

THE STAR

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Biofuels the choice of the future



CALTEX
Caltex Australia



From the Managing Director

Biofuels are a growing part of Caltex's fuel business. We have the largest network of sites selling biofuels in Australia and it is expanding every month.

Our main biofuels products are Bio E10 Unleaded which is petrol blended with ten per cent ethanol and New Generation Diesel, diesel blended with two per cent biodiesel.

This issue of *The Star* gives an overview of Caltex biofuels activities and explores some of the issues facing the biofuels industry.

Caltex is committed to the development of a biofuels industry that is commercially and environmentally sustainable. To succeed it must be consumer driven, with products of the highest standard, reliable supply of biofuels and competitive prices.

While biofuels sales volumes are growing rapidly, biofuels is still a fledgling industry with a lot of work to be done. Caltex is investing in upgrading our terminals to handle biofuels and working with ethanol and biodiesel suppliers to ensure we have continuity of supply. We are also informing our retail and commercial customers about biofuels and promoting the use of these new generation fuels.

It makes good business to invest in biofuels because consumers want to buy these products to reduce greenhouse gas emissions and reliance on fossil fuels. Caltex is also responding to government policies and regulations to increase biofuels sales.

Our employees, franchisees and resellers support making biofuels part of our product mix. Caltex franchisee Todd Stewart in Queensland who is selling our ten per cent ethanol blended petrol speaks for many when he says: "Every bit we can do as consumers contributes towards our planet's future."

The question of whether Australia really needs to produce its own fuel products or whether the oil refining industry is just another marginal manufacturing enterprise that could move offshore in the face of global change is addressed on page 8. It's an important issue for Caltex.

Finally I'd like to wish all Caltex employees, contractors, franchisees, resellers and the many other readers of *The Star* all the very best good wishes for a safe and happy holiday season.

Des

Des King

COVER: Harvest time at a sugar plantation. Molasses from sugar production is one of the feedstocks for the ethanol Caltex uses in its Bio E10 Unleaded biofuel blend



LPS at work

Incident free operations and LPS rely just as much on long term prevention as avoiding immediate threats to safety and business.

With this in mind, as the hot glare of summer arrives all Caltex people, parents in particular, should heed the warning by the Australian Cancer Council that eyes, like skin, are susceptible to long term damage from exposure to ultraviolet radiation.

The damage is not always immediately seen or felt but is cumulative over time. Repeated exposure to UV radiation can cause short-term eye complaints and serious damage including cataracts or cancer of the eye membrane or eyelids.

The answer is to avoid exposure as much as possible, wear a broad-brimmed hat and use wrap-around sunglasses that meet the Australian standard that classifies glasses based on the amount of radiation they filter out. Look for those labelled UV 4000 or EPF (Eye Protection Factor) 9 or 10. If these are hard to find, visit a Cancer Council store.

Because the damage is cumulative it is important to protect children's eyes from an early age, says the council, one of the charities supported by Caltex employees through the Fuelling Change workplace giving program.

Wearing a hat will provide some protection, but once a child is old enough to manage sunglasses he or she should be encouraged to do so whenever they're outside in moderate or above UV conditions (UV>3). And of course if you're an adult who's never worn sunglasses, it's never too late to start.

A very simple philosophy lies at the heart of LPS: eliminating risks – all risks – is the key to staying safe and avoiding loss.



Ready for the sun – keen beachgoer Max Lissenden, 5, son of Caltex Corporate Counsel Richard Lissenden always wears his safe sungear

“Motorists can buy these fuels of the future from over 300 Caltex service stations”

Biofu the choic

Caltex service station, January 2030. “Fill ‘er up please.” (Robot attendant approaches vehicle.) “Yes, sir. Will that be E10, E85, E100, B2, B5, B20, B100, ULP, PULP, SPULP, LPG, NGV, GTL diesel or hydrogen – or shall I plug it in to the power point?”

Motorists' choice of fuels in the future may not really be so complicated! But a bigger variety of ethanol and biodiesel blends will almost certainly be on the forecourt menu because renewable fuels will form part of the solution to climate change.



E10 Ambassador Daniella Pogano briefs customer Darren Kerber on biofuels at the Rydalmere site northwest of Sydney (see page 5)

els e of the future

Australian motorists can make a contribution to solving the problem right now – by buying these fuels of the future from over 300 service stations in the Caltex network.

Their availability represents a remarkable success story. Caltex reseller Bowen Petroleum started selling a ten per cent ethanol petrol blend under its own brand in the mid-90s. Then four years ago E10 Unleaded, the first Caltex branded biofuel product, made its appearance in a few service stations in Cairns.

How things have changed since then! Quietly, steadily, the Caltex biofuels business has been growing. Today about 1.2 per cent of Caltex petrol and diesel volume in New South Wales contains biofuel and this volume is likely to grow strongly.

Consider these sales achievements:

- In 2007, Caltex will sell approximately 750 million litres of biofuels blends.
- Caltex has met its targets for 2006 and 2007 for sales under the former federal government's Biofuels Action Plan that aimed for 350 million litres of "pure" biofuels sold in Australia by 2010.
- Over 200 Caltex sites now sell the ethanol blended petrol Bio E10 Unleaded in New South Wales, Queensland and the ACT and the network is expanding.
- All diesel supplied from Caltex's Newcastle terminal is New Generation Diesel (NGD), a two per cent biodiesel blend. Over 150 service stations sell this product and many also sell Bio E10 Unleaded.
- Caltex sells B5 – a blend of five per cent biodiesel and ordinary diesel – in New South Wales and South Australia and B20 (a 20 per cent blend) to commercial customers including truck and bus fleets in South Australia. Caltex Energy based in Newcastle is now also selling B5 at the retail level.

- In November Caltex launched a sub brand, "Bio", which will prefix all its biofuels products in future. "Over time we expect we will be launching more biofuel products, so with 'Bio' we're building a platform for future growth," explains Acting General Manager Marketing Mike McMennamin.

Coping with surging demand

As retail customers appreciate the lower price of Bio E10 Unleaded, and others recognise that biofuels can help to reduce greenhouse gas emissions and the nation's reliance on fossil fuels, demand for them is growing.

"A number of our major mining customers in particular are interested in reducing their carbon footprint," says Mike. "We are developing our supply and distribution chain to meet our customers' needs."

National Sales Manager Mining Scott Nicholls agrees. "Mining is looking for us to invest in biodiesel capability so we can provide a

quality product at a competitive price, and to work with them so they understand the benefits of using it in their equipment.”

Caltex is investigating ways in which it can supply more to the mining and transport sectors, and to continue growing the biodiesel business profitably.

It will also continue to identify and convert service stations to sell Bio E10 Unleaded, with country Queensland, country New South Wales and Victoria among the priorities and with a price discount an added retail incentive.

That can't happen without planning and expenditure – and plenty of it. Here again Caltex has been proactive in meeting infrastructure demands for storing, handling and blending products.

