plan in August 2009 to develop an oil storage system at a cost of US$9.6bn, according to a report by the Chinese Xinhua news agency. The plan is aimed at improving domestic refineries’ security of supply and stabilising the oil products

market. Citing local media reports, Xinhua stated that the project would be divided into two phases, with US$2.4bn spent between 2009 and 2015 and US$7.2bn earmarked for 2016-2025.

Gas Pipelines

BP is the operator of Vietnam’s largest pipeline, at Nam Con Son, which sends 4.8bcm per annum from the offshore Lan Tay-Lan Do gas field. Its maximum capacity is 7bcm. A proposal for a second gas pipeline from the project was submitted by PetroVietnam in October 2009.

PetroVietnam has said that it plans to spend US$1.3bn building a second gas pipeline from the Nam Con Son Basin to southern Vietnam, according to state media reports. The planned US$1.3bn pipeline would transport gas 400km from blocks 05.1 and 05.2 in the Hai Thach and Moc Tinh project to land, from where it would be sent to power plants in the Phu My district of the Ba Ria-Vung Tau province. Planned capacity is 6bcm. The new pipeline would boost onshore gas supply by 30-40%, according to PetroVietnam's general director, Phung Dinh Thuc, to 10-11bcm per year.

Gas discoveries in south western Vietnam have encouraged the construction of pipelines to feed the rapid expansion of the country's power generation capacity, particularly at the Phu My complex. Vietnam is also boosting the use of associated gas production. As well as the existing Nam Con Son pipeline, there is a pipeline transporting associated gas from the Bạch Ho and Rang Dong oil fields to Phu My. In August 2009, PetroVietnam also said that it was planning to build a 398km gas pipeline to transport gas from a field offshore the south west coast to power plants in the city of Can Tho at a cost of US$1bn. The company said that the pipeline would have a capacity of 5.8-6.6bcm and would be constructed by Russo-Vietnamese JV Vietsovpetro, although it was not specified which field would supply the gas.

Another pipeline carrying associated gas came onstream in June 2009, connecting the Vang (Lion) group of fields in Block 15-1 to the south east of the country. At full capacity, the pipeline will be able to transport 1.1bcm.

US oil major Chevron in March 2010 signed a deal with state-run energy group PetroVietnam to build a pipeline from its operated offshore assets in the Cuu Long Basin to southern Vietnam. The deal is a significant step forward for the so-called Vietnam Gas Project, which aims to commercialise reserves at Block B, 48/95 and 52/97.

Under the deal, Chevron, PetroVietnam and minority partner PTTEP of Thailand will spend US$1bn to build the 400km pipeline, which will be the longest in the country. The pipeline will run from production platforms about 250km off the coast to power plants in Can Tho City, with offshoots supplying power and fertiliser plants throughout the south western region. The pipeline will have carrying capacity of 6.4bcm a year. The midstream section of the Vietnam Gas Project will be operated by PetroVietnam

subsidiary **PV Gas** (51%) in partnership with Chevron, PTTEP and Japan's **Mitsui**, which has been selected as the main contractor. The upstream phase will be operated by Chevron.

The total cost of the Vietnam Gas Project is estimated at US$4.3bn, and Chevron expects to begin production in 2014, two years behind the original schedule, with output potentially reaching 5.1bcm per annum. While the initial volumes have been earmarked for local industrial customers, Chevron is proposing to construct an interconnector to Malaysia and Thailand, an option highlighted in PetroVietnam's press release on the Can Tho pipeline deal.

Macroeconomic Outlook

Real GDP Growth Set To Exceed Government's Target

BMI View: *Vietnam's real GDP growth came in at a better-than-expected 7.4% y-o-y in Q310, supported by robust growth in the construction and manufacturing sectors. The latest figures remain in line with our view that private consumption and infrastructure investments would continue to drive economic growth. However, given that Q310 figures were above expectations, we are revising our real GDP estimate upwards to 6.7% for 2010. Our real GDP forecast for 2011 remains at 5.6% in anticipation of a slowdown in external demand.*

Following strong real GDP growth of 6.2% in H110, Vietnam's Q310 real GDP growth figure came in at a better-than-expected 7.4% y-o-y in Q310. Figures released by the General Statistics Office (GSO) showed that the construction and manufacturing sectors were the key drivers of growth in Q310. In light of the strong figures for Q310, we are revising our real GDP growth estimates for 2010 upwards from 6.3% to 6.7%. Indeed, following the release of Q310 figures, the government said in an interview with local media that real GDP growth could potentially exceed its forecast of 6.5% for 2010. The government has announced that it will maintain its aggressive growth target of 7.0-7.5% for 2011. We believe, however, that global economic headwinds coming into play in 2011 will have a negative impact on investor sentiment and Vietnamese exports.

Looking at the key sectors of the economy, growth in industry and services continue to accelerate while agriculture remains on a downward trend. Infrastructure investment will provide support for the construction sector and be a key driver of economic growth for Vietnam in 2011. Indeed, the latest figures show that the construction sector grew at a robust pace of 11.4% y-o-y in Q310. Given that Vietnam will require further infrastructure investments to support its economic growth, we believe that the construction sector will continue to perform well in 2011. We are also witnessing an increasing focus by the government towards developing the agricultural sector and promoting foreign investment in the high-tech agricultural sector. However, we do not expect the agricultural sector to contribute significantly to real GDP growth in the short to medium term.

The manufacturing sector also performed well, registering a 9.4% y-o-y growth in Q310. Although Vietnam's manufacturing sector is largely structured towards exports, we see domestic demand as a potential source of growth for the industry as incomes continue to rise. Given that the manufacturing sector currently makes up 63% of industrial production, we would expect to see a similar pick-up in industrial production growth. Indeed, Vietnam's industrial production registered a seventh month of consecutive y-o-y growth since March, growing by 12.4% y-o-y in September. Our long-held view that domestic demand will remain resilient in 2011, suggests that industrial production will remain robust.

Despite a 10.8% month-on-month (m-o-m) drop in tourist arrivals from 430,000 visitors in August to 383,500 in September, tourist arrivals remain significantly above historical levels. In light of strong growth figures coming out of Asia in recent months, we believe that visitors from Asian countries will continue to provide support for Vietnam's tourism sector. Despite the drop in tourist arrivals in September, retail sales figures remain robust, registering a 2.4% m-o-m increase. We note that retail sales have traditionally been an accurate indicator of private consumption. Thus, resilient retail sales figures in September suggest to us that private consumption remains robust. We believe resilient private consumption will remain a key factor driving domestic demand.

Despite registering an 11.0% m-o-m decline in September, goods exports actually grew by 5.7% quarter-on-quarter (q-o-q) in Q310. Imports, meanwhile, grew by a smaller 3.2% in Q310, resulting in a narrowing of the trade deficit from US$2.8bn in Q210 to US$2.4bn in Q310. Although the momentum for goods export growth remains strong, we expect imports to outpace exports in the coming quarters on the back of robust domestic demand. Indeed, a steady increase in infrastructure investments should lead to an increase in raw material and machinery imports. As such, we are maintaining our forecasts for Vietnam's trade balance to remain in deficit at 7.4% of GDP in 2010 and 7.6% of GDP in 2011.

In line with our view that we will see a slowdown in global economic growth in 2011, we are maintaining our below-consensus forecast for real GDP growth to come in at 5.6%. We note that this is significantly below the Vietnamese government's real GDP growth target of 7.0-7.5% for 2011. From our standpoint, we believe that the government's imbalanced economic policies, which narrowly focus on economic growth while ignoring the risks of inflation, will lead to an overheating economy. As such, we expect consumer price inflation (CPI) to accelerate from the current rate of 8.8% to 11.5% in 2011. This suggests that the central bank could be forced to raise interest rates aggressively to cool the economy. Coupled with global economic headwinds that will lead to a slowdown in external demand, we see Vietnam's real GDP growth being capped at 5.6% in 2011.

Table: Vietnam - Economic Activity

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Nominal GDP, VNDbn [2]	974266	1143715	1477717	1645481	1908953	2246180	2535645	2869067	3231621	3623413
Nominal GDP, US$bn [2]	60.9	71.2	89.9	92.5	99.4	113.7	128.4	149.0	172.3	198.5
Real GDP growth, % change y-o-y [2]	8.2	8.5	6.2	5.3	6.7	5.6	6.1	7.0	7.0	7.0
GDP per capita, US$ [2]	724	836	1043	1060	1125	1274	1424	1637	1874	2139
Population, mn [3]	84.1	85.2	86.2	87.3e	88.4	89.3	90.2	91.1	92.0	92.8
Industrial production index, % y-o-y, ave [1,2]	18.0	16.8	13.6	6.7	15.0	10.0	15.0	16.0	17.0	16.0
Unemployment, % of labour force, eop [2]	4.8	4.6	5.0	5.5e	5.5	5.0	4.5	4.0	4.0	4.0

e/f = estimate/forecast. [1] at 1994 prices; Sources: [2] General Statistics Office. [3] World Bank/BMI calculation/BMI.

Competitive Landscape

Executive Summary

- State-controlled oil and gas industry, featuring IOC participation through PSAs. The main government vehicle is PetroVietnam, which, with its Vietsovpetro JV, provides the bulk of the country's oil production.

- IOC upstream involvement is growing, albeit gradually, without major investment pledges. While Russia's **Zarubezhneft** is the biggest foreign oil producer, Western majors plus Petronas are significant investors. The main area of majors' interest is gas, leaving mid-sized oil fields to independents.

- BP agreed to sell its Vietnamese assets to its Russian JV **TNK-BP** for US$1.8bn. The key investment is the US$1.3bn Nam Con Son Gas project. TNK-BP has a 35% field interest, operates the gas pipeline and owns a third of the Phu My 3 power plant.

- **ConocoPhillips** has stakes in six Vietnamese blocks, which averaged around 32,000boe/d in 2009. Appraisal work is ongoing at two discoveries in the Block 15-1 licence.

- Petronas has shares in eight blocks, including offshore Blocks 1 and 2 that contain the Ruby, Emerald and Topaz fields. The company's other producing asset is Cai Nuoc in Block 46. Petronas operates LPG import, storage and distribution JVs.

- In 2009, **Korea National Oil Corporation** (KNOC) supplied Vietnam with around 1.34bcm of gas from its Rong Doi and Rong Doi Tay fields. The Korean company holds stakes in three offshore blocks in Vietnam.

- Chevron hopes to start gas sales from its Vietnamese fields by 2014. It has discovered 70bcm of gas reserves in the Kim Long, Ac Quy and Ca Voi fields. The US firm is planning to invest a further US$1.5bn over the next five to seven years in various gas and power projects.

