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Pullout

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Outlook: Bio-diesel Impact on the Palm Oil Industry

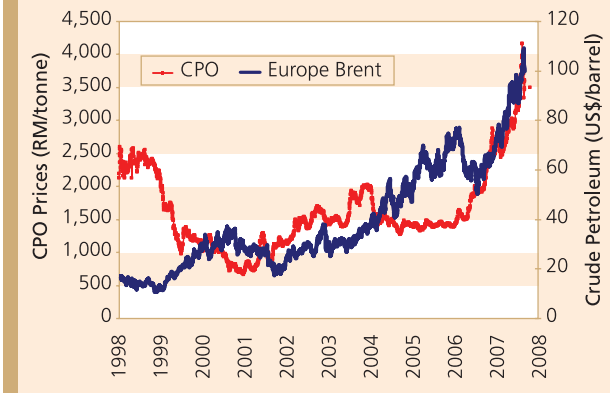
The rapid increase in petroleum prices above the price levels of vegetable oils, beginning in 2004, provided the impetus for turning vegetable oils into bio-diesel for transportation fuel. It was attractive to convert cheaper palm oil, rapeseed oil or soybean oil into methyl esters or bio-diesel and sell these at the price of petroleum diesel to earn a gross margin of up to US$200 per tonne or 40% of the price of the vegetable oils.

The initial attraction led to many governments especially in the EU, as well as the US Administration, to promote the increased use of bio-diesel to at least partially replace petroleum diesel.

The period when palm oil prices were below those of crude petroleum began in 2004 as shown in Figure 1, but because of the resultant increase in bio-diesel demand, palm oil prices reverted to the premium position against petroleum prices after about two years at the end of 2006.

Governments in the EU also provided subsidies or incentives to encourage the use of bio-fuel as it was part of their policy to reduce dependence on fossil fuels, and to lower carbon dioxide emissions to reduce global warming. Prices of vegetable oils were relatively cheaper than those of petroleum fuel at the end of 2004 and, with additional subsidies, it was even viable to burn palm oil directly in power plants to generate electricity in the EU.

Figure 1: CPO, FOB M'sia vs Crude Oil, Brent (1998-2008)



Before long, the demand for bio-diesel influenced prices of the oils and fats raw materials to increase rapidly, as shown for the period after 2006 in Figure 1; this caused the profit margins for bio-diesel producers to be reduced or even vanish. The vicious cycle of margin fluctuations is a feature of the bio-diesel industry which needs more detailed analysis if its long-term implications are to be fully understood.

Economic dilemma

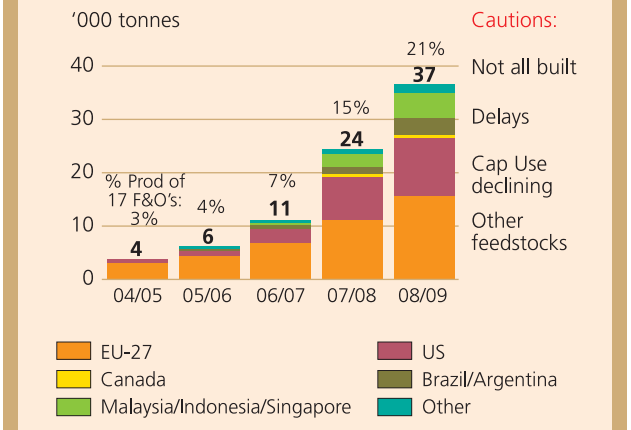
Global demand for fossil fuel (4,231 million tonnes in 2007) is so large that the 154 million tonnes of available oils and fats supply is only equivalent to less than 4% of annual petroleum consumption. While the oils and fats market has been in some degree of balance between supply and demand for the traditional food and oleochemical applications, the new big potential demand for bio-diesel will lead to a major imbalance.

Prices of vegetable oils and fats will have to increase to help reduce demand and re-create market equilibrium. The cycle of reduced demand will lead to price reduction which in turn will re-stimulate the demand for bio-diesel, and the price fluctuation cycle will be repeated.

Such cyclic changes will be tempered by market prices being distorted by subsidies on bio-diesel in the EU, the US and other countries. With subsidies, bio-diesel will appear to be still viable even if the price of vegetable oil is higher than that of petroleum diesel.

Even after the subsidies are factored in, the bio-diesel operator will continue to face a dilemma – the more successful he gets in converting vegetable oils into bio-diesel, the more unsuccessful he will become because his raw material prices will increase. This will reduce or remove his profit margin.