Here's what's happening at Caltex terminals:

- At Lytton terminal in Brisbane, a team is working on installing ethanol facilities. This \$2.3 million project includes automating the E10 blending process and upgrading existing tanks, pipes, bunds and safety

systems. The work will be completed in the first half of 2008 and is expected to allow Caltex to meet ethanol demands in south-east Queensland and northern New South Wales for years to come.

- At the Banksmeadow terminal in Sydney, ethanol facilities are being built and an option to install a facility at Silverwater is being reviewed. This will cut transport costs and loading time enabling economic supply to Sydney and southern New South Wales.
- At Newcastle terminal, a project to allow “ratio blending” of ethanol and biodiesel is nearing completion. This \$900,000 project will eliminate the current practice of loading ethanol or biodiesel then adding petrol or diesel from a separate hose.
- In Adelaide, Caltex currently has a B5 facility where trucks drive in, five per cent biodiesel is loaded and then it's topped up with regular diesel. “However, I expect automated ‘ratio blending’ will eventually be available here and at a number of other terminals,” says National Operations Development Manager Lisa Mason.

- Caltex has plans to supply biofuels from other facilities by late 2008. Those being considered include ethanol in Mackay as part of the existing expansion project, ethanol for Victoria and biodiesel for Brisbane, Gladstone and Perth, depending on the availability in those markets of biofuel supply.
- Integrating these fuels into the supply chain and blending them imposes extra effort, time, costs and dedicated resources because they can't be moved via multi-product pipelines, says National Fuels Marketing Manager Michael Ridley-Smith. In addition, tallow based biodiesel needs to be kept in heated tanks to stop it solidifying at low winter or overnight temperatures.

“Caltex has been proactive in meeting infrastructure demands for storing, handling and blending products”

Work is under way on the Caltex Lytton terminal's \$2.3 million biofuels blending plant in Queensland





Michael Ridley-Smith: "We're well ahead of most competitors in the number of sites at which ethanol blends are available"

Some areas of Australia are better suited for biofuels expansion than others. With its sugar plantations, Queensland is a logical place for further growth. So are grain-growing areas and Caltex has committed to taking at least 30 million litres a year from a big new grain-to-ethanol plant at Dalby in Queensland. See story on page 7.

Similarly New Generation Diesel is supplied from Newcastle because it's close to Caltex's main biodiesel feedstock supplier. But Caltex aims to sell NGD elsewhere when supply arrangements and infrastructure modifications have been completed.

The Caltex difference

A number of biofuels strategies set Caltex apart from, and ahead of, the competition. The first is making biofuel blends available to customers. "We're well ahead of most competitors in the number of sites at which ethanol blends are available," says Michael. "We're also more active in supplying and planning for biodiesel blends."

Another important differentiator is choice. So where the company has introduced Bio E10 Unleaded into its retail network, it has tried to ensure the site also offers ULP and the Vortex 95 and Vortex 98 premium products – four grades of petrol.

To date the strategy has been met positively by customers and governments. "Almost all Caltex E10 sites with four petrol grades outperform the competition," says Michael.

E10 is sold at a discount to regular unleaded petrol, though it is not cheap to produce and biodiesel producers are struggling because of very high feedstock costs. Biofuels are currently only viable because of government subsidies and excise concessions.

"We need to move away from regarding biofuels as discount products," says Michael. "They are quality products that offer environmental and air quality benefits over unblended fuels. Discounts may not always be possible if supply costs are high."

Replacing ULP with Bio E10 Unleaded

As the E10 network grows, what about sites equipped to sell only three grades of petrol? (Some sites, particularly in regional Australia, sell only two.) Caltex can't economically support installing tanks at these sites to offer the additional choice. At the same time it doesn't want to remove either of the premium products Vortex 95 and Vortex 98 which are performing well and serving a growing market as more and more vehicles require high octane fuel.

In these cases a preferred option could be to replace ULP with Bio E10 Unleaded. This will be trialled at service stations where research shows customer acceptance is high and E10 sales are likely to be strong, and where other Caltex sites nearby offer the four grades.

Bio E10 Unleaded Ambassadors

Another strategy to boost sales and customer awareness is the Ambassador Program, a marketing and promotional campaign currently promoting Bio E10 Unleaded at selected service stations in New South Wales. It's being conducted at franchisee sites with the help of government grants designed to support the growth of ethanol petrol blends.

Caltex "Ambassadors" in green livery offer information about Bio E10 Unleaded and advice to customers on forecourts and hand out brochures. The idea is to educate motorists at the point of purchase and to change negative perceptions of ethanol they may have. They get a chance to win \$1,000 of the fuel plus \$50 StarCash each week in onsite promotions.

Big issues for the industry

Regulation

Issues of concern to Caltex include mandated supply of ethanol blends. The New South Wales Government requires two per cent of the total volume of petrol sold in the state to be ethanol-blended. Queensland Government policy is for ethanol use equal to five per cent of ULP by 2010. Other states including Victoria and Western Australia have biofuels targets for the end of the decade but have not regulated their use.

Caltex is opposed to mandates because they don't allow market forces to dictate the pace of change and ultimately could lead to higher costs for consumers and marketers.

At present competitors selling biofuel blends use a variety of approaches, including those based on octane grades, discounts and choice of products.

"We're already seeing a distortion in how the ethanol market in New South Wales might otherwise have developed," says Mike McMenamin.

"Mandates push regular unleaded petrol out of the market and limit consumer choice, which is one reason Caltex opposes them," he says. "We want customers to shape the market, not have products forced on them."

Cost

Many of the raw materials to make biofuels are in short supply, which puts upward pressure on prices. Overseas, biofuels mandates are pushing up prices of raw materials like corn, tallow and palm oil. Though biofuels are currently profitable for Caltex – albeit less so than other products – a big challenge is to ensure it can make money out of them over the long term.

Currently, biofuels producers are caught in a squeeze between oil prices and feedstock prices. A number of ethanol and biodiesel producers have stopped operating or abandoned plans for new plants. There is not enough money in the supply chain to make many plants viable, which has led to calls for mandates and industry protection by banning imports or cutting taxes.

HOW PLANTS BECOME FUEL

Any plant material containing sugar or carbohydrates can be fermented to produce ethanol, in the same way that liquor producers make ethyl alcohol for beer, wine and spirits.

At present most ethanol from Queensland is made at distilleries owned by sugar company CSR from molasses feedstock. Molasses is a thick, dark syrup produced by boiling down juice from sugar cane (pictured being harvested on our cover this month) during the sugar refining process.

The carbohydrates in the molasses are fermented with the use of yeast in special fermentor tanks, a process that produces carbon dioxide and ethanol. The ethanol – a clear, colourless, flammable spirit – is recovered by distillation.

The same method is used to create ethanol from wheat, but the principal ingredient in this case is waste wheat starch, a byproduct of the manufacturing process for the starch that's used for making paper and in other industrial applications.

Ethanol from grain in Australia comes mainly from the milling group Manildra, which operates a distillery near Nowra in New South Wales, says Stephen Roe, Manildra's Ethanol Promotions Coordinator.