- The most active independents are UK-based **Premier Oil** and **Soco**, plus Canada's **Talisman Energy**.

- Japan's **Nippon Oil** holds three offshore licences in the southern Cuu Long Basin. Its first producing field, Phuong Dong, started producing 10,000b/d in Q308.

- The government has earmarked Petrolimex, the largest national fuel distributor, for sale as part of its renewed privatisation drive. Partial privatisation of Petrolimex, which controls around 60% of the Vietnamese fuels market through its 6,000-strong network of petrol stations, can be seen as part of the wider liberalisation of the downstream segment.

Table: Key Players – Vietnam Oil And Gas Sector

Company	2009 sales (VNDbn)	% share of total sales	No. of employees	Year established	Total assets (US$mn)	Ownership (%)
PetroVietnam	265	100	17,000	1975	na	100% state
ConocoPhillips	na	0.2	na	1995	na	100% ConocoPhillips
Vietsovpetro	3.19	100	na	1981	na	50:50 PetroVietnam/ Zarubezhneft
BP Vietnam	na	na	700	1989	na	100% BP

na = not available/applicable. Source: BMI, Company data

Overview/State Role

The government of the Socialist Republic of Vietnam controls both the upstream and downstream segments, although gradual liberalisation is under way. In the upstream segment, foreign companies are allowed to independently explore for oil and gas. While the presence of state-owned PetroVietnam (PV) is required for all producing projects, IOCs are allowed to hold majority stakes and receive a share of output.

The fuels downstream segment remains under full state control (with the exception of LPG), although reforms proposals have been on the table for some time. PetroVietnam's downstream subsidiary **PV Oil** operates the country's only refinery, while fuels retailing is carried out by government-run companies, such as Petrolimex and **Petec** under the Ministry of Trade, **PetroVietnam Trading Company** (Petechim) under PetroVietnam, **Saigon Petro** under Ho Chi Minh City People's Committee, **Military Petroleum Company** under the Ministry of Defence and **Vinapco** under Vietnam Airlines, all of which have been licensed to import petroleum products. Fuel prices are heavily subsidised for political purposes.

The government has issued over 80 investment licences for oil and gas exploration since the industry was opened to foreign partners in 1998. More than 30 companies from around the world now operate offshore Vietnam. However, several foreign firms have chosen to exit the country citing regulatory problems and disappointment at recovering smaller quantities of oil and gas than expected.

Licensing And Regulation

Permits are awarded on a bilateral basis, with no regular upstream bidding rounds. Amendments to Vietnam's Petroleum Law in 2000 paved the way for a more open and transparent licensing round scheme through which E&P projects would be offered to international investors. In June 2008, PetroVietnam announced an international exploration licensing round, which will offer seven offshore

blocks covering 50,000sq km in the Song Hong Basin off northern Vietnam, in water depths of 60-100m. The company claims that the blocks contain up to 5bn boe. The licences available provide for 30-year production sharing contracts (PSCs), with a five-year extension option, and a minimum 20% interest for PetroVietnam. The spread of the global economic crisis, however, led to the indefinite postponement of the round.

Overall, the government understands the importance of IOC investment in maintaining oil and gas output. The state is therefore generally committed to establishing an attractive tax framework for foreign energy investors. However, the negative impact of the economic downturn on the country's fiscal position has led to increases in some oil taxes. In April 2008, the finance ministry raised the crude export tax from 4% to 8%. In January 2009, crude production royalties went up by 2%, increasing the overall level to 10% for 20,000-50,000b/d fields and 6-8% for smaller ones.

Moreover, in July 2009 the government announced that it was discussing a proposal to impose a windfall tax on oil production to maximise state revenue in times of high oil prices. Under the proposal, foreign producers would have to pay 50% of their annual profit in years when oil prices rise by more than 20%. The windfall revenues would then be transferred to the Fuel Fund, which is used to subsidise domestic fuel prices.

Some recent measures, on the other hand, have benefited domestic fuel importers. In an attempt to stimulate consumer demand, in 2009 the government significantly reduced the import tariff on oil products. By late April 2009, petrol and diesel duty had fallen to 20%, down from 40% in January. The decision to slash import taxes was justified by the start-up of domestic refining that was expected to reduce the level of oil product imports by 37% between 2007 and 2010.

A more fundamental shift in import duties followed in January 2011, when the government brought in an automatic tariff tracker. Previously set centrally by the Finance Ministry, as of January 2010 the tariffs have been based on Platts' 30-day average price of Singapore-traded WTI crude. The biggest importer Petrolimex now publishes pricing information on its web site.

Consequently, import tariffs fell following the introduction of the tracker in light of the rising oil prices. In January 2011, Petrolimex cut the import tax rates on gasoline and jet fuel by half to 6% from 12%, the company said in a statement. The import tax on diesel was reduced to 2% from 5%, while that on kerosene was cut to 4% from 10%. The gradual relaxation of oil product import tariffs has been made possible by the start-up of domestic crude refining in Vietnam in early 2009, which reduced the fiscal importance of import duties to the government. Moreover, the build-up of refining capacity throughout the decade should practically eliminate the country's need to import the main types of distillates by late 2010.

Government Policy

The upstream segment is of great importance to the Vietnamese government, with PV providing 24% of the country's budget and 14% of its export earnings in 2009.

Under government proposals announced in July 2009, deputy trade minister Nguyen Cam Tu said that private Vietnamese companies would be allowed to import and sell refined products as long as they met requirements to have adequate storage facilities and terminals. In addition, the draft measure permits oil product distributors to change pump prices by up to 7% if world crude prices rise by more than 12%, although the state would still intervene in the event of abnormal changes in world prices. Currently, oil product distributors have to seek permission from the Finance Ministry and the Industry and Trade Ministry to change their pump prices.

The government has earmarked Petrolimex, the largest national fuel distributor, for sale as part of its renewed privatisation drive. Prime Minister Nguyen Tan Dung announced in January 2009 that the state was to reduce its holding in Petrolimex to at least 75% to help balance the country's budget. In a statement released in January 2011, Petrolimex said the IPO would be completed by the year-end.

Partial privatisation of Petrolimex, which controls around 60% of the Vietnamese fuels market through its 6,000-strong network of petrol stations, is part of the wider liberalisation of the country's downstream segment. In the summer of 2009, the government began debating proposals to allow importers of refined products to trade futures contracts and to permit private domestic operators in the fuels market. Price caps at the pump were also relaxed in H209, although December 2009 saw the government threaten to bring fuel pricing back under full state control.

Since 2005, PetroVietnam has floated and sold stakes in several subsidiaries, including **PetroVietnam Drilling & Well Services** and **Petroleum Technical Services**. The firm appears to be slowly privatising itself, with the government having been mulling an international public stock offering for some time. The global economic crisis has put plans for a large-scale privatisation on ice, but those plans began to move forward again as of early 2011.

International Relations

Russia

As a socialist country, Vietnam has held close ties with Russia. Surprisingly, those ties persevered after the collapse of the Soviet Union and Russia arguably remains the most important foreign player in Vietnam's oil and gas industry despite the opening up of the sector to Western firms.

Vietnam and Russia signed an agreement in late-December 2010 extending oil exploration and production cooperation in the Asian country's waters past 2010. The life of a joint venture between PetroVietnam and

Russia's Zarubezhneft, Vietsovpetro, is to be extended under the agreement, although authorities declined to mention by how long. The venture was due to expire by the end of 2010 under an agreement signed in 1991.

Table: Key Upstream Players

Company	Oil/liquids production (000b/d)	Market share (%)	Gas production (bcm)	Market share (%)
PetroVietnam[1]	327	85e	8.01	71e
(of which Vietsovpetro)	*(128)[2]*	*(40e)[3]*	*(1.3e)*	*(11e)*
ConocoPhillips	29	7.5e	0.15	1e
KNOC	16.4e[3]	4.2e[3]	0.5e[3]	4e[3]
BP	0	0	0.65	6e
ONGC Videsh (OVL)	0.7[4]	0	1.85[4]	16e[4]
Petronas	12.5[3]	3e[3]	0.04[3]	0

e = estimate; [1] Group figures inc. JVs; [2] 2010 data, [3] 2008 data; [4] Indian FY08-09 (Apr 1- Mar 31). Source: BMI, Company data 2009

Table: Key Downstream Players

Company	Refining capacity (000b/d)	Market share (%)	Retail outlets	Market share (%)
Petrolimex	na	na	1,871	51
PV Oil/Petechim	140	100	256	na
BP Petco	na	na	na	na
Petec	na	na	na	13e
Saigon Petro	na	na	1,000e	10e
Vinapco	na	na	Na	2e

e = estimate; na = not available/applicable. Source: BMI, 2009 company data

Company Monitor

PetroVietnam

Company Analysis

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 teaming up with IOCs in upstream projects and has recently brought its first refinery onstream. Investment demands are high, and PetroVietnam's coffers are being stretched by heavy capex and fiscal obligations. The support of state banks, however, gives it access to financing on preferential terms. At end-June 2010, the government converted the holding company of the Vietnam Oil and Gas Group (PetroVietnam) into a limited-liability company owned by the state.

SWOT Analysis

Strengths:	Dominant domestic oil and gas producer
	Partner to IOCs in most new developments
	Involvement in new refinery projects
	Growing international E&P presence
Weaknesses:	Over-dependence on Russian partner
	Rising investment requirement
	High windfall taxes
Opportunities:	Growth in domestic oil/gas demand
	Plans for new refining/petrochemicals capacity
	Significant untapped gas reserves/acreage
Threats:	Regional refining supply glut
	Changes in national energy policy

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Financial Statistics

Net revenue

- VND265trn (2009)
- VND280trn (2008)

Operating Statistics

- Year established: 1975
- No. of employees: 17,000

Oil Production (including Vietsovpetro plus share of other JVs)

- 327,490b/d (2009)
- 193,500b/d (2008e)
- 230,500b/d (2007e)

Market Position

Vietnam National Oil and Gas Group (PetroVietnam) is responsible for oil and gas E&P, storage, processing, transportation, distribution and related services. The company accounts directly for 20% of Vietnam's oil production and half of its gas production. Its **PetroVietnam Exploration Production** (PVEP) unit manages all upstream operations, while PV Oil is the main downstream subsidiary and PV Gas is responsible for gas distribution. 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, there are plans to offer IOCs sole control of the fields.

The 50:50 JV with Zarubezhneft, Vietsovpetro, accounts for about a third of the country's crude production, operating the flagship Bach Ho field in Block 09-3 as well as Blocks 09-1 and 05-2, sites of the White Tiger, Dragon and Dai Hung fields. In 2008, PetroVietnam launched three new oil fields: Phuong Dong, Ca Ngu Vang and Golden Lion. The Bunga Orkid and Nam Rong (South Dragon)-Doi Mai field was launched in 2009.

