INTRODUCTION

The oil industry has successfully dealt with many challenges in the past, through technology development, extended reach, innovative ways of doing business and by continuously creating and developing new opportunities. But the demand picture for the 2006 and 2007 appears far from robust. The strong demand growth seen in 2004 declined sharply in 2005 and this deceleration has continued into 2006. This has happened, despite the strong momentum in the global economy. Demand growth in 2006 is remain moderate 1.0 million barrels as day (mb/d), and expected to be reached 1.3 mb/d in 2007, although this requires a rebound from current trends.

Meantime, on the supply side the outlook for Non-Opec has changed dramatically after Non-Opec supply growth has fallen behind world demand growth over the past few years – which had led to Opec unexpectedly meeting the bulk of rising demand to the tune of around 4.5 mb/d since 2002, while also accelerating plans to expend production capacity. Non-Opec supply has already picked up by 0.9 mb/d in 2006 and is expected to grow this year at 1.8 mb/d, the highest rate since 2004, pointing to a clear imbalance between supply and demand.

Growth in Non-Opec supply is expected to exceed growth in world demand by around 0.7 mb/d in 2007, indicating the need for measures to rebalance a market already flush with stocks. As a result, the demand for Opec oil will be 28.1 mb/d, around 1.6 mb/d lower than total Opec production in September 2006.

This global situation leads, at least, to two issues are emerging, as Indonesia becomes a net oil importing country. First, it is not the volume but the value of the trade in crude oil and petroleum products that matters and its effects on the terms of trade in particular and the national economy in general. The projection (Prawiraatmadja, 1997) points to Indonesia becoming a major product importer, while still managing to export crude oil in the short to medium term. This leads to the second issue: trends in the international oil market, particularly in the Asia Pacific region, have implications for Indonesia, because the supply and demand balance of petroleum products in the region affects the availability of the products Indonesia needs. What are the futures prices of these products likely to be? How will these factors affect the process of market liberalization in Indonesia?

This paper argues that there is nothing intrinsically wrong with becoming a net oil importing country, but the adjustment is necessary. The downstream oil sector is likely to be the key to ensuring that the transition to net oil importing (in term of value) will not weigh down the national economy.

METHODS

The literature suggests three main channels through which natural resource abundance can affect
growth. One channel highlights political economy effects, whereby natural resources generate rents which in turn leads to rapacious rent-seeking (the “voracity” effect, as in Tornell and Lane, 1999) and to increased corruption (Mauro, 1995; Leite and Weidmann, 1999) with adverse effects on long term growth. Second, heavily dependence on natural resources exposes countries to volatility, particularly with regard to commodity prices, which could have an adverse effect on growth. Finally, there is well-known “Dutch Disease” problem, whereby exploitation of natural resources leads to real exchange rate appreciation, and this in turn results in a contraction of the tradable sector.

As argued by Sala-i-Martin and Subramanian (2003), this outcome, combined with the proposition that the tradable sectors generate higher growth owning to learning-by-doing and other positive externalities, leads to the conclusion that natural resource abundance exerts a drag on growth over the long run. At the same time, it could be argued that the Dutch disease is not a “disease” per se, but simply reflects the healthy functioning of the price mechanism including on factor prices in a general equilibrium framework.

Ezaki (1989) using CGE model of Indonesia constructed for 1980 and 1985 found that the negative impacts of the 105 price decline are fairly smaller in 1985 than in 1980. This means that there should have occurred some structural changes or structural adjustments in the Indonesian economy between the two years to mitigate the negative effects of the reverse oil stock” which began in March 1983.

With regard to question of how good to use revenue derived from exhaustible resources can be trace out from Solow (1974a) warned of the effects stemming from the traditionally high degree of volatility in these markets, he argued that, “in tranquil conditions, resource market track their equilibrium paths moderately well”, but that they are often exposed to shocks and “drastic movements of ... price and production”.

