

Green Energy, Green Car



Holden exports its VE Commodore to Brazil
as the Chevrolet Omega, which runs on 24% ethanol.

- **Cut carbon emissions**
 - **Cut fuel imports**
 - **Cut Australia's international debt**
 - **Build industries**
 - **Expand employment**

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A Green Energy, Green Car Policy: Executive Summary

Australia has the unique ability to reduce its carbon emissions, the cost of a carbon-trading system, its dependence on imported oil and cars and thereby cut its burgeoning foreign debt.

Australia has the agricultural and industrial capacity to create a major green renewable fuels industry combined with an expanded domestic motor vehicle industry producing green, flex-fuel cars capable of running on an ethanol mix of up to 85 per cent in petrol.

At US\$50 a barrel, Australia's net imports of crude and refined fuel are likely to reach \$27 billion a year by 2015, twice the 2005-06 deficit of \$12.8 billion, according to Belinda Robinson, Chief Executive of the Australian Petroleum Production and Exploration Association.

Farmers will continue to produce the sugar cane needed for an efficient ethanol industry only if the Federal Government legislates for an equitable and transparent pricing mechanism

for cane supply, including final-offer arbitration, and creates a marketing authority for fuel ethanol. No other policy could deliver a more substantial, sustainable cash flow to Australia's struggling rural industries. This would not impact on human food or stock food prices.

In 2005 Australia's deficit in trade in automotive vehicles and parts was around \$18 billion and domestically-produced cars fell below 30 per cent of new car sales. This could be substantially turned around by a domestically-owned car industry producing small and medium, as well as the currently produced large, vehicle range as flex-fuel cars.

Australia's combined deficit on imported cars and fuel is over \$30 billion, which is set to rise sharply. This is unsustainable for Australia with its growing net foreign debt of \$544 billion (53 per cent of GDP). A large sugar-cane-based ethanol industry and a domestically-owned car industry are the solution.

Policy

Ethanol mandate

(a) The Federal Government must mandate a minimum 5 per cent ethanol in all petrol and flex-fuel vehicle "variable mix" hoses on every fuel pump (5-85 per cent ethanol), to give consumers a choice not currently available.

(b) The mandate should be raised to 10 per cent over the next five years and the current fuel excise exemptions should be extended until a domestic industry is soundly established.

Fair, final-offer arbitration

In the face of a monopsony, voluntary collective bargaining has failed. Therefore a mandatory final-offer arbitration system must be reinstated to arbitrate on the price for sugar cane and all issues relating to supply agreements. This system must have a judge as arbitrator, advised by representatives of farmers, mills and a technical advisor nominated by the affected grower groups. The price for cane is to be based on actual prices achieved from the sale of all products derived from sugar cane. This policy can be achieved by direct federal legislation, or by an industry mandatory code of conduct.

Marketing authority for ethanol

Given that the two major supermarkets now dominate the petrol fuel market, a statutory marketing authority is required for the marketing of ethanol into the domestic market to ensure a fair price to ethanol mills and an equitable return to producers of ethanol feedstock crops.

Single selling-desk for sugar – compulsory acquisition

There is an urgent need to recreate the single selling-desk for the compulsory acquisition of all raw sugar produced in Australia, for sale onto the domestic and export markets. This will ensure that growers receive available price premiums which have been usurped by proprietary millers and refiners since deregulation.

Farmer co-operative ethanol mills

Consolidate these policies by providing \$500 million incentive for farmers to build farmer co-operative-run biofuels mills, or a development bank (badly needed to revive Australian industries) to help finance the ethanol and other new Australian industries.

A domestically-owned car industry

Australia needs to develop a truly independent domestic car company aimed at increasing production to about 1 million units. A domestically-owned car company would provide better prospects for aligning the interests of the motor vehicle producers with the economic and environmental interests of the nation.



A Biofuels Industry

Australia is one of the few nations with the land, water and sunshine needed to create a major biofuels industry. These renewable fuels substantially cut carbon emissions. In the case of ethanol, it is most efficiently produced from sugar cane, supplemented in the off-season with corn, and other crop biomass. As a McKinsey's Consulting report has noted, "whether through subsidies, import tariffs, or research grants, government regulation has helped drive both the demand and profitability in the industry." (W. K. Caesar et al., "Betting on biofuels", *The McKinsey Quarterly*, No 2, 2007).