The government's dissatisfaction with delays in refining projects led to PetroVietnam being placed under the control of the Industry Ministry in June 2003. For 2009, PetroVietnam was allocated a national oil production target of 325,480b/d, (40,000b/d of which is condensate) plus a gas output target of 8bcm. In late December 2009, the company said that oil production would be an average of 327,400b/d for the year.

Strategy

The firm appears to be slowly moving towards privatisation, spinning off non-core subsidiaries such as its insurance, real estate and tourism business, as well as some oil-related service companies. Media-circulated rumours of an IPO became more frequent in H208, although the terms of the process remain unclear. Recent auctions of various subsidiaries suggest the company aims to privatise its assets selectively, keeping the strongest profit generators under state control. The impact of low oil prices on PetroVietnam's profit margins may, however, speed up the liberalisation process.

As part of the privatisation process, PetroVietnam is selling a minority interest in its gas subsidiary PetroVietnam Gas (PV Gas). An open IPO held in November 2010 fell short of its target. The government raised US$97mn by selling around 3% in PV Gas, against 5% it hoped to offload. The government, however, has said it will carry on with plans to sell more PV Gas shares and announced plans to auction a 15-20% stake to a strategic investor for about US$600mn.

In 2010 it brought onstream the Topaz field and three other fields that were delayed from 2009, Pearl, D30 and Dana. The new launches from 2011 onwards include Su Tu Trang, Su Tu Nau, Te Giac Trang, Hai Su Trang, Diamond, Lan Do, Hai Thach-Moc Tinh and Kim Long-Ac Quy-Ca Voi.

PetroVietnam aimed to prove 82mn boe per annum of new hydrocarbon reserves in 2008-2010, 110mn boe in 2011-2015 and 200mn boe in 2016. To achieve this goal, the company plans to annually invest US$4.5bn in E&P, concentrating primarily on gas exploitation. The short-term target is significantly below the 225mn boe of new reserves per annum in 2005-2010 that had been announced previously.

Moreover, PetroVietnam planned to invest US$100mn in 2010 in the development of its foreign assets. PetroVietnam has been stepping up efforts to acquire overseas sources of production by taking stakes in projects in Venezuela, Cuba, Russia, Uzbekistan, Laos, Myanmar, Iran, Iraq, Egypt, Mongolia, Tunisia and Algeria. By April 2009, PetroVietnam held 19 foreign licences. By 2015, PetroVietnam is hoping to have 16 producing fields overseas.

In the downstream segment, PetroVietnam is involved with a number of refinery construction projects as it strives to reduce the country’s dependence on fuel imports.

Latest Developments

In January 2011, PetroVietnam has postponed the sale of US$1bn worth of overseas corporate bonds, which were initially scheduled to be issued in Q410. The funds were to be used to meet financial requirements of US$5-6bn during 2011. The company has not yet said when the issue will take place.

Seismic survey specialist France's **CGGVeritas** and **PetroVietnam Technical Services Corporation** (PTSC) are to begin a joint venture gathering 2D and 3D data, it was announced in December 2010. The venture will focus on providing surveys for companies based in Vietnam but may also branch out into other areas of South East Asia.

France's Technip, along with Japanese engineering company JGC Corporation, has been awarded a US$5bn contract by PetroVietnam to construct the Long Son refinery in Vietnam.

In September 2009, PetroVietnam awarded an FPSO construction contract to Malaysian engineering company **Bumi Armada**. The facility will be used for the Te Giac Trang (White Rhinoceros) oil field in Block 16-1 in the Cuu Long Basin. The Te Giac Trang FPSO will have a production capacity of 40,000b/d of oil and 566,340cm/d of gas and an oil storage capacity of 1mn bbl. Te Giac Trang’s development plan was approved in September 2009 and is due to come onstream in mid-2011. PVEP operates the block through the Huang Long Joint Operating Company (HLJOC), where it is partnered with Soco.

PVEP signed a PSC for Block 9-2/09 offshore southern Vietnam in mid-2009. The minimum investment programme comprises two wells and spending of US$25mn.

PetroVietnam made three oil discoveries in the first five months of 2009: Hai Su Den-2X, Thien Ung-3X and CC-2XST. In a press release, however, the government did not provide any reserves estimates for the finds. The Hai Su Den field was declared commercial in April 2009 and is expected onstream at a rate of 21,000b/d in 2011.

In May 2009, PetroVietnam exercised its option to buy back a 15% stake in Block 12W offshore south east Vietnam. Premier Oil is the operator of the block, which includes the Chim Sao (Blackbird) and Dua oil project that is currently in the development phase. Before the deal, Premier Oil held a 37.5% stake in the block, alongside Israel's **Delek Energy** with 25% and Australia's **Santos** with 37.5%. Under the terms of the deal, PetroVietnam will take an equity stake of up to 15% in return for payment of past costs.

In April 2009, PetroVietnam announced what it claims to be the largest gas discovery in northern Vietnam to date, confirming the region's upside gas potential. The Hac Long (Black Dragon) field, which is located in the Song Hong (Red River) Basin some 100km offshore, produced first test flows of around 400,000cm/d. The Hac Long field, in Block 103-107, is operated by PetroVietnam (55%) in partnership with Malaysia's Petronas (45%). The field is estimated to hold up to 50bcm of gas reserves and 45mn bbl of condensate.

The Su Tu Vang (Golden Lion) oil field came onstream in October 2008, with output rising to its peak of 65,000b/d by early 2009. In October 2009, however, PetroVietnam announced that production at Su Tu Vang nearly halved to 35,000b/d without citing reasons. A company official stated that the field's new output would be used in calculating 2010 national production forecasts, suggesting the long-term nature of the decline. The unexpected slump of Su Tu Vang is a big blow for PetroVietnam, which was hoping that the block where it is located, 15-1, would become Vietnam's biggest producing permit by 2010-2011, overtaking Bach Ho.

Block 15-1 is located in the Cuu Long Basin, and is operated by the **Cuu Long Joint Operating Company** (CLJOC), a JV between PetroVietnam (50%), ConocoPhillips (23.3%), KNOC (14.2%), **SK Energy** (9%) and France's **Geopetrol** (3.5%). Block 15.1 also contains the Su Tu Den (Black Lion) field which at end-2008 was producing 55,000b/d. Production from Block 15.1 is expected to overtake that of the Bach Ho field in 2010-2011. In 2010-2013, PetroVietnam expects to start production from three more fields in Block 15.1: Su Tu Den North-East, Su Tu Trang and Su Tu Nau. Associated gas production from Block 15-1 is transported to onshore power plans via a pipeline. Current capacity stands at 182 million cubic metres (Mcm) per annum, which will rise to 1.1bcm once all the satellites are brought onstream.

The Phuong Dong oil field in Block 15.2 came onstream in August 2008, producing 2,000-3,000b/d. Crude output from the field will be blended and sold with oil from the nearby Rang Dong field, which currently produces around 35,000b/d. The end of July 2008 saw the start of production from the offshore Ca Ngu Vang (Golden Tuna) field. The field will produce 10,000-20,000b/d of oil plus 0.2-0.5bcm of

associated gas over the next 20 years. **Hoan Vu**, a JV between PetroVietnam (50%), PTTEP (25%) and Soco (25%) operates the field.

BP Vietnam

Company Analysis

BP had led the IOC charge into Vietnam, benefiting from the absence of US companies since the Vietnam War and putting its emphasis on gas, rather than oil. That has changed in the wake of the Macondo oil spill. BP has now decided to sell its Vietnamese assets as part of its US$30bn divestment programme. If BP has its way, however, it will not be exiting the country altogether. In October 2010, the company announced that it had agreed to sell its assets in the country to its Russian JV TNK-BP for US$1.8bn. India's ONGC, however, holds the first right of purchase over the assets and after the TNK-BP deal was announced said that it was still in talks with PetroVietnam about pre-empting the deal.

SWOT Analysis

Strengths:	Key role in upstream gas supply
	Ownership of gas distribution infrastructure
	Active participant in downstream segment
	Good relationship with state energy group
Weaknesses:	No upstream oil exposure
	No retail fuels interests
	Asset divestment due to Vietnam/China territorial issues
Opportunities:	Growth in local/regional gas demand
	Scope for downstream oil expansion
	Equity in refining segment
Threats:	Changes in national energy policy
	Loss of dominant IOC position
	Financial fallout from the Macondo oil spill

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Operating Statistics

- Year established: 1989
- No. of employees: 700

Gas Production

- 0.65bcm (2009)
- 0.63bcm (2008)
- 0.85bcm (2007)

Market Position

BP is active in oil and gas E&P, the production and distribution of lubricants and LPG, crude supplies for the refining industry, the provision of gas oils and jet fuels, and the distribution of chemical and solar power systems. BP currently has a 3% share of Vietnam's LPG market and is the country's largest gas supplier.

The company's key investment is the US$1.3bn Nam Con Son Gas project, which involves the development of the offshore Lan Tay (West Orchid) and Lan Do (Red Orchid) gas fields in Block 06.1. BP holds 33.3% in the project and works in partnership with **ONGC Videsh** (OVL) and PetroVietnam. These two fields contain estimated reserves of 58bcm and are producing 4.8bcm on average. Gas from the Nam Con Son fields is transported via a 400km pipeline to two power plants in the Ba Ria-Vung Tau province. BP operates the pipeline in partnership with PetroVietnam and ConocoPhillips. The British major has a 33.33% interest in the Phu My 3 power plant, which is supplied by Nam Con Son. Gross production from the field reached an annualised rate of 5.5bcm in 2008, following the installation of new compressors.

Strategy

BP wants to develop its gas-to-power assets while supporting downstream manufacturing and marketing activities. The company will also continue increasing gas supplies to the Dinh Co LPG Plant. Although currently Vietnamese LPG demand is below the regional average, as income levels continue to grow consumption is set to increase.

BP is also set to play a role in Vietnam's nascent refining industry. In January 2009, BP signed a preliminary agreement to supply 70,000b/d to the Dung Quat refinery, which came onstream in February 2009. In return for the long-term supply contract, the Vietnamese government signalled its readiness to sell up to 49% in the refinery but BP has said it will not seek a stake. In July 2010, BP and Azerbaijan's state-run oil company **SOCAR** separately agreed to supply about 400,000bbl each to Dung Quat.