The first oil-price shock in the early 1970s sparked a number of studies that analyzed the question of whether governments should save (windfall) revenue from oil production or invest in productive capital. Solow (1974b) and Hartwick (1977, 1978), formally derived constant per-capita consumption streams from the exploitation of natural resources by having governments invest related revenues in productive capital. Around the second oil-price shock, Corden and Neary (1982), together with van Wijnbergen (1984), and Corden (1984), warned about the potentially harmful side-effects of excessive spending of resource revenues on macroeconomic stability, initiating an extensive literature on “Dutch disease” effects.

**Indonesia: Net Oil Importer.** A net oil importer country is one in which the combined volume of crude oil and oil products traded is in deficit. While it would be nice to have a trade surplus from oil, being a net importer is not of itself a cause for concern. Countries are not equally endowed with petroleum resources and most Asia – Pacific economies that have experienced high economic growth have been net oil importers. Examples include Japan, South Korea and Taiwan; Chine too has recently become a net importer, and yet the China economy continues to boom.

Given Indonesia’s modest oil reserves (currently around 5.5 billion barrels proven and a further 5.5 billion potential) and its population of around 200 million people, it is merely a matter of time before the country becomes a net oil importer. This prospect provides strong motivation for the economy to perform even better in the area of manufactured exports, which have been the driving force behind its high economic growth in recent years.

Indeed, the free fall of the oil price in the early and mid 1980s was a blessing in disguise, forcing Indonesia to realize that it could not continue to rely on revenues generated from oil exports alone. Deregulation and sound macro economy policies adopted since the oil price collapse have resulted in a significant improvement in economic growth, spurred by the manufacturing sector.

The transition from a petroleum-based economy to one driven by the export of manufactured goods has already happened. Exports of manufactures have been surging. Oil and natural gas accounted for 82 % of total export revenue in 1981/82, but their share has fallen continuously since then, and is now a mere 25 %. If this trend continues, becoming a net oil importer will not pose a serious problem for Indonesia in the long run. In the short term, however, strong economic growth has necessitated high imports, mainly in the form of capital goods needed to support the manufacturing sector, which in turn will generate more exports in the long term. This import level has resulted in a current account deficit of more than $ 6.5 billion. The deficit is exacerbated by the country’s high foreign debt of close to $ 100 billion, which has resulted in a debt-service ratio (the ratio of principal and interest repayments to exports) of around 30 %. It is therefore imperative that Indonesia continue to export as much petroleum as possible, until exports of manufactured goods begin to generate a high surplus in the trade balance – the situation currently
enjoyed by countries such as Taiwan and South Korea.

Impacts for the T.O.T. Exports of oil and natural gas are still essential if the trade balance is to remain in surplus. Indeed, it is the petroleum sector that provides the foundation for continued economic growth. While natural gas exports (LNG and LPG) can probably be maintained in the foreseeable future, that oil sector’s contribution will decline and eventually post a deficit when the oil import bill becomes larger than oil export revenues. To demonstrate this, it is necessary to analyze future supply and demand for both crude oil and petroleum products.

Current and Future Oil Production. Production in 1991 reached a peak at 1,530 kb/d in 1993 to barrels per day (KB / d), but declined steadily from 1,530 KB / d in 1993 to 1,499 in 1995. (Indonesia’s all-time high was 1,685 KB / d in 1977). On the other hand, imports of crude have also been increasing, from around 120 KB / d in 1990 and 1991 to 160 between 1992 and 1994, and almost 190 kid / d in 1995. Indonesia needs about 100 kb / d of Middle Eastern crude’s to produce asphalt, lubes and other petroleum products such as light distillates (LPG, gasoline and naphtha); middle distillates (avtur, kerosene and diesel); and heavy distillated (fuel oil), since indigenous curds are ill suited for making these products. Other imports have been used to optimize domestic refinery output, especially in efforts to increase middle distillate yields. Most of these curds are of the light sweet type from Malaysia, Australia and West Africa.

Between 1990 and 1995 the capacity utilization of domestic refineries was in the range of 90 to 96 %, translating to average crude runs of almost 800 kb / d; this does not include the newly on-stream EXOR I, which was officially brought into production in 1995 but had been used for test runs since late 1994. Meanwhile, during the same period, crude oil exports averaged 830 KB / d. With EXOR I in full operation and using 100-110 KB / d of indigenous crude, oil exports declined from 888 KB / d in 1994 to 827 in 1995.