An artist's impression of the new ethanol from grain biorefinery in Dalby, Queensland
Illustration courtesy of Tam Faragher & Associates Pty Ltd

Biofuels need research and development for new feedstocks and advanced technology. Some additional transitional financial assistance may be warranted to help overcome the current financial squeeze. However, a sustainable biofuels industry can't be built behind protective barriers – Australia learnt this lesson many years ago.

Consumer confidence

Many end users still don't fully trust ethanol blends, Caltex research shows. The industry has more work to do to overcome concerns about their suitability for vehicles and equipment.

Nevertheless acceptance of the blends is steadily increasing among drivers. Caltex research indicates that, nationally, acceptance grew from 43 per cent in 2004 to 64 per cent in April-May 2007.

A government study shows all aspects of E10 use are satisfactory for 60 per cent of Australia's vehicle fleet. In the case of fuel-injected vehicles, the percentage is much higher – at around 80 per cent.

"The biodiesel market must avoid the mistakes made with early ethanol blends that were unlabelled, and ensure biodiesel blends of over five per cent have appropriate pump labelling and that the industry operates to uniform quality and standards," says Mike. "A major benefit of New Generation Diesel is that all diesel vehicles can use it."

Sustainability

An ongoing, increasingly vocal global debate surrounds the sustainability of biofuels. Creating them requires vast amounts of plant based material like sugar cane, wheat, sorghum, canola, jatropha or palm oil. There is concern that "monoculture" of key ethanol and biodiesel crops in developing countries could increase deforestation, reduce

biodiversity and displace small farmers and food production. Life cycle greenhouse gas emissions could also be increased.

And if feedstock is imported, how will biofuel producers know it's been sustainably produced? Caltex has not purchased imported palm oil based biodiesel and won't unless it can be shown to be sustainable to the satisfaction of key stakeholders in the countries in which it's produced.

"Acceptance of the blends is steadily increasing among drivers"

Developing technologies for producing fuels from waste material hold great promise, though these could be five to ten years away.

"When we can make ethanol from any cellulosic plant material, not necessarily valuable food grain, we'll be in a more

sustainable position,” says Mike. “Current technologies will need to be replaced so Australia has to be careful with subsidies to current ones. This is another reason not to mandate biofuel use.”

Long term outlook

Caltex believes the government should prepare a comprehensive plan for biofuels in Australia through to 2020. Failure to do so could hold the biofuels industry back or – ironically – even make it unsustainable.

“The plan would consider some pressing short term regulatory and financial issues including the biodiesel blend standard and the longer term transition to non-food biofuels feedstocks,” says Government Affairs Manager Frank Topham.

Caltex supports the development of a market-driven, sustainable biofuels industry based on consumer confidence, reliable supply and competitive prices. It looks to a commercial “win-win” for producers and marketers in an industry that is economically, environmentally and socially sustainable.

“Biofuels must be environmentally sustainable in the long term to justify their existence,” observes Frank.

“This means production that has no adverse effects on land, water supply or ecosystems. These fuels must have real, scientifically demonstrated benefits for the environment and be cost effective.”

Biofuels must also be socially sustainable. Stakeholders must be cautious about diverting food or water to fuel and driving up food prices at a time when pressure on natural resources is increasing.

With these caveats in mind, the company foresees a biofuels business that continues to expand. While there’s no prospect of them replacing all fossil fuels, it believes there is potential for these products to occupy a larger portion of the market than its current small percentage.

To this end Caltex is committed to meeting its annual targets under the former government’s biofuels action plan targets and will continue to invest in its supply chain to maintain and expand supply efficiently. Caltex advocates incorporation of this plan into a longer term plan under the new Labor government. ●

‘OVER THE MOON’ ABOUT BIO E10 UNLEADED

“I was over the moon when we found out we’d been accepted to sell Bio E10 Unleaded,” says Todd Stewart, franchisee at the Caltex service station and Star Shop in the north Brisbane suburb of Redcliffe.

The reason for Todd’s enthusiasm is that Bio E10 Unleaded offers him and his 11 staff an opportunity to boost overall petrol volumes along with revenue. Early signs are promising. The site began to offer Bio E10 Unleaded at five pumps in early November – making it one of the newest in the Caltex network to sell the product – and it immediately began moving 8,000 litres a week.

“That’s significant seeing as we’re a 100,000 litres of petrol a week site,” says Todd.

“There’s a big Caltex Woolworths site accepting vouchers about a kilometre away, so this presents us with an opportunity to grow our volume and offer our own customers a discount. At the same time I’m elated to be working with Caltex to meet volume and environmental targets set nationally. Every bit we can do as consumers contributes towards our planet’s future.”

\$100M ETHANOL PLANT TO FEED CALTEX

A vital new source of ethanol for Caltex’s Queensland operations next year will be a \$100 million biorefinery currently under construction at Dalby on the Darling Downs. The grain-to-ethanol plant is expected to be in production by the end of September 2008, producing up to 80 million litres a year.

Caltex is contracted to buy at least 30 million litres from the plant annually for three years, an undertaking that underpinned the facility’s development. However demand for ethanol is such that production has already been forward-sold.

Dalby Biorefinery will produce ethanol from grain, mainly supplied by Queensland growers via the publicly listed Australian agribusiness Graincorp, according to Dalby Biorefinery director Chris Harrison. At least 205,000 tonnes of grain will be required to feed it each year.

“We expect to be running at close to full production in the first year,” Chris told *The Star*.

“More and more motorists are discovering the benefits of ethanol blended petrol, not just for the environment but in providing Australia with a secure and sustainable fuel supply that helps regional communities. We look forward to working with Caltex to expand the use of renewable fuels in the state.”

B5’S ENCOURAGING RETAIL DEBUT



“Sales at the B5 pump at Hexham are up 35 per cent in July to November compared with the same period last year,” says Wade Death, General Manager of reseller Caltex Energy NSW. “The other diesel sales at the site were up just two per cent.” For the team at the Caltex site at Hexham, near Newcastle – the first Caltex-branded site in the country to be selling B5 – this is encouraging news. Though biodiesel has been on offer there for two years under the Bogas brand, it’s experienced the kick in B5 sales since the branding was changed to Caltex. The Hexham site operators report that customers’ interest in B5 has noticeably increased. So that the team can answer all queries effectively, they have developed information brochures.

Pictured at the site from left are Zahid Hussain, Wade Death and Ali Ramay

Does Australian oil refining really matter?

Does Australia really need to produce its own fuel products? Or is the oil refining industry just another marginal manufacturing enterprise that could move offshore in the face of global change? In a recent speech prepared for the American Chamber of Commerce, Caltex Managing Director and CEO Des King examined these and other issues.

Petroleum products like petrol, diesel and jet fuel provide 35 per cent of Australia's energy. They are vital to many industries like transport, mining, agriculture, construction and tourism, and everyday commerce. Without them, Australia would literally stop moving.