In July 2010, BP announced an acceleration of its divestment plans for its Vietnamese assets to meet liability costs for the US Gulf of Mexico Macondo oil leak. Three months later, the company announced that it had agreed to sell it assets in the country to its Russian JV TNK-BP for US$1.8bn. India's **ONGC**, however, holds the first right of purchase over the assets and after the TNK-BP deal was announced said that it was still in talks with PetroVietnam about pre-empting the deal. In January 2011, India's petroleum minister said that OVL's bid for BP's Vietnamese assets 'was not a closed chapter', suggesting negotiations are still under way.

Latest Developments

BP decided to reduce its Vietnamese upstream exposure significantly in March 2009 by withdrawing from two offshore blocks. The company will exit Block 5-2, in which it owns a 55.9% stake, and Block 5-3, in which it holds a 75% interest. The blocks contain the Hai Thach and Moc Tinh gas and condensate fields. According to BP, the licences no longer fit its portfolio. Maritime disputes between Vietnam, Taiwan and China are also likely to have played a part in its decision. BP has taken a US$210mn impairment loss in relation to exploration costs at the blocks, which it was operating in partnership with ConocoPhillips and PetroVietnam. The divestment spells the end of BP's plans to build a US$2bn pipeline linking the Hai Thach and Moc Tinh fields to the Nam Con Son gas project.

Petronas Vietnam

Company Analysis

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 cooperation 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 Petronas' Asian strategy.

SWOT Analysis

Strengths:	Significant upstream oil investor
	Substantial downstream fuels involvement
	Key player in petrochemicals segment
Weaknesses:	Little current upstream production
	No share in refining/fuels retail segment
	Limited direct role in gas development
Opportunities:	Growth in regional oil/chemicals demand
	Scope for petrochemicals expansion/upgrading
	Potential for joint Vietnam/Malaysia projects
Threats:	Changes in national energy policy

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- www.petronas.com.my

Oil Production

- 12,650b/d (2008)

Market Position

Petronas has interests in Vietnam's upstream, downstream and chemicals sectors. In partnership with PetroVietnam, the Malaysian firm operates four Vietnamese blocks (01, 02, 102, 106) and has interests in further nine (10, 11.1, 46, 46/02, 01/97, 02/97, 122, 103 and 107). Petronas operates two LPG plants, one in Hai Phong (which it owns through its 71.2% interest in **Thang Long LPG** company), and the other in Dong Nai. In addition, the firm has a 93.1% interest in the **Phu My Plastics & Chemical**, which operates a 100,000tpa PVC plant in Vung Tau.

Strategy

The company has been developing a number of deals in Vietnam and looks set to continue in this vein, accumulating a sizeable portfolio. In particular, Petronas is focusing on the development of production capacity.

Latest Developments

Petronas brought onstream the Topaz (Block 02) and Pearl (Block 01) oil fields in November 2010. Topaz has been producing 1,700b/d at launch, while Pearl yielded 2,500b/d. Petronas holds 85% in both fields, with the remainder held by PetroVietnam.

In September 2010, Petronas announced a discovery at the Ham Rong-2X well off the coast of Hai Phong. The well is in Block 102 and 106 in the Song Hong Basin and initial estimates suggested it could produce 6,300b/d of oil and 0.22Mcm/d of gas. Petronas Carigali is the operator of the block with a 50% interest, while partners **ATI Petroleum** and **Singapore Petroleum** own 20% each and PetroVietnam owns the remaining 10%. Although hydrocarbons were also discovered in earlier drillings of the Yen Tu-1X well and the Ham Rong-1X well, no concrete plans for development and production of the block had been made as of January 2011

In October 2009, a PetroVietnam official told Vietnamese newspaper Lao Dong that the company was in negotiations with Petronas, commodities trader **Trafigura** and Abu Dhabi-based **International Petroleum Investment Company** (IPIC) to take over the planned US$7bn 200,000b/d Long Son refinery project. However, the parties did not reach a deal, and PetroVietnam subsequently organised a roadshow in Japan in June 2010 to lure Japanese investment for Long Son.

In April 2009, Petronas made a significant gas discovery at the Hac Long field in Blocks 103 and 107. The discovery appears to be the largest gas find in northern Vietnam to date. The Hac Long (Black Dragon) field, located 100km offshore the Red River Basin, produced first test flows of around 400,000cm/d. Petronas holds 45% in the block working alongside PetroVietnam. The discovery is estimated to hold up to 50bcm of gas reserves and 45mn bbl of condensate, confirming the area's high

upside potential. The two firms announced in June 2008 their intention to spend US$58mn on a drilling campaign at the two blocks.

In January 2009, Petronas began the appraisal of the Yen Tu 1X well in Block 102. Wildcat wells are also being spudded in the adjacent Block 106. Petronas holds a 50% operatorship in both concessions. The company plans to spend US$85mn on exploration activities in the area in 2008-2009. According to its local partner **ATI Petroleum** (ATIP), the blocks hold 18mn bbl of recoverable reserves.

The Song Doc field in Block 46/02, where Petronas holds 15%, came onstream in December 2008, flowing at 25,000b/d. The field's proven reserves stand at 3mn bbl. Two more fields in the block are expected to produce by 2011.

In 2009, Petronas was expected to drill a wildcat and conduct a 2D survey in deepwater Block 122, located in the Phu Khanh Basin. The decision as to whether to proceed to development will be made on the basis of the data obtained. Block 122 covers an area of about 6,981sq km and is located in water depths of between 50m and 2,500m. Petronas is working on the block in a 50:50 JV with Chevron as operator, having signed a PSC in April 2006. Under the contract terms, Petronas and Chevron committed 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 years of the PSC's seven-year exploration period.

In June 2008, Petronas launched its LPG bottling plant in Dong Nai Province, which was acquired from **ExxonMobil** in September 2005. The plant, Petronas' second LPG facility in Vietnam, marked its entry into the country's southern LPG retail market. Petronas also operates the Thang Long LPG JV in collaboration with PetroVietnam.

Zarubezhneft

Company Analysis

The Russian state-owned company mainly operates through its Vietsovpetro JV with PetroVietnam. Although output is falling, the JV continues to account for over 60% of Vietnam's total output. Vietsovpetro remains the key to current oil supply and there have been no signs of any change in commitment. There are suggestions that the fields operated by the JV could be more cost-efficient and productive in IOC hands, but the Vietnam/Russia ties remain strong. As new upstream projects enter production, the gas industry develops and old fields decline, the role of Zarubezhneft looks set to diminish.

SWOT Analysis

Strengths:	Major domestic oil producer
	Long-standing JV with PetroVietnam
	Substantial exploration portfolio
Weaknesses:	No role in proposed refinery projects
	Declining output from mature fields
	Limited development projects
Opportunities:	Growth in local/regional oil demand
	Significant untapped reserves/acreage
Threats:	Competition from IOCs in new projects
	Changes in national energy policy
	Limited gas involvement

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Operating Statistics

- Year established: 1981

Oil Production

- 65,500b/d (2009)
- 77,500b/d (2008)
- 87,500b/d (2007)

Gas Production

- 0.82bcm (2009)

Financial Statistics

- Net revenue: US$3bn (2008e)
- Net profit: US$918mn (2008)

Market Position

Following Vietnam's entry into the Soviet trading bloc COMECON in 1978, Zarubezhneft became the first foreign company to operate in its oil industry, forming the 50:50 Vietsovpetro JV in 1981. Originally set to expire in 2010, the JV was extended indefinitely in October 2008. Reflecting a gradual shift in power, under the new terms Vietsovpetro became a limited company in January 2011, with Zarubezhneft holding 49% and PetroVietnam 51%.

Vietsovpetro operates seven fields in the South China Sea. Its main producing assets are the Bach Ho (White Tiger), Mo Rong (Dragon) and Gau Lon (Big Bear) fields. Although most of the fields have gas-capture facilities, direct gas involvement is limited. Given Vietnam's significant upside gas potential, this poses a threat to Zarubezhneft's long-term position in the country's energy sector.

Vietsovpetro's share of national oil production slipped below half of the national total for the first time in 2008. Production at its flagship Bach Ho field is declining steadily, producing around 125,000b/d in H208, half of its peak production in mid-1990s. By 2014, Vietsovpetro expects production at the field to decline to 20,000b/d.

With a 50% stake, Zarubezhneft is also a majority partner in VRJ Petroleum, alongside PetroVietnam (35%) and Japan's Idemitsu Kosan (15%).

Strategy

Frequent high-profile visits by Russian politicians to Vietnam underline Zarubezhneft's ongoing commitment to the Vietsovpetro JV. To maintain its preferred partner status, Zarubezhneft has been offering PetroVietnam equity in Russian upstream assets. In September 2008, the **Rusvietpetro** JV was established (PetroVietnam 49%) to develop four blocks in the Nenets region. The blocks currently consist of 13 fields and hold estimated oil reserves of around 572mn bbl. Other projects in Russia and third countries are being considered.

Vietsovpetro continues to drill on Block 09-1 (site of the Bach Ho and Rong fields) with moderate success. The development of new satellites is expected to partially offset the decline of the main fields.

In July 2010, the deputy director of Zarubezhneft, Victor Gorshenev, told Russian business newspaper Vedomosti that the company was hoping to decide whether to acquire blocks 05-2 and 05-3 in the Nam Con Son Basin off southern Vietnam. The company will either acquire the blocks through Vietsovpetro or as a minority partner. BP relinquished the blocks in March 2009, booking a US$102mn impairment cost.

Latest Developments

In December 2010, Vietsovpetro awarded Singapore-based oil and gas company **EMS Energy** a US$12mn contract for the construction of a pipe lay system. According to Upstream Online, EMS will be responsible for the design, manufacture and commission of the system. The contract outlines a 12-month delivery schedule.

In December 2009, VRJ Petroleum began production from the Nam Rong-Doi Moi oil field. The field is expected to produce 4,500b/d.

Vietsovpetro made a much-needed discovery near its Bach Ho field in July 2009. Test results at the new field, called Bach Ho Northeast-19, indicated the presence of oil with an API gravity of 41º, although no reserve estimates have been released.

In January 2008, VRJ Petroleum confirmed a commercial oil discovery in Block 9-3, located 135km offshore the city of Vung Tau. VRJ has drilled three exploration and appraisal wells on the Doi Moi structure in water depths of around 50m. The appraisal well flowed at 3,500b/d. Production at the field began on February 25 2010 and could be sustained for up to 25 years at 20,000b/d.

Vietgazprom – Summary

Vietsovpetro's gas counterpart is the 50:50 Vietgazprom JV formed in 2000 between PetroVietnam and **Zarubezhneftegas**, a subsidiary of Russian state gas company **Gazprom**. Originally focused on exploration, in 2006 the Russian and Vietnamese authorities announced plans to transform Vietgazprom into a fully integrated gas company. The company holds a sizeable prospective portfolio and has recently been increasing its drilling activity.