We expect that the current level of production can be maintained for another year or two before a decline begins. According to our base case estimates, total production will be around 1,300 KB / d in 2000. By then, Indonesia crude oil exports are expected to have declined from the current level to about 600 kb / d. Since Indonesia also imports crude and an increasing volume of products, it may well become a net oil importer not long after the turn of the century.

Petroleum Product Demand. Table 1 shows petroleum product consumption from 1987 to 1995. In 1994 there was a 0.8 % decline in the consumption of major products – gasoline, avtur, kerosene, gas oil (automotive diesel oil, or ADO, and industrial diesel oil, or IDO), fuel oil and LPG. This phenomenon was unprecedented, since consumption of these products had been increasing at about 9 % annually from 1987 to 1993 – a result of the country’s impressive economic growth rate of well over 6 % per annum. Yet in 1994 the economy was not stagnating; in fact, GDP increased by over 7 %. How, then, can we explain the 1994 decline in oil consumption, and how will it affect demand projections?

Oil has been Indonesia’s dominant primary energy resource, although this share in the total primary energy mix has continually declined, from as high as 90 % 1972 to around 60 % in 1994. This decline is the result of energy diversification efforts – especially in the electricity sector, where substitution away from oil has long been planned and is economically practicable. Consumption of electricity supplied by the state-owned utility rose by more than 15 % per year from 1987 to 1993, and the electricity sector’s consumption of oil (i.e. fuel oil and diesel) declined by a huge 44 % in 1994, a reduction of 51 thousand barrels per day.

Since Indonesia’s total (commercial) primary energy consumption in 1994 increased by 10 %, the decline in oil consumption was more than offset by arise in the use of other energy resources. In 1994, oil’s share in total primary energy consumption fell to just over 60 %, from around 64 % in 1993. At the same time, coal consumption increased by more than 30 % (raising its share of the total from 8 to 10 %), while natural gas consumption went up by more than 20 % (its share rising from 21 to 24 %). Geothermal energy, despite contributing only 1 % to total primary energy consumption, increased by 22 % in 1994.

As table 1 shows, although total oil product consumption fell in 1994, there were increases in demand for LPG (16 %), gasoline (12 %), avtur (11 %) and kerosene (3 %). By contrast, a large drop occurred in fuel oil consumption (almost 22 %), and ADO and IDO consumption also fell (by 3.5 % and 4 %, respectively).

When demand is analyzed by sector, it becomes apparent that the reductions in fuel oil and ADO/IDO consumption in 1994 were caused by the electricity sector’s diversification away from these fuels. In the other sectors, the consumption of petroleum products actually increased in 1994; in transportation by 12 %, in industry by 3.8, and in the household sector (which includes commercial consumption) by 4 %.

The largest shares of consumption in the transport
sector in 1994 were of gasoline (46%) and ADO (47%), followed distantly by avtur (5%)’ IDO (1%) and fuel oil (less than 1%). In the industrial sector, ADO accounted for a similarly large share (63%) of consumption followed by fuel oil (19%) and IDO (17%), with kerosene taking a much smaller share (1%). Consumption in the household sector is dominated by kerosene (about 90%), although its share has been declining, and LPG accounts for the rest. Following the electricity sector’s large reduction in petroleum product demand in 1994, its consumption shares were almost equally divided between fuel oil (50%) and ADO (49%), with IDO (1%) accounting for the remainder.

RESULTS AND DISCUSSION

The Petroleum Product Balance. To balance refinery output and domestic demand, Indonesia engages in petroleum product trades. Indonesia has been an exporter of straight run naphtha and fuel oil (in the form of low sulfur waxy residue, LSWR), whereas diesel is heavily in deficit. Exports of LSWR have been in the range of 120-135 KB / d, while exports of naphtha have fallen from around 35 kid / d in 1990 to 18 in 1995. Until 2000, we expect that LSWR exports will continue to be above 100 KB / d, whereas naphtha exports will diminish, because domestic consumption will surge in tandem with the massive expansion of the country’s ethylene production capacity.