Figure 2: World bio-diesel capacity growing faster than feedstocks



Source: Prudential Banche Commodities, LLC

Bio-diesel plant capacity

In view of the attractive margin for bio-diesel during the first cycle between 2004 and 2007, which was somewhat extended by the effect of subsidies, many countries promoted investments in bio-diesel plants.

As shown in Figure 2, world capacity for bio-diesel increased from an equivalent of 3% to 22% of oils and fats supply between 2004 and 2008. Considering that oils and fats supply expanded only at 4% per year, or 16% over the last four years, it implies that bio-diesel plant capacity is expanding faster than supply.

The current expansion in oils and fats supply is meant to cater for normal expansion in traditional applications such as food and oleochemical uses. If demand expansion for bio-diesel is to grow according to plant capacity, the supply of oils and fats to meet the total need for the food, oleochemical and bio-diesel industries would have to grow at a much higher rate.

In total, supply should have expanded by 38% (16%+ 22%) over the last four years to meet food, oleochemical and bio-diesel demand. As it was not possible for the food and oleochemical uses to contract over the last four years, or for the total oils and fats supply to expand at 38%, prices had to increase mainly to discourage bio-diesel production.

Food versus fuel

The projected price increase for oils and fats is driven by the large capacity of bio-diesel plants established globally. It represents unlimited demand whenever the effective price of oils and fats is below or close to that of petroleum fuel. The threat of reduced availability forces the food and oleochemical sectors to react by raising their buying prices in order to bid for supply. Demand for food and oleochemical uses is rather inelastic when compared to demand for fuel.

A gallon of cooking oil may take a person one month to consume in the food sector, and his per day cost of oil use is therefore 1/30 of a gallon price. The same gallon of oil, if used as fuel, would last a person only for 20 miles or 30 minutes of travel time. His daily cost in using vegetable oil bio-diesel is probably equivalent to the cost of 2 or 3 gallons of oil to cover daily travel.

Thus the person in the food industry is more able and willing to pay a higher price for oil than the person in the fuel industry who will revert to using cheaper petroleum diesel as an alternative, once bio-diesel becomes relatively expensive. In essence, the food industry will always have its supply of oils and fats because of the willingness to pay a higher price compared to the fuel user.

Assuming supply of vegetable oils and fats is more than adequate to meet the traditional demand in the food and oleochemical markets, prices of vegetable oils will not rise far above the prices of petroleum for too long, as the fuel sector will not support such high prices.

On the other hand, effective prices of vegetable oils will not fall far below the prices of petroleum fuel as the bio-diesel industry will use large quantities of cheaper raw materials for its current capacity. This will force prices of oils and fats to be highly correlated with those of petroleum fuel as shown in Figure 1 for the period between 2007 and 2008.

In the debate of food versus fuel, a few outcomes are expected:

1. Demand for vegetable oils for use as bio-fuel will be highly cyclic as many bio-diesel plants will stop operations when vegetable oil effective prices are higher than petroleum diesel prices; the plants will resume operations when raw materials (vegetable oils) are cheaper. Over time, some of the non-integrated plants with weak financial support will have to be closed due to lack of sustained profits.

2. The food industry will have to live with the fact that vegetable oil prices will no longer be as cheap as in the years before bio-diesel was introduced. Prices of vegetable oils will be at least as high as the prices of petroleum fuels. Prices of vegetable oils will only become cheaper when the prices of petroleum come down, as they are highly correlated.

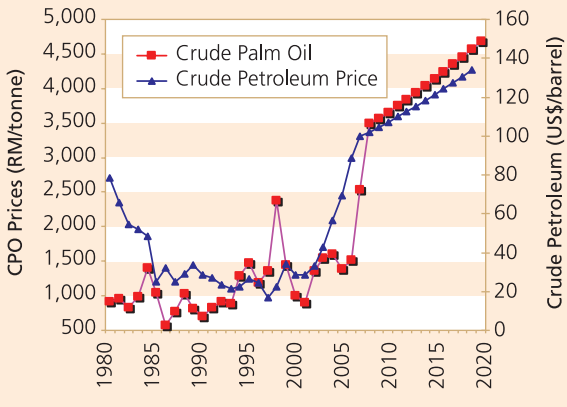
3. Demand for bio-fuel such as corn-based ethanol and soybean bio-diesel will affect food prices, because animal feed from corn and soybean sources will be expensive, and land for grain and soybean production will face competition from corn for bio-ethanol. The resultant shortage of soybean due to lower planted area and its use as bio-diesel will mean that more palm oil will be needed to supplement the shortages.

Thus whether palm oil is used directly as bio-diesel or not, substitutability factors will ensure that it will continue to enjoy a price rise similar to soybean oil, resulting from the demand for bio-fuel (bio-ethanol and bio-diesel) around the world. The real driver in pushing up prices of food is not bio-diesel demand but high petroleum prices, which triggered the bio-fuel industry.