In 2007, the JV reported its first gas discovery at a well in Block 112, located in Bak Bo Bay, which registered initial flow rates of 400,000cm/d. Another discovery followed in October 2010, when Vietgazprom struck gas and condensate at Bao Vang field with its VGP-113-BV-3X well. Gas at the well flowed at 104mcm/d. The well is part of the six-well drilling programme that was planned by Vietgazprom over 2009 and 2010.

In February 2009, Vietgazprom received a licence to explore and develop blocks 129, 130, 131 and 132. The licence will be valid for 30 years, with the possibility of a five-year extension. Under the agreement, Vietgazprom has committed to drill at least two wildcat wells and carry out a 2D seismic survey within a three-year period. Gazprom announced that it would bear the initial costs of exploration.

In October 2008, PetroVietnam and Gazprom agreed to create a new JV called **Gazpromviet** to work in Russia and third countries.

ConocoPhillips – Summary

ConocoPhillips is the largest US energy investor in Vietnam. The company holds stakes in six blocks and its most successful project is a 23.25% operating stake in Block 15-1, located in the Cuu Long Basin site of the Lion oil fields: Su Tu Den, Su Tu Vang and Su Tu Trang. Combined production in 2009 stood at 29,000b/d of oil and 155Mcm of gas.

A lack of expansion in recent years means Conoco's Vietnamese operations could well form part of the US$10bn asset sale programme announced in October 2009, especially following the unexpected slump in production from its main Su Tu Vang field announced by the government in the same month. In April 2010, ConocoPhillips's Block 15-1 partner, KNOC, reported that the Su Tu Den north east had started producing oil. The company has a 23% stake in the project and expects gross peak production of 30mn boe/d. The company is currently appraising the Su Tu Trang and Su Tu Nau fields, with expected start-up in 2012.

ConocoPhillips also has a 36% interest in Block 15-2 in the Cuu Long Basin. The Phuong Dong (Oriental) oil field on the licence came onstream in August 2008, flowing at 2,000-3,000b/d. Output from the field will be blended and sold with oil from the nearby Rang Dong (Aurora) field, which currently

produces around 35,000b/d. Its partners in the block are **Japan Vietnam Petroleum**, a unit of **Nippon Oil**, with a 46.5% stake and PetroVietnam, with 17.5%.

In March 2009, Conoco farmed out a 38% stake in deepwater Blocks 113 and 114 in the Nam Con Son Basin to Talisman. The deal leaves Conoco with a 32% stake, with the remaining 30% held by PetroVietnam.

Idemitsu Kosan – Summary

In April 2008, Idemitsu signed a JV deal with PetroVietnam, Kuwait Petroleum Corporation (KPC) and Mitsui Chemicals to build the Nghi Son refinery, opening an office in the country soon after. Idemitsu and KPC will each hold 35.1% interests alongside PetroVietnam (25.1%) and Mitsui (4.7%). The US$6.2bn Nghi Son petrochemical and refining complex is expected to have capacity of around 200,000b/d and will be located in Thanh Hoa province, 175km south of Hanoi. Idemitsu plans to sell the refinery's oil products in Vietnam and other Asian countries, while Mitsui will obtain raw materials for synthetic fibres from the petrochemicals plant, processing them at its Asian facilities. The project suffered a setback in September 2010 when Idemitsu said that it had delayed an FID until March 2011. The company said the delay would push back the expected start date for the project from December 2013 to 2014.

In the upstream segment, Idemitsu is an equity holder in exploration licence 05-1 and has 15% in the VRJ exploration venture where it is partner to PetroVietnam and Zarubezhneft. The VRJ exploration venture saw block 9-3 come onstream in February 2010 producing about 20,000b/d.

Korea National Oil Corporation – Summary

KNOC has been involved in Vietnam's energy sector since 1992 and holds stakes in two producing assets – blocks 15-1 (14.25%) and 11-2 (39.75%).

KNOC and PetroVietnam started producing gas from Block 11-2 in December 2006. The field had initial output of 1.34bcm and is thought to be capable of producing around 24.2bcm of gas and 23mn bbl of condensate over its lifespan. The US$300mn block covers two gas condensate developments, Rong Doi (Twin Dragon) and Rong Doi Tay (Twin Dragon West), 280km offshore Ba Ria-Vung Tau province. Under the terms of a 2002 agreement, gas will be purchased by PetroVietnam until 2028 and all the output will be piped to a major power complex. Gross production from Block 11-2 is around 1.4bcm. Block 11-2 was the first overseas operating project of KNOC.

Chevron – Summary

US major Chevron has been exploring Vietnamese waters since 1996 and expanded its asset portfolio through the acquisition of Unocal in 2005. The company is currently the operator of three PSCs. It has a 42.4% stake in the unitised blocks B & 48-95, a 43.4% interest in Block 52/97 (all in the Cuu Long Basin) and a 50% interest in Block 122 in the Phu Khanh Basin. Following a discovery in May 2008, the gas reserves in the Block B & 48-49 fields of Kim Long, Ac Quy and Ca Voi, stand at around 70bcm, with Chevron claiming up to 142bcm of potential.

The cost of the development dubbed the Vietnam Gas Project is estimated at US$4.3bn, and the firm expects to begin production in 2014, with output rates potentially reaching 5.1bcm per annum. Gas will be sold to local power producers, and Chevron is proposing to construct a pipeline to transport Vietnamese gas to Malaysia and Thailand. It also intends to construct a gas-fired 750MW power plant in the province of Can Tho in the Mekong Delta region. In June 2009, Chevron was forced to push back the project's start-up from 2012 to 2014 over disagreements over gas sale prices with PetroVietnam. The company's CEO, Jim Ollen, however, told Reuters that negotiations were progressing and cited gas price range of US$5.8-8.2/mn BTU as reasonable.

In July 2009, Chevron and its partners awarded a US$4bn design contract for the Cuu Long gas development, which covers Blocks B, 48-95, and 52/97, to Japan's Mitsui. Other investors in the project are PetroVietnam and PTTEP.

Chevron was awarded an operating interest in Block 122 in April 2006. Under the terms of the seven-year PSC, equal partners Chevron and Petronas committed to acquire, process and interpret 3,000km of 2D seismic data and drill one exploratory well by 2009. However, a seismic programme on the block was suspended in 2007 because of a territorial dispute between Vietnam and China.

Talisman Energy – Summary

Canadian independent Talisman Energy has interests in four offshore blocks: Block 46/02 (30%), near the Malaysian maritime border; Block 15-2/01(60%) in the Cuu Long Basin; and Blocks 113 and 114 (38%) in the Nam Con Son Basin, which were acquired from ConocoPhillips in March 2009. In 2010, Talisman planned to spend around US$1.1bn in South East Asia, where it also holds development properties in Malaysia and Australia. In 2009 the company spent US$189mn in Vietnam. The focus of its 2010 capex programme will be the development of the Hai Su Den-Hai Su Trang (HSD/HST) field.

Block 46/02 contains the Song Doc field. Talisman has a 30% interest in Block 46/02 via the **Truong Son Joint Operating Company** (TSJOC), which operates the block. Its partners are PetroVietnam (40%) and Petronas (30%). Talisman estimates its net proven and probable (2P) reserves at the Song Doc field at 6mn bbl, of which 3mn bbl are proven. The company announced first oil production from Song Doc in

December 2008. Output from five pre-drilled wells was expected to average 24,000b/d in H109 and rise by the end of the year as more wells came online. The subsea wells are tied back to a central wellhead platform that is served by an FPSO unit capable of processing 30,000b/d and storing 360,000bbl of oil.

Talisman holds a 60% stake in Block 15-2/01, which contains the Hai Su Trang (White Sealion) and Hai Su Den (Black Sealion) fields, with the remaining 40% owned by PetroVietnam. In April 2009, the company said it planned to invest a total of US$1.1bn to develop commercial production at the two fields, which it aims to bring onstream in September 2011 with combined output of 35,000b/d. A development plan was to be sanctioned in 2009, but the go-ahead is now expected in 2011. The partners have discovered another field nearby called Hai Su Bac (Silver Sealion), with tests showing flow of around 600b/d. The field was declared commercial in October 2009.

Premier Oil – Summary

UK-based Premier Oil is one of the most active explorers of Vietnamese waters. The company holds equity in three blocks: 53.1% in Block 12W, 30% in Block 07-03 (both in the Nam Con Son Basin), and 50% in Block 104-109/05 (Hong Song Basin). Following the government's approval of its Block 12W development plan, the company has concentrated on sourcing the funds for an FPSO installation. Originally scheduled for 2010, funding difficulties have pushed back the launch to 2011.

Premier announced a discovery with the Chim Sáo North appraisal well on Block 12W in May 2008. The Chim Sáo field has estimated reserves of about 50mn boe and is scheduled to start producing 25,000boe/d in July 2011. The field also contains the Dua oil and gas discovery. Premier works on Block 12W alongside Australia's Santos (31.8%) and PVEP (15%). According to Premier, Block 12W has a similar geology to Indonesia's West Natuna Sea area.

In July 2009, Premier bought out Israel's Delek Energy's 25% stake in Block 12W for US$72mn. Future payments of up to US$10mn may be made if further discoveries are made on the block.

Premier reported a large discovery on Block 07/03 in June 2009, hitting a 90m oil column with its Ca Rong Do (Red Emperor) wildcat. The well tested flow rates of 3,265b/d of oil and 0.23Mcm/d from two reservoirs. The company will now carry out a 3D survey to define the resource potential of the prospect. An appraisal well (CRD-2X) will be drilled in February 2011. If commercial, Ca Rong Do could either be developed on its own or tied back to Premier's nearby Chim Sáo and Dua developments. The Cá Rong Vang (Golden Emperor) exploration well, however, came up dry in December 2009.

Following a farm-out agreement with **Pan Pacific Petroleum** (PPP) announced in May 2009, Premier's operating stake in Block 07/03 is to fall from 45% to 30%, leaving **Pitkin Petroleum** (a wholly owned subsidiary of **Vietnam American Exploration**) with 40% and **Pearl Oil** with 15%. In October 2009, however, PPP announced that PVEP had decided to pre-empt its farm-in to the licence.

A 50% operating interest in Block 104-109/05 was awarded to Premier in February 2008. A joint study between Premier and PetroVietnam has identified numerous leads on the block in water depths ranging from 20m to 60m. The PSC carries a firm work commitment of seismic acquisition plus one exploration well. Japan's Mitsui holds the other 50% and will carry the cost of the first exploration well under a farm-in agreement with Premier. Premier aimed to reach at least 50,000boe/d of production by end-2010.