Growing oil demand is making supply more difficult, more expensive and more risky. Given that Australia is heavily dependent on oil, we should avoid losing any of the links in the oil supply chain. Doing all we can to retain oil refining in Australia makes sense provided it remains a net positive for the economy including energy security.

World energy demand up 50 per cent by 2030

Globally, there will be a massive increase in demand for energy and all the services that energy provides – including heating and cooling, cooking, mobility and ultimately employment. The International Energy Agency (IEA) projects a 50 per cent increase in energy demand by 2030.

Developed countries, particularly the United States and the countries of Europe, have high energy demand but relatively low energy growth. Their share of demand drops from 56 per cent to 40 per cent by 2030.

China, India and many other developing countries are coming off a lower energy use base but growing much faster. Their share of demand increases to 60 per cent.

World will continue to rely on oil, coal and gas

Where will all this energy come from? The IEA projects that oil dependence will fall but

oil will continue to dominate energy supply, about one third of the total. Gas and coal will continue to supply about one quarter of global energy.

Other sources will grow but still supply less than 20 per cent of energy. It will be important to develop a range of new renewable energy sources but these are generally seen as playing a minor role over the next 20 to 30 years.

Longer term, major changes will be needed in the way energy is produced and consumed. The problem is not really the endowment of resources, it's developing the resources sustainably and delivering them to markets. That is best achieved through competitive markets for investment and trade in energy at the global, regional and domestic levels.

Conventional oil supply will fall below demand

There is a wide range of forecasts for oil supply. "Peak oil" forecasters see conventional oil production declining within 10 to 15 years but oil companies are generally more optimistic. It is likely the trend will be tighter oil supply and increasing prices, with periods of substantial price volatility.

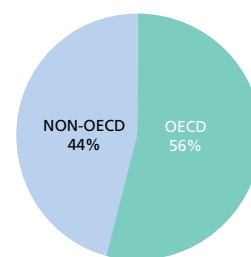
Even if "peak oil" forecasters are correct, we would be producing about as much oil in 2030 as we do today. The real worry in that case would be growth in demand and what we could do to supplement conventional oil supply to fill the supply gap.

Oil supply will become more difficult and risky

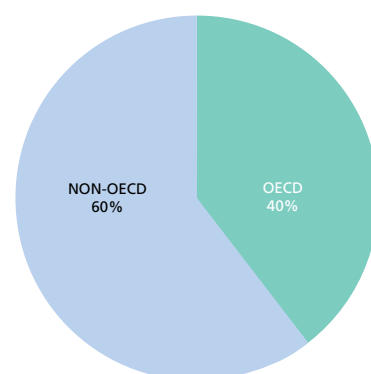
Resources of oil are extensive but the technological, financial and political

WORLD ENERGY DEMAND

Source: IEA World Energy Outlook 2006
An exajoule is 10^{18} joules



2004: 470 exajoules



2030: 715 exajoules

challenges of producing enough oil at an acceptable price are daunting.

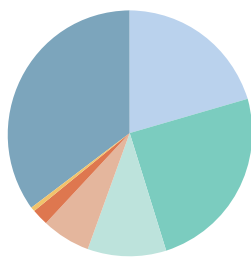
By 2030, more than half of production will have to come from development of existing reserves – a massive capital requirement – and growth in production will have to come from unconventional oil resources and new discoveries.

Large conventional crude oil resources are located in areas that are subject to substantial risk such as the Middle East, Russia, the Caspian region, Venezuela and Nigeria. Other crude oil resources are in difficult environments such as ultradeep water.

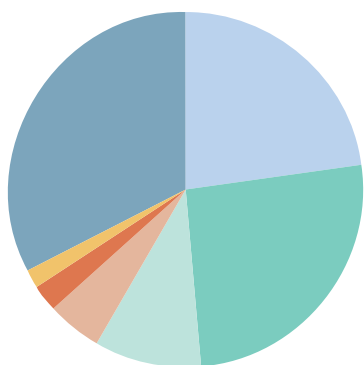
Unconventional oil resources are costly and technologically challenging, such as Canadian tar sands, Venezuelan extra heavy oil and US oil shale. Biofuels face major technological challenges to make large scale production sustainable and cost-competitive.

WORLD ENERGY SUPPLY

Source: IEA World Energy Outlook 2006
An exajoule is 10^{18} joules



2004: 470 exajoules

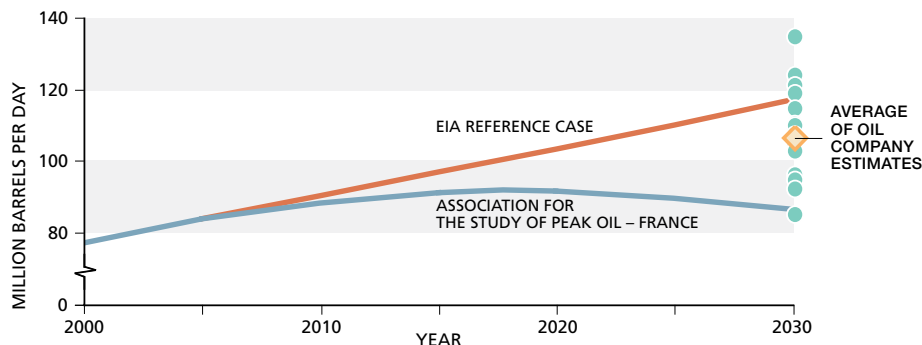


2030: 715 exajoules

OIL COAL NUCLEAR
GAS BIOMASS HYDRO
WIND/SOLAR/GEOTHERMAL

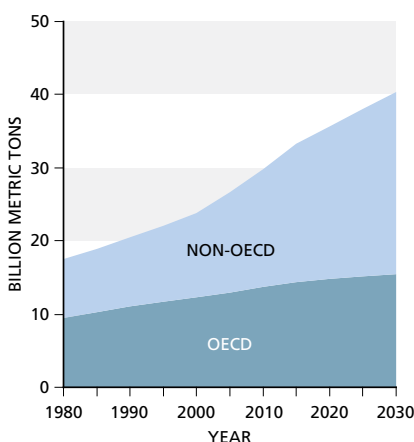
GLOBAL OIL SUPPLY FORECASTS

Source: National Petroleum Council 2007



WORLD CARBON DIOXIDE EMISSIONS

Source: IEA World Energy Outlook 2006
Reference Case



“The earth . . . will be reliant on fossil fuels for many years. That is why carbon capture and storage is so important to climate change policy”

Greenhouse gas must be reduced

Supplying oil and other energy to a growing world is a huge challenge – but an even larger challenge is climate change, which requires action to greatly reduce greenhouse gas emissions.

“Longer term, low carbon technologies may include plug-in hybrids, hydrogen internal combustion engines, hydrogen fuel cells and pure electric vehicles”

In 1980, global emissions of carbon dioxide were less than 20 billion tonnes, with the developed countries of the OECD accounting for more than half. By 2030, emissions will exceed 40 billion tonnes, with most of the growth in developing countries. However,

developed countries will still have much higher emissions per head of population.