Product imports rose from around 65 KB / d in 1990 to 148 in 1995, to meet escalating domestic demand at a time when domestic refinery output was somewhat flat. The 1994 reduction in imports reflects the fall in product consumption discussed above. Since we expect demand growth to continue, we predict that product imports will rise sharply by the year 2000, especially if there is no significant expansion of domestic refining capacity.

Petroleum product exports and imports reflect the imbalance between Indonesia’s demand pattern and domestic refinery output. When we compare domestic consumption and refinery output from 1993 to 1995 for the major petroleum products, which constitute more than 90% of total petroleum consumption. With the additional of EXOR I in 1995 with its total capacity of 987 thousand barrels per day, the domestic refining system could meet current domestic demand if refinery output were able to match the demand pattern. Domestic production of gasoline is nearly in balance with demand. However, Indonesia has a large surplus of fuel oil and a pronounced shortage of middle distillate. In 1995, Indonesia exported almost 138 kb/d of LSWR, while importing 37 KB / d of kerosene (kerosene and avtur) and 81 KB / d of diesel oil.

Implication for the Product Balance. It is obvious that, to meet the increasing demand, Indonesia needs more refining capacity if it does not want to be too dependent on imports. Since 1989, Indonesia has been trying to attract foreign companies to invest in the refining sector, but none has done so. A major hindrance is that government, with a social objective that requires subsidies sets domestic prices. Since private sector access to the domestic retail market is still prohibited, any products destined for the domestic market would have to be purchased by the national oil company, Pertamina. The government’s position is that any such output would be priced at international market rates. But Pertamina can provide no guarantee that it will actually buy these products, or will it guarantee to make any crude supply available to private refiners.

In the meantime, it is understood that the government will not fund any new refinery for Pertamina in the near future. Pertamina is currently trying to increase both capacity and the efficiency of its existing refineries by ‘debottlenecking’ and other modifications. Current plans include a firm addition of some 80 KB / d in existing refineries. Taking these changes into account, and excluding any additional refinery, it has been forecasted that by 2000 Indonesia will have to import up to 15 kb / d of gasoline, 50 of kerosene, and 120 of diesel, while still being able to export up to 100 kb / d of LSWR.

The domestic private sector is actually showing interest in investing in refining. Several proposals have been submitted and approved by the government. They are designed, however, as if the proposed refineries would operate solely for the export market. For this reason, funding does not appear feasible, since the uncertainties are very high, and are exacerbated by the prospect of competition from Singapore’s better-established refineries. These proposals are therefore more by way of showing domestic company intentions. Therefore, some firms have taken an important tactical step by securing licenses.

Two factors are believed to be crucial to ensuring that investment in the refining sector materializes: first, domestic price restructuring, with a long term objective of greater free market orientation, and second, opening of the domestic market to joint ventures. The government is aware that these two conditions must be met, and the Ministry of Mines and Energy is currently assessing the gradual steps needed. Other Asian countries such Malaysia, the Philippines, Singapore and Thailand have already
made the transition from regulated to open market system. Since adjustment to market prices would mean an increase in domestic prices, especially of subsidized product such as kerosene and diesel, this move would be an unpopular one for the Indonesia government, especially in the lead-up to the 1997 election. It could occur after the election, especially if crude oil price stay low enough to prevent a steep increase in domestic price.

The Regional Market Outlook. Under the combination of an expanding world demand for crude oil and a tight world crude supply, crude oil price have been on a run up spree in recent years (Krichene, 2006). By breaking a record level of US$ 78.30 per barrel (bl) on August 2006 and remaining comfortably in the neighborhood of US$ 75 /bl during part of 2006, crude oil prices had risen to unexpected territory and seemed boundless. While developments in crude oil prices were being followed closely by economic agents, including traders, investors, speculators, and policy makers, not much was known about the stochastic processes driving these prices.