Soco International – Summary

London-listed independent Soco began producing oil in Vietnam in July 2008 when the Ca Ngu Vang (Golden Tuna) field in Block 09-2 in the Cuu Long Basin came onstream. By end-2008, the field was producing 20,000b/d. SOCO holds a 25% stake in the block alongside partners PetroVietnam and Thailand's PTTEP.

Soco's other Vietnamese asset is a 30% stake in Block 16-1, also located in the Cuu Long Basin. First production from the Te Giac Trang field is expected in mid-2011. In late July 2010, SOCO partner Hoan Vu Joint Operating Company (HVJOC) said that it was considering drilling an additional CNV well between Q410 and Q211.

Soco reported another discovery at block 16-1 with the TGD-2X well in September 2010. In October, however, the company said that it had decided to plug and abandon the well after a disappointing production test. In January 2011, Soco said the government was reluctant to extend HVJOC's licence for Te Giac Den.

Total – Summary

French major Total entered Vietnam's upstream segment in 2007 and moved downstream in 2008 as part of its diversification strategy in the Asia Pacific region. In August 2007, Total was awarded a 35% interest in a PSC to explore Block 15-1/05 in the Cuu Long Basin. Exploration will be undertaken in conjunction with PetroVietnam (40%) and SK Energy (25%). The first phase of the exploration programme will involve 800sq km of 3D seismic and drilling two wells. The first well hit oil at the Lac Da Nau prospect in November 2009; the well tested at 4,300b/d of 44º API oil. In October 2010, Total reported another discovery at the block with the Lac Da Vang exploration well. The well flowed 3,500b/d of API 43° crude during production testing.

In March 2009, Total signed a PSC with PetroVietnam for exploration blocks DBSCL-02 and DBSCL-03, located onshore the Mekong Delta. Total will operate the blocks with a 75% interest, while the state company will hold the remaining 25%. Under the deal, the first phase of exploration will cover the acquisition of 2D seismic on the blocks, which cover 14,850sq km and 13,800sq km respectively.

In December 2008, **Elf Gas Saigon**, a JV between Total (85%) and **Saigon Construction** (15%), bought **Saigon Gas** for an undisclosed sum. The deal gives Elf Saigon 15% of the national LPG market, an LPG import station in Ho Chi Minh City and 20 LPG distributors.

Petrolimex – Summary

Petrolimex is the country's dominant fuels retailer, boasting around 6,000 outlets and a 60% market share. Under privatisation proposals announced in early January 2009, the government is planning to sell 25% of the company, although the timeframe is uncertain. Petrolimex is run by the Ministry of Trade and is one of the largest companies in Vietnam, with an estimated turnover of VND25trn (US$1.3bn) in 2008. Evaluating the company is difficult given that it does not publish accounts, but analysts interviewed by the Financial Times value it at US$1-1.5bn.

Although Petrolimex has an extensive distribution network and an established brand, it is set to face growing competition from private firms as the liberalisation of the downstream segment proceeds. In particular, the company's fuel import permits, the source of its current dominant market position, will gradually lose their power as more domestic refineries come onstream. A lack of exposure to the burgeoning refining sector is another source of weakness for the company.

Others – Summary

US major ExxonMobil was reportedly negotiating with PetroVietnam in November 2008 over the acquisition of its first Vietnamese exploration acreage. Any deal would most likely cover deepwater acreage offshore, although it would depend on Vietnam's resolving its maritime boundary dispute with China. In July 2008, Chinese officials told Exxon to withdraw from an exploration deal with Vietnam in the South China Sea, claiming that the blocks under contract were in Chinese waters and therefore constituted a breach of Chinese sovereignty.

According to a report at the time in the South China Morning Post, citing sources close to the US firm, Chinese diplomats in Washington DC were continually lobbying Exxon executives in the lead-up to the withdrawal, warning them that the company's future business interests on the Chinese mainland could be at risk if it were to proceed with exploration in the area. China and Vietnam have long disagreed over their respective territorial rights to the South China Sea. Although Exxon is reportedly confident of Vietnam's sovereign rights to the exploration blocks, the company will be extremely wary of antagonising the Chinese.

Vietnam's offshore acreage plays host to several Australian players. Major gas company Santos holds two offshore exploration licences: 55% of Block 101-100/04 in the northern Song Hong Basin and 31% in the PSA for Block 12W-12E. In April 2009, Santos spudded its first exploration well in Block 101-100/04.

The Ha Mai-1 wildcat is being drilled to a depth of 41m. Santos works on the block alongside **Singapore Petroleum Company** (SPC), a **PetroChina** subsidiary.

Independent **Neon Energy** signed a PSC with PetroVietnam for Block 120 in the Song Hong Basin in January 2009. Under the deal, Neon was to hold a 100% participating interest in the block but in April 2010 **Kris Energy** and **Enovation Resources** announced that they had farmed in to the block. Under the new arrangement, Neon will operate the block with a 50% stake, Kris will hold a 40% stake and Enovation will hold the remaining 10%.

In January 2010, Neon was awarded its second permit in Song Hong, Block 105-110/4. During the initial four-year exploration programme, the company plans to acquire 2D seismic data and drill at least one well, with surveys to start in 2010. Neon will hold 90% in Block 105-110/4 and PVEP the remaining 10%.

Singapore-based Kris Energy has acquired a 33.3% stake in Block 06/94 in the Nam Con Son Basin from British explorer **Serica Energy** in December 2009. Serica's decision to exit Vietnam is likely to have been prompted by disappointing drilling results. Serica originally intended to keep a 10% stake in the permit and sell the remaining 23.3% to **AWE**. The deal, however, was terminated in August 2009 after the first wildcat on the block came up dry. The other partners in the licence are Pearl Oil (33.34%) and Swedish company **Lundin Petroleum** (33.33%). More wells were planned to be drilled on the permit in 2010.

South Korea's SK Energy holds equity in one producing asset and two exploration licences. The company holds 9% in Block 15-1, which is operated by PetroVietnam (50%). Gross output in 2009 is expected to average 7,700b/d. In exploration blocks 123 and 15-1/05, SK holds 20% and 25% respectively.

Thailand's PTTEP has a gas producing asset in Block 9-2, with output reaching 20,000boe/d by end-2008. Its other asset, Block 16-1, is still in the exploration stage.

UK-based **Salamander Energy** holds two PSAs offshore southern Vietnam. It is the sole owner of the Cuu Long River Delta Block 1 (DBSCL-01) and holds 60% in nearby Block 31, where PetroVietnam holds the remaining 40%. Salamander plans to undertake geological and geophysical studies before starting exploration drilling in 2010. Salamander failed to find significant volumes of hydrocarbons at its Tom Hum Xanh-1X well in Block 31 in the offshore Vinh Chau Basin. The company plugged and abandoned the well. Japan's Nippon Oil holds three offshore licences in the southern Cuu Long Basin: 46.5% in Block 15-2, 35% in Block 05-1 and 40% in Block 16-2. Its first producing Vietnamese asset came onstream in Q308. Initial flow rates at the Phuong Dong field in Block 15-2 were 10,000b/d. Nippon Oil aims to develop the block's potential further.

Pearl Energy, a subsidiary of Abu Dhabi's **Mubadala** investment vehicle, holds two Nam Con Son licences. It is the operator of Block 06/94 (33.3%) and holds a participating interest in Block 07/03 (15%). In late June 2009, Pearl announced that its Tuong Vi-1X wildcat on Block 06/94 was a duster.

Kuwait Petroleum International (KPI) is part of the JV building the US$6bn oil refining and petrochemicals complex at Nghi Son, which is due for completion in 2013. The scheme includes a 200,000b/d refining complex, which is one of many destined to be built in the rapidly expanding Asian country.

Kuwait Foreign Exploitation Company (KUFPEC), the international arm of Kuwait Petroleum Company (KPC), holds stakes in three exploration blocks: 51, 19 and 20. In blocks 19 and 20 it has a 40% non-operating stake, working alongside Malaysian explorer **Mitra Energy** (60%). Mitra is contractually committed to drill at least one well in each block during the first three years of the licence period.

Oil And Gas Outlook: Long-Term Forecasts

BMI oil and gas forecasts have been extended to cover a 10-year period, providing a guide to likely supply and demand trends from 2010 to 2020. The near to medium-term projections are discussed in the body of this report, but our longer-term assumptions are discussed below.

Regional Oil Demand

A slowing of oil demand growth is predicted for the region beyond 2015, although China, India and Pakistan form the backbone of a robust consumption trend. The overall 2015-2020 gain of 10.8% is driven largely by 15.92% growth in China, 15.93% in India and 10.41% gains in Indonesia, Pakistan and Taiwan. Vietnam's growth is forecast at 35.72%, with 27.63% in PNG and 15.93% in Singapore. Japan is expected to see a decline of 1.82% in oil demand by the end of the period, with a 1.7% reversal forecast for South Korean consumption. A pedestrian growth rate is predicted for Australia (2.53%). Hong Kong and Thailand are expected to register respective gains of 10.41% and 9.87% during the 2015-2020 period.

Table: Asia Pacific Oil Consumption (000b/d)

Country	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Australia	970	974	979	984	989	994	999	1,004
China	10,664	11,090	11,478	11,880	12,236	12,604	12,982	13,306
Hong Kong	322	328	335	342	348	355	362	370
India	3,710	3,858	4,013	4,133	4,257	4,385	4,516	4,652
Indonesia	1,462	1,491	1,521	1,551	1,582	1,614	1,646	1,679
Japan	4,100	4,100	4,125	4,150	4,100	4,100	4,050	4,050
Malaysia	525	536	547	555	563	572	580	589
Pakistan	446	455	464	471	475	482	494	509
Papua New Guinea	37	39	41	43	45	47	50	52
Philippines	297	307	316	324	331	337	349	361
Singapore	1,117	1,150	1,185	1,220	1,257	1,295	1,334	1,374
South Korea	2,350	2,355	2,350	2,350	2,345	2,333	2,322	2,310
Taiwan	1,087	1,109	1,131	1,153	1,176	1,200	1,224	1,248
Thailand	1,040	1,061	1,082	1,104	1,120	1,143	1,165	1,189
Vietnam	**427**	**453**	**480**	**511**	**542**	**580**	**615**	**652**
BMI universe	28,553	29,307	30,047	30,772	31,368	32,041	32,689	33,345
other Asia/Pacific	744	750	756	762	768	774	780	786
Regional total	29,298	30,057	30,803	31,534	32,136	32,815	33,468	34,131

f = forecast. All forecasts: BMI.

Regional Oil Supply

The forecast 9.73% reduction in oil production by the Asia Pacific region in 2015-2020 is a reflection of significant declines in countries such as Indonesia (-14.67%), Pakistan (-29.23%), Thailand (-22.62%), Vietnam (-15.07%), Australia (-33.61%), India (-13.51%) and the Philippines (-22.62%). Somewhat more modest output declines are predicted for China (-6.65%) and Malaysia (-4.90%).