While there is no agreed target for reduction in global emissions, a reduction of 50 per cent or more in global emissions by 2050 is commonly suggested, with a greater reduction in developed countries. The changes in energy supply and demand to meet such a target will be truly radical.

The earth can't sustain the increased carbon dioxide emissions from burning fossil fuels – yet it will be reliant on fossil fuels for many years. That is why carbon capture and storage is so important to climate change policy. While efficiency measures will reduce electricity demand, there can't be a long term future for coal and gas unless power station emissions of carbon dioxide are captured and permanently disposed of.

For oil, action lies more on the demand side, to greatly improve the fuel efficiency of vehicles. In the medium term, diesel engines

and petrol or diesel hybrids offer lower grams of carbon dioxide emissions per kilometre. Longer term, low carbon technologies may include plug-in hybrids, hydrogen internal combustion engines, hydrogen fuel cells and pure electric vehicles. Renewable fuels will help cut emissions from the supply side but are likely to play a relatively small role.

Global refining capacity will remain tight

World oil demand and supply will continue to grow strongly, even with the challenge of climate change. That means growing demand for refined petroleum products and the refineries to produce them.

New refineries and capacity additions will be constrained by increasing capital costs and tougher environmental requirements for cleaner fuels. As a result, global refining capacity is expected to remain tight. Despite this, there will be strong growth in capacity in developing regions, including the Asia Pacific.

Australian refining production is less than demand

Australia has seven major refineries in operation, as shown in the map below. In recent times, ExxonMobil closed its refinery in Adelaide and is now importing petrol and diesel mostly from its refinery in Singapore. It also scaled back its refinery in Melbourne to cut the cost of upgrading it to produce cleaner fuels.

Caltex has refineries in Sydney and in Brisbane. Caltex is an Australian company in the business of refining crude oil into petroleum products, then distributing and marketing those products at the wholesale and retail levels. In the first half of 2007 our profit was \$255 million on a replacement cost basis. That's just 2.6 cents per litre across all our sales of petroleum products. It's a high volume, low margin business.

Australian refineries produce about 590 thousand barrels per day of petrol, diesel and jet fuel or about 34 thousand megalitres per year, mostly for local demand. This is well below Australian demand for these petroleum products, which is about 43 thousand megalitres per year.

The shortfall in refining capacity means imports are about 22 per cent of Australian demand for petrol, diesel and jet fuel.

Petroleum product imports will grow strongly

Demand for petrol is fairly flat but demand for diesel is growing strongly at four per cent a year and jet fuel at three to four per cent annually. Petrol demand growth is reduced by increased fuel efficiency and penetration

of biofuels. Diesel demand is closely linked to economic growth and jet fuel to tourism.

Strong growth in demand for diesel and jet fuels means that imports will grow as no new refineries will be built in Australia and capacity increases at existing refineries will be much less than demand growth.

Imports in 2015 could equal 30 to 40 per cent of demand for petrol, diesel and jet fuel. By 2030 imports could be 50 to 70 per cent of demand.

Regional supply and demand remains tight in medium term

Economic growth, particularly in Asia, is driving global demand for petroleum products, particularly diesel, and keeping prices for diesel high. It wasn't always like this.

There was excess capacity in Asia in the late 1990s, particularly for petrol. Financial returns were unsustainably low and oil refining in Australia was in dire straits. Since about 2003, Asian demand has been very strong, particularly in China, and refining capacity is scrambling to catch up. In Australia and globally, oil refining is now earning reasonable returns after years in the doldrums.

New Asian refineries

Higher returns induce new investment. For example, the new Reliance Petroleum oil refinery at Jamnagar in north-west India will be on stream in late 2008 making petrol, diesel and jet fuel for the export market. Its capacity of about 600 thousand barrels per day will be similar to the total capacity of Australia's seven oil refineries. The new refinery will complement



The vast new Reliance Petroleum refinery in Jamnagar, north-west India

the existing Reliance Industries refinery at Jamnagar, making a total capacity of 1.2 million barrels per day.

Large modern Asian refineries have economies of scale that mean lower unit costs than Australian refineries and higher energy efficiency. Apart from India, there are large oil refineries in Singapore and other refineries throughout Asia and in the Middle East with products for export to Australia.

Shipping costs create location advantage for refineries

So how can we compete? The economics of refining are basically simple. Crude oil is imported in large ships – up to 200,000 tonnes. Petroleum products are imported in much smaller ships – up to 45,000 tonnes.

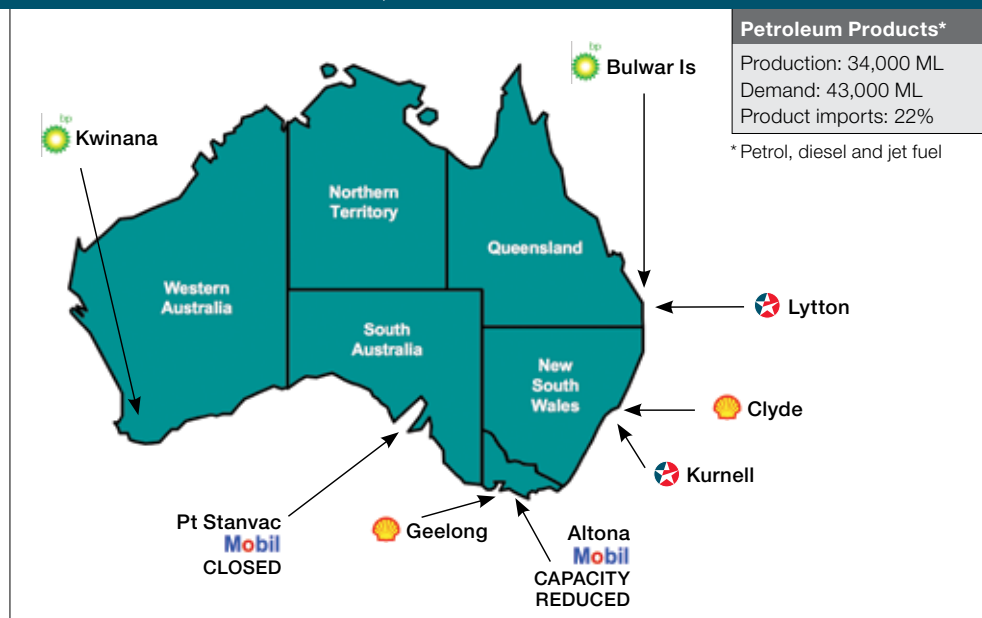
The key question for refinery viability is whether the landed cost of crude oil in Australia plus refining costs and a profit margin is less than the landed cost of petroleum products. The higher cost of freight for product imports provides a location advantage for Australian refineries.