It is no secret that the Asia-Pacific is the new engine of demand growth in the oil market. Indeed, in the late 1980s and early 1990s, world oil demand would have declined if not for the steep growth of requirements in Asia. Growth in demand for petroleum products has been rapid, especially at the lighter end of the barrel, in response to a market trend towards tighter product specification, most notably in terms of sulfur content.

The most striking feature of the Asia-Pacific oil market is that supply and demand are far from matching. The region has limited crude oil and has been a net importer of petroleum products (Fresharaki et al. 1995). Indigenous crude production is expected to become somewhat flat, giving rise to ever-increasing imports from outside the region. Although some countries will increase imports from Africa or the Americas, the volume of crude from outside the region is overwhelmingly Mideast in origin (Prawiraatmadja & Fresharaki, 1995). This will raise the proportion of more sour (high sulfur) crude in the total crude slate, whereas the products in demand will be subject to tighter specifications on sulfur. A greater premium will be given to Asian curds, since almost all, including those from Indonesia, are low in sulfur. Indonesia can take advantage of this by optimizing its portfolio in domestic consumption and exports.

The market is in shortage in almost all petroleum products, but imbalances are not equally distributed. Table 2 shows the Asia-Pacific petroleum product balance in 1995. LPG is the largest import in terms of its share of demand: nearly half of the region’s LPG is imported. In the case of naphtha, the region imported 29 % of its requirements, share, as the figure for gasoline was only 2 %. It is quite clear that the refiners are electing to produce gasoline and import cheaper naphtha. While most LPG and naphtha can be imported from the Middle East.

Using expansion plans for refining capacity, we have developed a projected petroleum product supply and demand balance for 1998 and 2000, based on a country by country analysis. Table 3 shows a summary of the net imports of the Asia Pacific region in 1998 and 2000. In 1998, taking into account additional capacities that will be on stream by then, the region will be generating a surplus of gasoline but will still be very much in deficit in LPG naphtha, middle distillate and fuel oil. By 2000, the situation is expected to become worse, there are deficits in all products, although gasoline, with a very small deficit, can be regarded as in balance.

CONCLUSION

Given the country’s projected oil production and petroleum product demand, it is clear that Indonesia will become a net oil importing country in the near future. In the long run, this should not pose a problem if manufacturing exports can be maintained or even expanded. Oil export revenues, together with those from natural gas, have made a significant contribution and are still important to generating a trade surplus. In the oil trade, Indonesia exports lower value products while importing more expensive ones. It is thus certain that Indonesia will become a net importer in terms of value even sooner than in terms of volume. The outlook for the Asia Pacific oil market, especially on the petroleum product side, is not favorable to Indonesia. Indonesia is likely to face increasingly expensive imports of middle distillate (kerosene and diesel), products that are heavily subsidized domestically. It is the downstream oil sector, therefore, that will be the key to Indonesia’s transition to net oil importing, if oil is not even weighing down the economy.

REFERENCES

Asia: A line in the water; South-East Asian oil. The Economist. London: Mar 12, 2005. Vol. 374, Iss. 8417; p. 70


### ATTACHMENT

Table 1. Major Petroleum Product Consumption in Indonesia, 1987-95. (Kb/d)