Table: Asia Pacific Oil Production (000b/d)

Country	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Australia	640	610	595	550	515	475	440	395
China	4,100	3,990	3,910	3,875	3,790	3,750	3,710	3,650
India	925	940	925	900	875	860	850	800
Indonesia	980	965	920	890	865	840	810	785
Japan	5	4	4	4	3	3	3	3
Malaysia	725	750	743	735	728	720	713	706
Pakistan	75	68	65	60	60	55	50	46
Papua New Guinea	35	34	32	31	30	29	27	26
Philippines	70	67	63	60	57	54	51	49
Singapore	na	na	na	na	na	na	na	na
South Korea	na	na	na	na	na	na	na	na
Taiwan	1	1	1	1	1	1	1	1
Thailand	318	302	287	273	259	246	234	222
Vietnam	**385**	**372**	**365**	**350**	**350**	**330**	**325**	**310**
BMI universe	8,224	8,068	7,877	7,697	7,502	7,334	7,187	6,967
other Asia/Pacific	951	960	970	980	989	999	1,009	1,019
Regional total	9,174	9,029	8,847	8,677	8,492	8,334	8,196	7,986

f = forecast; na = not applicable. All forecasts: BMI.

Regional Refining Capacity

Growth in oil refining capacity for the Asia Pacific region is forecast at 8.94% between 2015 and 2020, with most countries expected to boost crude processing capability. Hong Kong is set to remain refinery-free, while we see negative capacity changes in Japan. For China, 13.31% growth is predicted. India (+7.93%) and Pakistan (+15.38%) should also add significantly to capacity, but the regional leader in terms of growth is certain to be Vietnam, going from 140,000b/d in 2010 to an estimated 840,000b/d by 2020.

Table: Asia Pacific Oil Refining Capacity (000b/d)

Country	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Australia	734	734	734	734	734	734	734	734
China	9,595	9,895	10,145	10,445	10,695	10,995	11,245	11,495
Hong Kong	na	na	na	na	na	na	na	na
India	4,000	4,300	4,300	4,500	4,650	4,650	4,900	4,900
Indonesia	1,406	1,556	1,856	1,856	2,056	2,056	2,056	2,056
Japan	4,350	4,350	3,950	3,950	3,950	3,950	3,950	3,950
Malaysia	550	720	720	720	720	720	720	720
Pakistan	400	650	650	750	750	750	750	750
Papua New Guinea	33	33	33	33	33	33	33	33
Philippines	265	265	465	465	465	465	465	465
Singapore	1,385	1,400	1,400	1,400	1,475	1,475	1,550	1,550
South Korea	2,850	2,850	2,850	2,850	2,850	2,850	2,850	2,850
Taiwan	1,309	1,309	1,309	1,309	1,309	1,309	1,309	1,309
Thailand	1,240	1,240	1,240	1,540	1,540	1,540	1,540	1,540
Vietnam	**140**	**340**	**540**	**540**	**540**	**840**	**840**	**840**
BMI universe	28,257	29,642	30,192	31,092	31,767	32,367	32,942	33,192
other Asia/Pacific	438	438	438	438	438	438	438	438
Regional total	28,695	30,080	30,630	31,530	32,205	32,805	33,380	33,630

f = forecast; na = not available/applicable. All forecasts: BMI.

Regional Gas Demand

The Asia Pacific region's estimated 30.01% gas demand growth in 2015-2020 is a slight downturn from the 2010-2015 trend (31.36%), but still represents a major increase in consumption. Leading the way in absolute terms is China with 47.20% growth to 206bcm. PNG, the Philippines and Vietnam will grow still more quickly, but from a low base. India and Hong Kong are forecast to register gains of 53.85% and 33.82%, while Pakistan and Thailand should use 22.44% and 25.20% more gas respectively. Consumption is expected to rise much more slowly in Japan, South Korea, Australia and Malaysia.

Table: Asia Pacific Gas Consumption (bcm)

Country	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Australia	29.5	30.4	31.1	31.9	32.7	33.5	34.4	35.2
China	118.3	130.0	140.0	150.5	161.0	180.0	192.6	206.1
Hong Kong	3.2	3.4	3.6	3.8	4.0	4.2	4.5	4.8
India	85.5	97.7	105.0	109.9	122.1	137.4	146.5	152.6
Indonesia	43.1	45.7	48.4	51.3	54.4	57.6	61.1	64.8
Japan	89.3	89.6	89.8	90.1	90.4	90.6	90.9	91.2
Malaysia	33.8	34.7	35.2	36.1	37.9	39.7	40.2	41.1
Pakistan	42.0	43.5	44.8	46.0	47.5	48.5	51.8	54.4
Papua New Guinea	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4
Philippines	4.8	5.3	5.7	6.2	6.8	7.5	9.0	9.0
Singapore	11.8	12.7	13.7	14.7	15.8	17.0	18.2	19.6
South Korea	44.8	44.8	46.8	48.9	48.9	48.9	53.0	55.0
Taiwan	13.0	13.5	13.8	14.1	14.4	14.7	15.0	15.3
Thailand	46.0	48.3	50.7	53.3	54.8	57.6	60.5	63.5
Vietnam	**14.0**	**16.0**	**18.0**	**20.0**	**22.0**	**24.0**	**26.0**	**28.0**
Regional total	579.2	615.7	646.9	676.9	713.0	761.5	804.0	841.0

f = forecast. All forecasts: BMI.

Regional Gas Supply

A production increase of 15.44% is forecast for the Asia Pacific region in 2015-2020, representing a significant deceleration compared with the 2010-2015 period (33.12%). Australia, India and the Philippines are expected to lead the way, with supply growth of 35.80%, 16.44% and 50.94% respectively. Malaysia is capable of delivering 17.65% more gas by the end of the period. Indonesia's supply is expected to grow by 12.50%, while less gas is expected to be offered by Thailand (-15.15%).

Table: Asia Pacific Gas Production (bcm)

Country	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Australia	62.0	70.0	81.0	90.0	100.0	105.0	110.0	110.0
China	89.0	89.5	90.0	93.0	95.0	96.0	98.0	100.0
India	60.0	70.0	73.0	75.0	80.0	81.0	82.0	85.0
Indonesia	85.0	82.0	80.0	85.0	90.0	90.0	90.0	90.0
Malaysia	75.0	80.0	85.0	90.0	90.0	95.0	100.0	100.0
Pakistan	41.0	42.0	42.0	42.0	44.0	45.0	47.0	48.0
Papua New Guinea	8.0	20.0	36.0	36.0	37.0	37.0	38.0	38.0
Philippines	4.8	5.0	5.3	5.5	6.0	6.5	8.0	8.0
South Korea	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.3
Taiwan	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Thailand	34.0	33.0	33.0	33.0	32.0	32.0	30.0	28.0
Vietnam	**15.0**	**20.0**	**22.0**	**25.0**	**25.0**	**25.0**	**25.0**	**25.0**
Regional total	474.8	512.3	548.1	575.2	599.7	613.2	628.7	632.7

f = forecast. All forecasts: BMI.

Vietnam Country Overview

Between 2010 and 2020, we are forecasting a decline in Vietnamese oil production of 12.7%, with crude volumes peaking at 390,000b/d in 2011/12, before slipping to 310,000b/d by 2020. Oil consumption between 2010 and 2020 is set to increase by 78.1%, with growth beyond 2009 ranging from 5-7% per annum and the country using 652,000 b/d by 2020. Gas production is expected to rise from an estimated 8.9bcm in 2010 to 25.0bcm in 2020. With 215% demand growth, we see potential for exports midway through the period to turn into modest imports by the end of the period.

Methodology And Risks To Forecasts

In terms of oil and gas supply, as well as refining capacity, the projections are wherever possible based on known development projects, committed investment plans or stated government/company intentions. A significant element of risk is clearly associated with these forecasts, as project timing is critical to volume delivery. Our assumptions also take into account some third-party estimates, such as those provided by the US-based Energy Information Administration (EIA), the International Energy Agency (IEA), the Organisation of the Petroleum Exporting Countries (OPEC) and certain consultants' reports that are in the public domain. Reserves projections reflect production and depletion trends, expected exploration activity and historic reserves replacement levels.

We have assumed flat oil and gas prices throughout the extended forecast period, but continue to provide sensitivity analysis based on higher and lower price scenarios. Investment levels and production/reserves trends will of course be influenced by energy prices. Oil demand has provide itself to be less sensitive to pricing than expected, but will still have some bearing on consumption trends. Otherwise, we have assumed a slowing of GDP growth for all countries beyond our core forecast period (to 2015) and a further easing of demand trends to reflect energy-saving efforts and fuels substitution away from hydrocarbons. Where available, government and third-party projections of oil and gas demand have been used to cross check our own assumptions.

Glossary Of Terms

AOR	Additional Oil Recovery
APA	Awards for Predefined Areas
API	American Petroleum Institute
bbl	barrel
bcm	billion cubic metres
b/d	barrels per day
bn	billion
boe	barrels of oil equivalent
BTC	Baku-Tbilisi-Ceyhan Pipeline
BTU	British Thermal Unit
Capex	capital expenditure
CBM	coal bed methane
CEE	Central and Eastern Europe
CPC	Caspian Pipeline Consortium
CSG	coal seam gas
DoE	US Department of Energy
EBRD	European Bank for Reconstruction & Develpt
EEZ	exclusive economic zone
e/f	estimate/forecast
EIA	Energy Information Administration
EM	emerging markets
EOR	enhanced oil recovery
E&P	exploration and production
EPSA	exploration and production sharing agreement
FID	final investment decision
FDI	foreign direct investment
FEED	front end engineering & design
FPSO	floating production, storage & offloading
FTA	free trade agreement
FTZ	free trade zone
GDP	gross domestic product
G&G	geological and geophysical
GoM	Gulf of Mexico
GS	geological survey
GTL	gas-to-liquids conversion
GW	gigawatts
GWh	gigawatt hours
HDPE	high density polyethylene
HoA	Heads of Agreement
IEA	International Energy Agency
IGCC	Integrated Gasification Combined Cycle
IOC	international oil company
IPI	Iran-Pakistan-India Pipeline
IPO	initial public offering
JOC	joint operating company
JPDA	Joint Petroleum Development Area
JV	joint venture
KCTS	Kazakh Caspian Transport System
km	kilometres
LAB	Linear Alkyl Benzene
LDPE	low density polypropylene
LNG	liquefied natural gas
LPG	liquefied petroleum gas
m	metres
mcm	thousand cubic metres
Mcm	mn cubic metres
MEA	Middle East and Africa
mn	million
MoU	Memorandum of Understanding
mt	metric tonne
MW	megawatts
na	not available/ applicable
NGL	natural gas liquids
NOC	national oil company
OECD	Organisation for Economic Cooperation & Development
OPEC	Organisation of the Petroleum Exporting Countries
PE	polyethylene
PP	polypropylene
PSA	production sharing agreement
PSC	production sharing contract
q-o-q	quarter-on-quarter
R&D	research and development
R/P	reserves/production
RPR	reserves to production ratio
SGI	strategic gas initiative
SoI	Statement of Intent
SPA	Sale and Purchase Agreement
SPR	Strategic Petroleum Reserve
t/d	tonnes per day
tcm	trillion cubic metres
toe	tonnes of oil equivalent
tpa	tonnes per annum
TRIPS	Trade-Related Aspects of Intellectual Property
trn	trillion
T&T	Trinidad and Tobago
TTPC	Trans-Tunisian Pipeline Company
TWh	terawatt hours
UAE	United Arab Emirates
USGS	US Geological Survey
WAGP	West African Gas Pipeline
WIPO	World Intellectual Property Organisation
WTI	West Texas Intermediate
WTO	World Trade Organisation
y-o-y	year-on-year