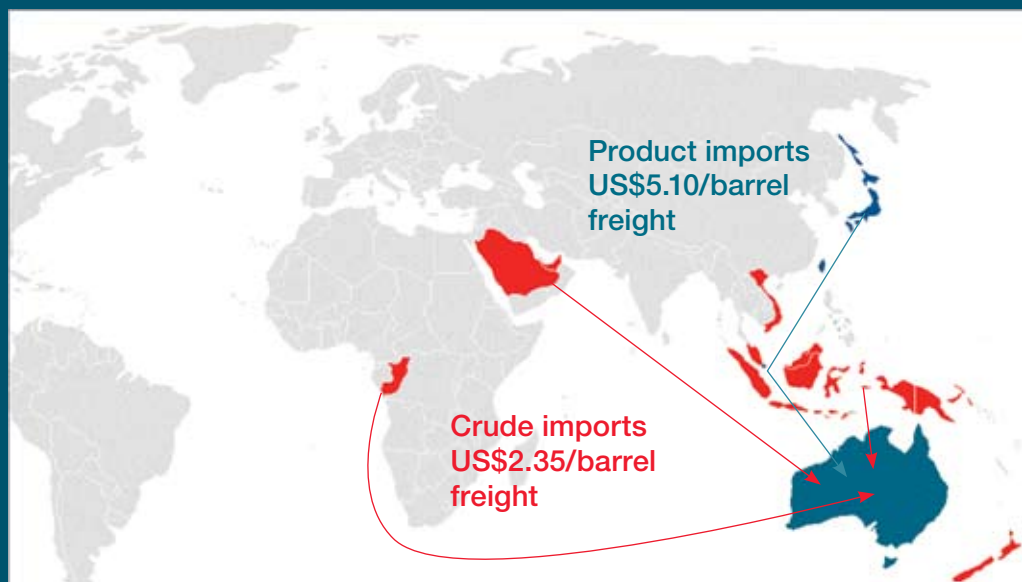
In the first half of 2007, the freight difference for Caltex between small product ships and large crude oil tankers was US\$2.75 per barrel. (A barrel is 159 litres.) However, this natural protection is eroded by the higher cost of refining in Australia which results from smaller scale, higher capital costs, and higher wages and energy costs. So Australian refining is quite marginal and vulnerable to additional costs not faced by our international competitors.

How do we stay competitive? Not through protection – Australian oil refining has no tariff protection and we don't propose any. Not through subsidisation – unlike many industries

AUSTRALIA'S REFINERIES

Source: Australian Institute of Petroleum, DITR





REFINING LOCATION ADVANTAGE US\$2.75/BARREL

Source: Freight rates are for Caltex refineries for 1H07 (Caltex data)
Crude oil and petroleum product sources are for total Australian imports (DITR data)

we don't seek and don't receive financial assistance. Not through regulation – we want a level playing field, not regulatory distortions in our favour.

“From time to time, various politicians, organisations and media engage in oil company bashing as a cheap way of gaining public support”

Staying competitive requires strenuous efforts to improve efficiency and cut costs. It also requires all governments to avoid imposing costs that cumulatively could kill refining in Australia.

Let me give you some examples.

Refining faces carbon pricing risks

Carbon cost. Total Australian greenhouse gas emissions in 2005 were 559 million tonnes of carbon dioxide equivalent. Of this about eight per cent was from use of petrol, eight per cent from diesel and four per cent from jet fuel and other fuels. To manufacture these fuels, oil refineries produced about one per cent of Australia's emissions.

Under the emission trading scheme proposed for Australia, permits to emit greenhouse gases in a particular year will be auctioned, with the revenue going to the government. Emitters must surrender permits each year equal to their emissions.

However, companies that face import competition from countries that do not impose carbon costs may be classified as “trade exposed, emissions intensive” and receive

free permits. As Singapore refineries will bear no carbon costs, Caltex should receive a free allocation of permits for its refinery emissions.

Unless this occurs, up to \$1 per barrel of the \$2.75 per barrel freight advantage could be eroded. This level of carbon cost would probably make all of Australia's refineries uneconomic and shift production to Singapore, India and other countries that will not bear any carbon costs.

Also under emission trading, the former government proposed that Caltex should be responsible not only for our own emissions but also our customers' emissions. At a carbon cost of \$40 per tonne of carbon dioxide, Caltex would have to purchase \$1.4 billion in permits annually – then increase our prices to recover the money. This would impose a huge financial risk on Caltex far out of proportion to our earnings and financial capability.

Other regulatory issues

Biofuels. Caltex supports the development of biofuels like ethanol and biodiesel as they may play a significant role in future fuel supply and energy security if costs can be reduced and sustainability issues can be overcome. However, we are concerned at government policies and legislation to mandate the supply and use of biofuels.

Biofuels need research and development for new feedstocks and advanced technology and may warrant some additional transitional financial assistance. However, a sustainable biofuels industry can't be built behind protective barriers – Australia learnt this lesson many years ago.

Environmental requirements. Air pollution is still a major issue and Caltex has invested \$500 million to produce cleaner fuels to cut

air pollution. Over the period 2007 to 2009 we will spend about \$1 billion on various capital projects to improve safety, reliability and production capability and to maintain our refineries. We support expenditure to reduce the impact of our refineries on the air, water and land but such expenditure has to be realistic and spread over a reasonable period – we just can't afford everything or do it all over the next few years.

Fuel price regulation. From time to time, various politicians, organisations and media engage in oil company bashing as a cheap way of gaining public support. I am pleased to say that neither the Coalition nor Labor have taken this approach, which is to their credit, and the ACCC is taking a fair, rigorous and fact-based approach to its current inquiry. However, other attacks and proposals for regulation undermine confidence in the industry and ultimately call into question the desirability of investment. False perceptions of excessive profits and market power can also constrain political and regulatory ability to rationalise the industry or impose unreasonable conditions on such rationalisation.

Does oil refining really matter?

Retaining a substantial oil refining capability is essential to Australia's energy security. It is essential to Australia's productivity and competitiveness that we build and maintain our energy supply capability all the way along the supply chain from source to end user.

There is a strong case that oil refining in Australia does matter and policies and attitudes need to recognise its vital strategic role in the Australian economy. ●

The speech was presented on Des King's behalf by Richard Beattie, Group Manager Policy, Public and Government Affairs.

Outstanding teachers take centre stage

Bill Dorman is a big man with a big personality who's hard to miss. His email address starts with the name "Redbeard".



Caltex award winner Bill Dorman from Goulburn, New South Wales

"You can see why, can't you?" laughs the teacher from Mulwaree High School in Goulburn. Indeed Bill's shaggy mane and beard are as noticeable as his passion for his work.

The sculpture and metalworking teacher started the Owing Our School project at Mulwaree High four years ago with fellow teacher and artist Suzie Bleach, aiming to help students with mental health problems. To engage the youngsters and improve their self esteem they teach them to build dramatic sculptures and mosaics, many of which are on display at the school.

A winner in last year's Caltex and Rotary Club of Sydney Awards for Innovation in Teaching, Bill spoke at the 2007 awards presentation in Sydney recently. His prize funded a trip to Scotland, where he visited sculpture studios, meeting artists working in communities and schools.

While in Glasgow Bill also addressed a Rotary meeting and spent time with two trusts working with disadvantaged people. He not

only learned about their woodworking and community gardens projects, he got actively involved in their work, helping to set up a metalworking shop.