<table>
<thead>
<tr>
<th>Year</th>
<th>Fuel Oil</th>
<th>IDO</th>
<th>ADO</th>
<th>Kerosene</th>
<th>Avtur</th>
<th>Gasoline</th>
<th>LPG</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>61</td>
<td>25</td>
<td>115</td>
<td>119</td>
<td>14</td>
<td>84</td>
<td>5</td>
<td>424</td>
</tr>
<tr>
<td>1988</td>
<td>56</td>
<td>26</td>
<td>165</td>
<td>123</td>
<td>15</td>
<td>90</td>
<td>5</td>
<td>480</td>
</tr>
<tr>
<td>1989</td>
<td>54</td>
<td>27</td>
<td>180</td>
<td>128</td>
<td>17</td>
<td>98</td>
<td>6</td>
<td>510</td>
</tr>
<tr>
<td>1990</td>
<td>74</td>
<td>30</td>
<td>204</td>
<td>136</td>
<td>19</td>
<td>111</td>
<td>7</td>
<td>581</td>
</tr>
<tr>
<td>1991</td>
<td>79</td>
<td>29</td>
<td>226</td>
<td>140</td>
<td>20</td>
<td>119</td>
<td>8</td>
<td>621</td>
</tr>
<tr>
<td>1992</td>
<td>83</td>
<td>31</td>
<td>263</td>
<td>146</td>
<td>22</td>
<td>125</td>
<td>9</td>
<td>679</td>
</tr>
<tr>
<td>1993</td>
<td>88</td>
<td>32</td>
<td>286</td>
<td>149</td>
<td>25</td>
<td>128</td>
<td>14</td>
<td>722</td>
</tr>
<tr>
<td>1994</td>
<td>69</td>
<td>30</td>
<td>276</td>
<td>154</td>
<td>28</td>
<td>144</td>
<td>16</td>
<td>717</td>
</tr>
<tr>
<td>1995</td>
<td>69</td>
<td>27</td>
<td>299</td>
<td>161</td>
<td>31</td>
<td>160</td>
<td>18</td>
<td>765</td>
</tr>
</tbody>
</table>


Table 2. Asia-Pacific: Petroleum Product Balance, 1995 (Kb/d)

<table>
<thead>
<tr>
<th>LPG</th>
<th>Production</th>
<th>Imports</th>
<th>Exports</th>
<th>Consumption a)</th>
<th>Net Imports</th>
<th>Net Imports as % of Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naphtha</td>
<td>1,161</td>
<td>774</td>
<td>312</td>
<td>1,412</td>
<td>627</td>
<td>44</td>
</tr>
<tr>
<td>Gasoline</td>
<td>2,787</td>
<td>311</td>
<td>250</td>
<td>2,906</td>
<td>61</td>
<td>2</td>
</tr>
<tr>
<td>Kerojet b)</td>
<td>1,715</td>
<td>524</td>
<td>242</td>
<td>1,942</td>
<td>282</td>
<td>15</td>
</tr>
<tr>
<td>Diesel</td>
<td>4,551</td>
<td>1,156</td>
<td>597</td>
<td>5,116</td>
<td>559</td>
<td>11</td>
</tr>
<tr>
<td>Fuel Oil</td>
<td>3,185</td>
<td>914</td>
<td>632</td>
<td>3,432</td>
<td>282</td>
<td>8</td>
</tr>
<tr>
<td>Others</td>
<td>574</td>
<td>159</td>
<td>91</td>
<td>639</td>
<td>68</td>
<td>11</td>
</tr>
<tr>
<td>TOTAL</td>
<td>14,748</td>
<td>4,607</td>
<td>2,266</td>
<td>17,065</td>
<td>2,341</td>
<td>14</td>
</tr>
</tbody>
</table>

Consumption is not always equal to production + imports, owing to changes in stock.  
b) Kerojet includes both avtur and kerosene.  

Table 3. Asia-Pacific: Projected Net Imports of Petroleum Products (Kb/d)

<table>
<thead>
<tr>
<th>Year</th>
<th>LPG</th>
<th>Naphtha</th>
<th>Gasoline</th>
<th>Kerojet</th>
<th>Diesel</th>
<th>Fuel Oil</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>627</td>
<td>462</td>
<td>61</td>
<td>282</td>
<td>559</td>
<td>282</td>
<td>68</td>
<td>2,357</td>
</tr>
<tr>
<td>1998</td>
<td>659</td>
<td>468</td>
<td>(4) a</td>
<td>203</td>
<td>781</td>
<td>350</td>
<td>85</td>
<td>2,542</td>
</tr>
<tr>
<td>2000</td>
<td>741</td>
<td>497</td>
<td>24</td>
<td>189</td>
<td>1,015</td>
<td>323</td>
<td>100</td>
<td>2,889</td>
</tr>
</tbody>
</table>

a) Number in parenthesis denotes net exports.  
Source: As of Table 2.