Glossary Of Vietnamese Oil And Gas Fields

Vietnamese Name	English Name	Vietnamese Name	English Name
Bach Ho	White Tiger	Moch Tinh	Jupiter
Ca Ngu Vang	Golden Tuna	Nam Rong	Dragon South
Ca Rong Do	Red Emperor	Phuong Dong	Oriental
Chim Saó	Blackbird	Rang Dong	Aurora
Dai Hung	Great (Big) Bear	Rong Doi	Twin Dragon
Hac Long	Black Dragon	Rong Doi Tay	Twin Dragon West
Hai Su Back	Silver Sea lion	Rong Tre	Young Dragon
Hai Su Den	Black Sea lion	Su Tu Den	Black Lion
Hai Su Trang	White Sea lion	Su Tu Nau	Brown Lion
Hai Thach	Sea Stone	Su Tu Trang	White Lion
Hong Ngoc	Ruby	Su Tu Vang	Golden Lion
Kim Long	Golden Dragon	Te Giac Trang	White Rhinoceros
Lan Do	Red Orchid	Thien Long	Eagle
Lan Tay	Orchid West	Tran Chau	Pearl
Mo Rong	Dragon	Yen Tu	Quiet, resting place

Business Environment Ratings Methodology

Risk/Reward Ratings Methodology

BMI's approach in assessing the risk/reward balance for oil and gas industry investors is threefold. First, we have disaggregated the upstream (oil and gas E&P) and downstream (oil refining and marketing, gas processing and distribution), enabling us to take a more nuanced approach to analysing the potential within each segment, and identifying the different risks along the value chain. Second, we have identified objective indicators that may serve as proxies for issues and trends that were previously evaluated on a subjective basis. Finally, we have used **BMI**'s proprietary Country Risk Ratings (CRR) in a more refined manner in order to ensure that only those risks most relevant to the industry have been included. Overall, the new ratings system – which is now integrated with those of all industries covered by **BMI** – offers an industry-leading insight into the prospects/risks for companies across the globe.

Ratings Overview

Conceptually, the new ratings system is organised in a manner that enables us clearly to present the comparative strengths and weaknesses of each state. As before, the headline oil and gas rating is the principal rating. However, the differentiation of upstream and downstream and the articulation of the elements that comprise each segment enable more sophisticated conclusions to be drawn, and also facilitate the use of the ratings by clients who have varying levels of exposure and risk appetite.

Oil & Gas Business Environment Rating: This is the overall rating, which comprises 50% upstream BER and 50% downstream BER;

Upstream Oil & Gas Business Environment Rating: This is the overall upstream rating, which is composed of rewards/risks (see below);

Downstream Oil & Gas Business Environment Rating: This is the overall downstream rating, which comprises rewards/risks (see below);

Both the upstream BER and downstream BER are composed of Rewards/Risks sub-ratings, which themselves comprise industry-specific and broader country risk components;

Rewards: Evaluates the sector's size and growth potential in each state, and also broader industry and state characteristics that may inhibit its development;

Risks: Evaluates both industry-specific dangers and those emanating from the state's political and economic profile that call into question the likelihood of expected returns being realised over the assessed time period.

Table: BMI's Oil & Gas Business Environment Ratings – Structure

Component	Details
Oil & Gas Business Environment Rating	Overall rating
Upstream BER	**50% of Oil & Gas BER**
Rewards	70% of Upstream BER
– Industry rewards	75% of Rewards
– Country rewards	25% of Rewards
Risks	30% of Upstream BER
– Industry risks	65% of Risks
– Country risks	35% of Risks
Downstream BER	**50% of Oil & Gas BER**
Rewards	70% of Downstream BER
– Industry rewards	75% of Rewards
– Country rewards	25% of Rewards
Risks	30% of Downstream BER
– Industry risks	60% of Risks
– Country risks	40% of Risks

Source: BMI

Indicators

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

Table: BMI's Oil & Gas Business Environment Upstream Ratings – Methodology

Indicator	Rationale
Upstream BER: Rewards	
Industry rewards	
Resource base	
– Proven oil reserves, mn bbl	Indicators used to denote total market potential. High values given better scores.
– Proven gas reserves, bcm	

Table: BMI's Oil & Gas Business Environment Upstream Ratings – Methodology

Indicator	Rationale
Growth outlook	
– Oil production growth, 2009-2014	Indicators used as proxies for BMI's market assumptions, with strong growth accorded higher scores.
– Gas production growth, 2009-2014	
Market maturity	
– Oil reserves/production	Indicator used to denote whether industries are frontier/emerging/developed or mature markets. Low existing exploitation in relation to potential is accorded higher scores.
– Gas reserves and production	
– Current oil production vs peak	
– Current gas production vs peak	
Country rewards	
State ownership of assets, %	Indicator used to denote opportunity for foreign NOCs/IOCs/independents. Low state ownership scores higher.
Number of non-state companies	Indicator used to denote market competitiveness. Presence (and large number) of non-state companies scores higher.
Upstream BER: Risks	
Industry risks	
Licensing terms	Subjective evaluation of government policy towards sector against BMI-defined criteria. Protectionist states are marked down.
Privatisation trend	Subjective evaluation of government industry orientation. Protectionist states are marked down.
Country risks	
Physical infrastructure	Rating from BMI's CRR. It evaluates the constraints imposed by power, transport and communications infrastructure.
Long-term policy continuity risk	From CRR It evaluates the risk of a sharp change in the broad direction of government policy.
Rule of law	From CRR. It evaluates government's ability to enforce its will within the state.
Corruption	From CRR, to denote risk of additional legal costs and possibility of opacity in tendering or business operations affecting companies' ability to compete.

Source: BMI

Table: BMI's Oil & Gas Business Environment Downstream Ratings – Methodology

Indicator	Rationale
Downstream BER: Rewards	
Industry rewards	
Market	
– Refining capacity, 000b/d	Indicator denotes existing domestic oil processing capacity. High capacity is considered beneficial.
– Oil demand, 000b/d	Indicator denotes size of domestic oil/gas market. High values are accorded better scores.
– Gas demand, bcm	
– Retail outlets/1,000 people	Indicator denotes fuels retail market penetration; low penetration scores highly.
Growth outlook	
– Oil demand growth, 2009-2014	Indicators used as proxies for BMI's market assumptions, with strong growth accorded higher scores.
– Gas demand growth, 2009-2014	
– Refining capacity growth, 2009-2014	
Import dependence	
– Refining capacity vs oil demand, %, 2009-2014	Indicators denote reliance on imported oil products and natural gas. Greater self-sufficiency is accorded higher scores.
– Gas demand vs gas supply, %, 2009-2014	
Country rewards	
State ownership of assets, %	Indicator used to denote opportunity for foreign NOCs/IOCs/ independents. Low state ownership scores higher.
No. of non-state companies	Indicator used to denote market competitiveness. Presence (and large number) of non-state companies scores higher.
Population, mn	From BMI's CR team. Indicators proxies for market size and potential.
Nominal GDP, US$bn	
GDP per capita, US$	
Downstream BER: Risks	
Industry risks	
Regulation	Subjective evaluation of government policy towards sector against BMI-defined criteria. Bureaucratic/intrusive states are marked down.
Privatisation trend	Subjective evaluation of government industry orientation. Protectionist states are marked down.
Country risks	
Short-term policy continuity risk	Rating from BMI's CRR. Evaluates risk of a sharp change in the broad direction of government policy.
Short-term economic external risk	From CRR. Evaluates vulnerability to external economic shock, the typical trigger of recession in emerging markets.
Short-term economic growth risk	From CRR. Evaluates current trajectory of growth and the state's

Table: BMI's Oil & Gas Business Environment Downstream Ratings – Methodology

Indicator	Rationale
	position in the economic cycle.
Rule of law	From CRR. Evaluates government's ability to enforce its will within the state.
Legal framework	From CRR. Denotes risk of additional illegal costs/possibility of opacity in tendering/business operations affecting companies' ability to compete.
Physical infrastructure	From CRR. It evaluates the constraints imposed by power, transport and communications infrastructure.

Source: BMI

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 historical 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.

Energy Industry

There are a number of principal criteria that drive our forecasts for each Energy indicator.

Energy supply

Supply of crude oil, natural gas, refined oil products and electrical power is determined largely by investment levels, available capacity, plant utilisation rates and national policy. We therefore examine:

- national energy policy, stated output goals and investment levels,

- company-specific capacity data, output targets and capital expenditures, using national, regional and multinational company sources,

- international quotas, guidelines and projections, such as OPEC, IEA, US Energy Information Administration (EIA),

Energy consumption

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

- underlying economic (GDP) growth for individual countries/regions, sourced from **BMI** published estimates. Historic relationships between GDP growth and energy demand growth at an individual country are analysed and used as the basis for predicting levels of consumption,

- government projections for oil, gas and electricity demand,

- third-party agency projections for regional demand, such as IEA, EIA, OPEC.

- extrapolation of capacity expansion forecasts, based on company- or state-specific investment levels.

Cross checks

Whenever possible, we compare government and/or third party agency projections with the declared spending and capacity expansion plans of the companies operating in each individual country. Where there are discrepancies, we use company-specific data as physical spending patterns to ultimately determine capacity and supply capability. Similarly, we compare capacity expansion plans and demand projections to check the energy 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.

Sources

Sources include those international bodies mentioned above, such as OPEC, IEA, and EIA, as well as local energy ministries, official company information, and international and national news agencies.