"These were both non-tick-box organisations," Bill said. "They weren't merely interested in putting people through programs, they wanted to build a sense of community and extended family. This has inspired me to spread our program to a wider audience in Australia, not just to youngsters.

"Work, I've discovered, is a universal language for everyone."

The 2007 winners

This year's winners, who were each awarded up to \$6,500 to be used to visit an overseas educational institution of their choice, are equally as inspiring in their commitment. They are:

- Connie D'Anna of Evans River K-12 Community School in Evans Head, northern New South Wales. Connie developed three programs at Evans River that boost students' employment prospects and confidence by allowing them to acquire practical skills.
- Ian Hale of Fairfield High School in Sydney. Ian has for the past two years fostered artistic talent on a scale that's unprecedented in his state. His Gifted and Talented Visual Arts Primary School Program caters annually to 350 kids from 22 primary schools in the vicinity of Fairfield High.
- Poobal Naidoo of Thomas Reddall High School in Ambarvale, Sydney. Poobal's determination to making student support services more user friendly at Thomas Reddall High School has resulted in significant changes to the way pupils access help.

A desire to help

A powerful desire to assist kids suffering from anxiety and social phobia to cope with mainstream school life motivated Cheryl Bazzano, another 2006 winner who spoke at the awards ceremony.

Cheryl, from Rivendell School for Specific Purposes in Concord West, attended the tenth Biennial International Association of Special Education Conference in Hong Kong. She brought back ideas, strategies, books and other resources which she intends to

implement at Rivendell. She also promoted Rivendell's programs when she visited schools in Hong Kong.

"Meeting other special educators from round the world was a very informative experience," she said. "Australia certainly is at the forefront when it comes to working with students with special needs."

Most of all Cheryl brought back a determination to make the wider community more aware of the need for support and understanding of children suffering from Aspergers – a disability on the autism spectrum. A fairly recent psychiatric diagnosis, Aspergers is an emerging condition that requires specialised programs to help young people take their place in the community.

"Work, I've discovered, is a universal language for everyone"

Giving pupils greater choice

A 2005 winner, Melissa Giddins, addressed the awards lunch too. Formerly an English teacher at Emmaville Central School in northern New South Wales, Melissa has since become Head Teacher English at Kandos High School, 350 kilometres west of Newcastle.

Her program introduces pupils to higher order thinking skills using such theories as the "multiple intelligences" developed by Harvard educationist Dr Howard Gardner, Bloom's Taxonomy, Ralph Pirozzo's Grid and others. It's led to improved results at both schools.

On her trip to the US east coast and Canada in April last year Melissa visited schools that base their curricula on multiple intelligences, a form of teaching that eschews the traditional notion of intelligence based on IQ testing as too limited.

Some of the American schools embraced modular based learning in which students are given greater choice. For example they can choose to study a course they are interested in, and the class for that course has a mixture of students of different ages and abilities. Teachers in turn can teach the courses they're passionate about. Research has shown this leads to more effective learning and fewer behavioural difficulties, Melissa said.

One of her challenges is to communicate what she's learned to colleagues as well as students and to continue implementing modular based learning techniques.

Meanwhile Melissa remains grateful to Caltex. Her award not only allowed her to travel to North America, it helped her win the Head Teacher's job at Kandos High.

"I know," she says, "because it was mentioned when I got the promotion." ●

If it's not safe, tell your mates

One day, Charlie Morecraft drove up to a piping manifold at his Exxon refinery in the US and “swung a blind” in the line (isolated it), taking a short cut in the proper procedure to save time and effort.

A leak suddenly developed, spraying Charlie with an octane-boosting product similar to petrol. Temporarily blinded, he ran from the scene past his truck.

In a split second, Charlie realised his mistake: he'd left his engine running. Too late. A spark from the truck's ignition lit the vapours and Charlie was enveloped in a fireball. He dived into a puddle of water but had received burns to over half his body. Five years of agonising rehabilitation and more than 50 operations followed.

“At first I was bitter with the company for allowing me to get into that situation,” Charlie says.

But ultimately he blamed the person who had allowed him to go out without wearing safety glasses, to roll up the sleeves of his fire-retardant suit and to leave his vehicle running – all against regulations.

“That person was me,” says Charlie, who's now a safety consultant in the US.

Workers at Caltex's Lytton and Kurnell refineries have been watching a video presentation by Charlie in orientation sessions for the Incident and Injury Free (IIF) program that's been rolled out to the refineries' 1,600 employees and contractors.

Afterwards they discuss safety. What does it mean to each of them? Are they prepared to approach workmates to speak about working safely and to be approached in turn? Do they take the initiative and make their own judgements about safety issues?

The Caltex refineries' IIF program started early in 2007 with consultants interviewing a cross section of people about Refining's safety culture. “The results made for sometimes painful reading,” admits IIF Project Manager Michael O'Sullivan.

Honest feedback

Many respondents felt managers paid lip service to safety and were only concerned about their own jobs. Suggestions for improvements often disappeared into “black holes”, they said, and were never heard about again.

As a first step in introducing IIF, all Refining managers and team leaders attended a two-day commitment workshop and 34 employees were trained to conduct IIF orientation workshops for all refinery people. The Refining Leadership Team received regular coaching

from the consultants as well. An intensive program, IIF Supervisor Skills, followed, aimed at superintendents and managers. This is based on the premise that reinforcing “more safe” behaviour is the key to success. About 90 per cent of supervisors have now been trained.

The reaction from participants has been outstanding, Michael says. “Some blokes who were sitting with their arms folded at the start of meetings were saying by the end, ‘Okay you've convinced me – I don't want to get injured, I don't want to see my mates get injured and I'd like us to be more open in the way we talk to each other.’”

Adds Operational Excellence specialist John Newby: “IIF is about building relationships. The better relationships you have with your workers, peers and bosses the more open they'll be to talking about how they can improve safety and other factors influencing performance.”

‘GRADUALLY, THEY'RE GETTING IT’

A recent “pulse survey” has shown that while there's still potential for improvement, IIF is leading to significant movement in Refining's safety culture and that people are more receptive to talking about it.

Confidence to speak up

“I've noticed a change around the place,” says Col Groth, maintenance fitter for the Lytton reliability team. “People are more friendly and approachable which is a side effect of the program. They have more confidence to speak to their mates to see if they're okay, when they're struggling or if there's a safer way to do something.”

Showing they care

“Gradually they're getting to know what it's about,” says Kurnell Loss Prevention System Coordinator Alex Mann. “I've really noticed a difference. People are coming up to me these days and asking me about my family. That shows me they want me to go home safely.”

Show, don't tell

Kurnell Production Manager Ray Greenup agrees colleagues are slowly adopting the system, but says more effort is needed. “Until they see changes across the board, IIF is not going to work to its full potential so we must improve further,” Ray says. “We tell people safety is our number one priority; we must continue to show them that it is – and that means everyone.”