The current policy – a voluntary ethanol target agreed between the Federal Government and the oil industry – has failed. The Prime Minister's taskforce on biofuels had set a target of 350 megalitres of ethanol in fuel by 2010 (one megalitre equals one Olympic-sized swimming pool). This would have replaced a mere 1.75 per cent of all petrol used in Australia. As part of this process, a minimum target of 89-124 megalitres was set for 2006. Oil company resistance saw less than 18 per cent of this target reached last year. The current policy has failed. It's time for a mandate on biofuels.

The first key step for a fuel ethanol industry:

(a) **The Federal Government must mandate a minimum 5 per cent ethanol in all petrol and flex-fuel vehicle "variable mix" hoses on every fuel pump (5-85 per cent ethanol), to give consumers a choice not currently available.**

(b) **The mandate should be raised to 10 per cent over the next five years and the current fuel excise exemptions should be extended until a domestic industry is soundly established.**

This policy would set the stage for a major ethanol industry, with the mandate rising as the industry puts the infrastructure in place for sustainable industry restructure and expansion.

How much ethanol can Australia produce from sugar cane?

In Brazil, the Dedini process is the most efficient for producing ethanol from sugar cane. It yields 125.5 litres/tonne of sugar cane, utilising sugars, bagasse and cane trash (José Luiz Olivério, operational vice-president Dedini Industries, "Ethanol Road Show" Australia, August 2004). Eastern Australia has about 400,000 ha under sugar cane, producing about 98.9 tonnes per ha. Therefore, substituting just 10 per cent of the 20,000 megalitres of petrol consumed annually with ethanol could be achieved using about 42.3 per cent of the current sugar-cane crop. In fact, less of the Australian sugar crop would be required as Australian cane has a higher sugar content than Brazilian cane. To run all of Australia's petrol engine cars on E85, would require a 3.6 times expansion of the sugar industry over the medium term.

Currently, Australia consumes about 30 per cent of its sugar, with the rest exported. Hence, 10 per cent ethanol in fuel would not force up the price of sugar to consumers.

Can the price of ethanol be made comparable to fossil fuel petrol?

Prices quoted for sales of ethanol produced from molasses to retailers is 72cents/litre. Commercial in confidence issues result in a lack of transparency in pricing, making confirmation difficult.

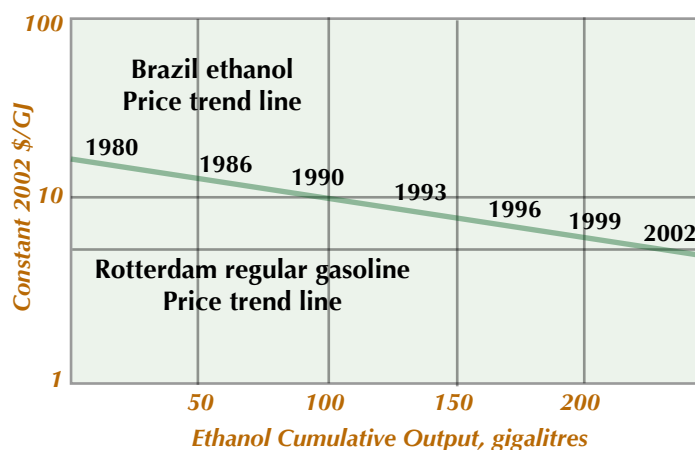
However, any investigation of ethanol has to consider the huge

technological strides being made in the biofuels industry, bringing down costs in an industry which is in its infancy. In Brazil between 1975-2000, sugar cane yield per hectare increased 33 per cent, cane sugar content rose 8 per cent, ethanol yield from sugar rose 14 per cent and fermentation yields rose 150 per cent. (Sergio Trindade, president of the independent consulting firm, SE2T International, Ltd., "Fuel Ethanol Globalisation: Brazil and Latin America", Queensland Ethanol Conference, 2006).

The diagram below shows the falling cost curve for ethanol in Brazil. This is likely to continue as bagasse not used for co-generation is used to produce ethanol from cellulose.