4. Farmers will benefit from high prices of vegetable oils and this may encourage them to increase supply of oilseeds. The increase in supply will probably not be able to reduce prices in a significant way as it will be insufficient to meet the needs of the large bio-diesel market.

5. For a producer-country like Malaysia, oil palm will still be the most profitable crop for farmers. Planting non-edible oil crops for bio-diesel feedstock would penalise farmers with lower income potential, compared to planting oil palm. The food industry will have access to palm oil as long as they pay at prices above the equivalent of petroleum fuel. Otherwise the farmers would want to benefit from the higher price by selling their palm oil partly to the fuel industry.

Figure 3: CPO vs Crude Petroleum Price Movement and Forecast



The outlook

It is possible for bio-diesel development to suffer an abortive growth trend in the near future because of the self-conflicting effects of success that will automatically lead to failure. Success in the bio-diesel industry will promote excessive demand and high prices, and this will reduce or create a negative margin tendency and, ultimately, failure to obtain a profit margin. In this regard, the development of the bio-fuel industry is going to be transitory in nature.

It is no different to past trends where no bio-diesel plant could exist and vegetable oils were not used as bio-fuel because of their relative high prices compared to petroleum fuels even though there has long been awareness of the production technology. Commercialisation of bio-diesel was then not feasible because the food industry was always willing to buy oils and fats at prices above the prices of petroleum products.

Another possibility is the mandatory blending of bio-diesel which will force up prices of vegetable oils, higher than petroleum diesel. Such large demand for vegetable oils will push prices up so high that the fuel industry will be forced to reconsider the wisdom of burning very expensive oils for fuel relative to petroleum oils, even though the impact of bio-diesel on petroleum demand or supply replacement may be negligible.

This scenario may allow the bio-diesel cycle to survive a little longer before a public outcry sets in, because high oils and fats raw material prices will be passed on to them when they buy mandatory blends of transport fuel.

Ultimately, there is a strong possibility that vegetable oil producers will encourage an optimal number of bio-diesel plants to survive so that oilseed farmers will be assured of an additional demand that will keep prices high for their produce. This is leveraging on the bio-diesel industry to maximise on high prices to benefit the oils and fats production business.

The subsidy needed to sustain a small number of bio-diesel plants is not significant compared to the revenue earned from high prices by the rest of the oils and fats supply participating in the traditional oils and fats market. This leverage opportunity will likely be exploited by major oils and fats producers including the Malaysian palm oil sector in the future, as it forms a floor-price assurance protecting producers and farmers from the affliction of low prices for oils and fats commodities.

Future prices of vegetable oils and fats will be correlated with petroleum prices because bio-diesel capacities already in existence will mop up any excess supply of raw materials. Prices of oils and fats will not likely move too high relative to petroleum products, as demand from the bio-diesel operators will vanish if raw materials are at a high premium to petroleum prices.

Prices of palm oil could be projected to correlate closely with the prices of petroleum. As the price of petroleum is projected to remain high due to depleting supplies, future prices of palm oil will depend on the prices of petroleum as shown in Figure 3, provided that demand for food and oleochemical is adequately met by projected expansion in supply.

Prices of oils and fats may break away from the close correlation with petroleum prices if their supply cannot meet the projected growth through traditional demands for the food and oleochemical industries. This possibility is real.

Current demand expansion for food and oleochemical uses is about 3-4% per year as influenced by income and population growth trends. With world annual production of 154 million tonnes of oils and fats in 2007, the 3% expansion amounts to 4.62 million tonnes of additional oils and fats needed per year.

Simple cumulating of additional demand for 10 years would lead to 46.8 million tonnes of additional oils and fats in the 10th year from now. If this additional demand from the 10th year onwards were to be produced from palm oil, it would require about 12 million hectares of new oil palm plantations. If it were to be supplied by soybean oil, 120 million additional hectares would have to be cultivated.

After more than 40 years of rapid expansion, the oil palm industry in Malaysia and Indonesia can only produce about 33 million tonnes of palm oil from a combined area of 13 million hectares of plantations. It is therefore unlikely that the additional 46.8 million tonnes of oils and fats can be produced via palm oil cultivation in the next 10 years. Similarly, such additional quantities cannot be met by soybean supply expansion alone as the 120 million hectares of land needed may not be readily available.

It could be wishful thinking to expect a large production of bio-diesel from vegetable oils and fats knowing that there may not be enough even to meet the projected needs of the growing demand for food and oleochemicals in the intermediate to long-term projection.