So ideas don't fall into “black holes”, teams at the refineries are working on improving communication and understanding. A group led by Lytton Event Manager Joe Callaghan is looking at ways to get better feedback to people on issues raised and making safety jobs more visible and Reliability Improvement Specialist Kynan Baker is working on a similar project at Kurnell.

Authority to Stop Work cards

Under IIF and LPS all refinery workers are authorised to stop work if they believe a situation is unsafe. This has always been the ruling, Michael points out, but some people have felt that unless they had something in writing, it wasn't really “official”.

This has been rectified with a formal Authority to Stop Work card that states Caltex approves and supports such action. These are being issued in December at Kurnell and Lytton.

IIF principles were clearly evident in a recent decision to shut down a major plant at Lytton following a small fire on the line into a fractionator. After the fire was quickly extinguished, rather than continuing to run the plant in a potentially unsafe way the team took the decision to shut it down, says General Manager Refining Brian Waywell.

“When IIF becomes ‘the way we do things around here’, we won't notice these examples,” Brian says, “because they'll just be part of how we normally operate.” ●



Andrew Scott (left) and Col Groth at Lytton – more open about safety

YOUNG ACHIEVERS DELIGHT THEIR SHAREHOLDERS

Where will our next generation of business leaders come from? They may just be among the students of Wynnum High School in Brisbane. Ten Year 11 students recently won Queensland Student Company of the Year in the Young Achievement Australia (YAA) 2007 awards.

The program, sponsored by Caltex and the Lytton refinery, introduces kids to the world of business and challenges them to develop a product from scratch as a business venture.

In a year-long enterprise, the students:

- conducted market research
- designed and developed products
- sold shares to bankroll their project

- developed action plans, business reports and marketing plans
- produced an annual report for shareholders.

Their product? Decorated glassware and servingware. Pliable wire and coloured stones were used to decorate their creations in a variety of elegant designs for wine, cocktail and spirit glasses as well as salad and cake servers.

The company was liquidated in October and for every \$2 share purchased, investors received \$4.95 – an impressive return by any standards.

The YAA program ran every Wednesday for ten months. As well as financial assistance from Caltex and the refinery, the students received ongoing advice and support from their teacher Elizabeth Forster and



CALTEX FUELS THE MARK WEBBER CHALLENGE

Tasmanians saw popular F1 driver Mark Webber take to a track of a different kind in late November when he competed in the Mark Webber Pure Tasmania Challenge that he founded four years earlier.

Caltex is one of the sponsors of the cycling, kayaking and hiking charity adventure race. It teamed up again with Tasmanian reseller Caltas to play a crucial role in the provision of Vortex for support vehicles during the seven day event.

Mark created the race in 2003 to raise money for The Mark Webber Challenge Foundation, supporting young Australians with life threatening illnesses along with environment and conservation projects. This year it raised money for

the Leukaemia Foundation and the Save the Tasmanian Devil Appeal.

The challenge has two categories – the Van Diemen Cup for four person corporate teams and the 2theXtreme cup for two person elite teams. The winners, respectively, this year were Telstra and Schweppes, whose members covered over 450 kilometres of Tasmania's beautiful terrain.

ABOVE: Mark Webber fills a support vehicle with Vortex

LIGHTING UP LITTLE LIVES

Caltex has joined forces with Frucor Beverages in a nationwide, year long store promotion to raise at least \$30,000 for the Starlight Children's Foundation.

For every bottle of Evian mineral water sold in Caltex stores during the "Light up a Little Life" campaign, 15 cents will be donated to Starlight. All Evian bottles supplied to Caltex until 1 July 2008 will be fitted with a bright yellow cardboard necktag advertising the promotion.

Frucor Beverages has set up a special code for Evian to ensure all Caltex outlets receive stock and to facilitate collection of the money. Caltex has committed to raising a minimum of \$30,000, but is hoping for more.

"This is the first long term commitment of its kind to a charity by Caltex Merchandise and one of its suppliers and it's exclusive to us," says National Merchandise Manager Karim Sumar.



business mentor Toni Dugdale from the Lytton refinery.

They experienced the gamut of real life business experience – learning about the value of teamwork, work-life balance and strong and clear communication, says Toni. The judging panel agreed they excelled in all functions.

“It’s been simply amazing to watch these dedicated pupils become the most successful student company in Queensland,” says Toni. “They’ve become young leaders and I’m proud of them all.”

BELOW: Young Wynnum entrepreneurs Louis Jess, Rhianna Roberts and Louise Owen with some of their products



A CHALLENGE TO SHAPE UP, ONE STEP AT A TIME

Australian sporting icon Herb Elliot AC MBE, one of the world’s greatest middle distance runners, visited Caltex recently to meet participants in the Global Corporate Challenge and present an award to our best performing team.

The Global Corporate Challenge is a health and fitness initiative helping people in the corporate world to step away from potentially deadly sedentary habits and get moving again. The aim is to reduce obesity and heart disease and get people back in shape – literally one step at a time.

Seven teams of seven members from Caltex put their best foot forward and took up the challenge. Participants must wear a pedometer for 125 days to measure the number of paces they take. This figure is entered on the program’s website which

converts the steps into kilometres and plots team progress on a virtual online course covering 20,000 kilometres.

The Caltex “Star Steppers” team made great strides, averaging 14,378 steps per day (equivalent to about 10 kilometres), almost 4,000 steps more than the average for all competitors, finishing in 161st place out of a total of 3,336 teams.

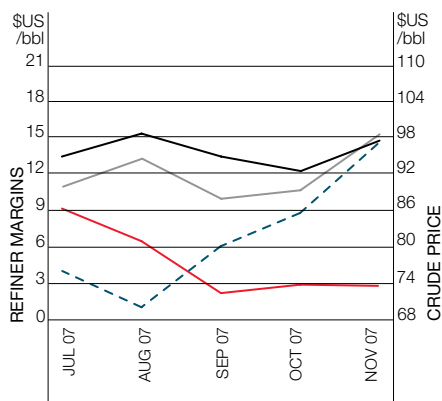
Chief Financial Officer Simon Hepworth stepped up to receive the award – a gold replica of Herb’s running shoe from his gold medal-winning performance in the 1,500 metres at the 1960 Rome Olympics – on behalf of the Star Steppers. The challenge was a good way to keep fit, says participant Blaine Bester. “It really pushed me to walk a bit further every day and motivated me to keep more active at the weekends too.”

ABOVE: Stepping out: Simon Hepworth and athletics legend Herb Elliot

SHARE PRICE



CRUDE OIL PRICE & SINGAPORE REFINER MARGINS



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MARGINS
 — Petrol (95 ULP) (left axis)
 — Jet (left axis)
 — Diesel (0.005%) (left axis)
 - - Tapis – crude oil price (right axis)

Tapis is the crude oil produced in Malaysia. The Tapis price is the benchmark for crudes in the region. The refiner margins for petrol, diesel and jet fuel are the differences between the Tapis crude oil price and the ex-refinery price in Singapore for the products.

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