Global Self-Sufficiency Status in 2007

Oils and Fats Balance 2007 ('000 tonne)						2006 Net Exports/ (Imports)
	Production	Disappearance	Imports	Exports	Net Exports/ (Imports)	
Indonesia	19,438	4,794	86	14,515	14,429	13,675
Malaysia	17,754	3,543	881	15,038	14,157	14,248
Argentina	8,637	1,094	16	7,491	7,475	7,357
Brazil	7,578	5,342	303	2,536	2,233	2,334
Ukraine	2,661	963	358	2,105	1,747	1,432
Canada	2,535	1,388	531	1,682	1,151	1,133
Philippines	1,352	785	301	868	567	816
US	16,898	16,582	2,743	3,106	363	- 41
Thailand	1,421	1,043	96	438	342	167
Australia	866	765	326	451	125	162
Colombia	938	882	266	325	59	35
Russia	3,403	3,506	897	676	- 221	- 252
Taiwan	502	820	326	17	- 309	- 296
Nigeria	1,454	1,841	400	24	- 376	- 354
South Korea	417	1,212	799	10	- 789	- 751
South Africa	375	1,192	827	21	- 806	- 699
Turkey	1,299	2,239	990	167	- 823	- 1,368
Japan	1,900	2,824	930	11	- 919	- 913
North Africa *	439	1,568	1,368	275	- 1,093	- 1,329
Egypt	373	1,515	1,353	229	- 1,124	- 1,144
Mexico	1,658	2,822	1,174	29	- 1,145	- 1,071
Iran	467	1,643	1,315	95	- 1,220	- 1,204
Bangladesh	208	1,481	1,280	-	- 1,280	- 1,102
Pakistan	1,730	3,500	1,832	97	- 1,735	- 1,635
India	9,074	14,249	5,333	339	- 4,994	- 4,650
EU-27	19,561	28,249	9,844	1,478	- 8,366	- 8,416
China	19,726	29,085	10,074	202	- 9,872	- 7,525
Others	- 25,213	- 32,220	- 12,712	- 5,700	7,012	- 8,406
World Total	**154,024**	**154,814**	**58,369**	**57,829**	**- 540**	**203**

** North Africa=Algeria, Morocco, Tunisia*

By implication, the world oils and fats prices may continue to be higher in the future to reflect the projected shortage in supply even in the traditional food and oleochemical market, and prices may move up independent of petroleum prices because of the projected shortages.

Very few countries are in a position of net excess to supply oils and fats to the world market. As Figure 4 shows, only three countries – Malaysia, Indonesia and Argentina – are major net exporters of oils and fats. Most countries are net importers, including the US for the first time in 2006.

Developed countries like those in the EU with ambitious bio-diesel programmes and future targets are already major net importers of oils and fats – even when the bio-diesel industry has not yet taken off in a big way. This presents a pessimistic scenario for bio-diesel development due to potential supply shortages. However, the same factors provide an optimistic scenario for oil and fats suppliers and exporters as they can expect prices to remain remunerative.

Conclusions

The bio-diesel industry is currently undergoing a difficult phase of its development. Producers face the problem of no margins because of high prices of raw materials, as a result of over-capacity in plants. This conforms to the theoretical projection that the large demand created by bio-diesel capacity will push prices upwards to eventually affect profit margins and viability of the bio-diesel industry.

Profit margins may be re-created with oils and fats prices weakening subsequently but oilseed producers will likely take the strategy of keeping a certain capacity of the bio-diesel plants active to prevent prices from falling too low.

Need for bio-diesel will be regarded as a new 'Blue Ocean' demand that will change the structure of the oils and fats market. It is projected that prices of oils and fats will not fall below the equivalent level of petroleum prices because active bio-diesel capacity maintained by oilseed producers will mop up any cheap oils and fats in the market.

Consequently, the food industry will not be able to buy oils and fats as cheaply as in the past because of potential demand in the bio-diesel sector. Still, prices will not rise excessively as the bio-diesel industry will not tolerate prices higher than that of the petroleum equivalent.

With the projection that prices of non-renewable crude petroleum will continue to remain relatively high, prices of oils and fats will also remain high because of their close correlation.

This provides an optimistic outlook for oils and fats producers, but most of the bio-diesel producers will have a transitional existence whose survival will be highly dependent on supporting subsidies. This will limit capacity expansion to an extent encouraged by oils and fats producers who may be looking at price leveraging for its floor-price protection effect.

In the long term, oils and fats supply may not be able to meet the need for the normal 3-4% expansion in demand in the food and oleochemical sectors. This could push prices higher than those of petroleum until the high prices force a reduction in demand, thereby bringing the market into supply and demand equilibrium.