The Scale Factor: Brazil Ethanol Learning Curve

Adapted from Goldemberg, et al, "Ethanol learning curve - The Brazillian experience", *Biomass and Bioenergy* 26 (2004) pp. 301-304.



Source: Sergio Trindade (see above)

Recently, the US has invested US\$385 million in six projects to develop the enzymes and technologies to produce cellulose ethanol. Cellulose plant material is made up of sugars bound together in long, stable molecular chains. The enzymes are being rapidly developed to breakdown cellulose that comes from switch grass, wood, corn stubble, cane tops and other farm waste. The aim is to produce cellulose ethanol from biomass other than crops used for human consumption and animal stock feed. (see W. K. Caesar et al., *The McKinsey Quarterly*, No 2, 2007, see above).

Will producing crops for ethanol push up the price of food?

This problem has not arisen in Brazil, until recently, the world's largest ethanol producer.

Locally, short-sighted reports have made this claim based on using grains to produce ethanol rather than sugar cane. Sugar cane farmers, from the Ord River in WA and along the northern NSW and Queensland coasts, are desperate for a biofuels industry to lift their returns after years of crippling low prices dictated by a corrupt world market price for their sugar. Further, these short-sighted reports do not include the medium-term possibility of

expanded use of arable land and water for cane, corn and other biofuel crops. Australia has the capacity to expand production of such crops in the Ord River region, where another 78,000 ha can be made available for agriculture. The Gilbert River in north Queensland has an average flow of 9,000 gigalitres, about 37 per cent of the Murray-Darling Basin flow, with about 400,000 ha of land suitable for irrigation.

Additionally, there are the huge black-soil plains of western Queensland. These cover an area roughly 1,000km by 500km. Irrigating this land would require the tapping of some of the far north's water, where huge annual flows are a staggering 9.7 times the Murray-Darling average flow. A federal parliamentary committee is already examining water and agricultural development in northern Australia, in part to examine the feasibility of shifting some food and fibre production from the southern part of the continent.

Does the energy input required justify an ethanol industry?

Yes. It is generally accepted that in Brazil, the world's leading fuel ethanol producer, one unit of energy input is used to produce 1.7 units of energy from sugar cane. Brazil established an ethanol industry because it could not afford fossil fuels. In the US, one unit of energy produces 1.2-1.3 units from corn-based ethanol.

However, in terms of fossil fuel inputs to create ethanol, sugar cane ethanol is miles ahead. It can be produced and refined using renewable energy. For example, in place of fossil fuels, sugar cane's fibrous waste bagasse can fire an electricity co-generation plant to produce ethanol, with excess power sold into the electricity grid. Further, ethanol can be used in the transport and farming process, also replacing fossil fuels. As a result, in Brazil the ethanol energy output/fossil fuel input is 8.3.

Comparable energy output/fossil fuel figures for corn (1.3 to 1.8), sugar beet (1.9) and wheat (1.2) make them viable supplements to a sugar-cane-based ethanol industry. (see Sergio Trindade, above).

[Note: As part of a campaign against ethanol, Cornell University's David Pimentel has claimed that ethanol requires more energy inputs than are gained from burning it as motor fuel. This study has been soundly rebutted by Dr Michael Graboski, citing four different reports since 1995 showing that the energy balance from corn ethanol is favourable. Pimentel did not consider sugar cane ethanol. View Graboski's report at www.ncga.com/ethanol/pdfs/EthanolFuelsRebuttal.pdf]

How much can ethanol reduce carbon emissions?

As a renewable fuel, ethanol is greenhouse-neutral. Burning ethanol produces CO₂, which is absorbed back into the crops from which it is produced. Australia's 14 million vehicles pump 3.5 million tonnes of CO₂ into the atmosphere annually. The more ethanol used in cars, the less net CO₂ added cumulatively to the atmosphere.

As indicated above, 8.3 units of energy from sugar cane ethanol can be produced by just one unit of fossil fuel. Further, "Lifecycle assessments, which take into account all the effects of the entire chain from fuel production to its use, show that a change from fossil fuels to biofuels could reduce CO₂ emissions by a factor of five, provided that a high proportion of renewable energy is used at all stages in the process." (Alfred Szwarc, of the Sao Paulo sugar growers' association (UNICA), "Ethanol-Gasoline Blends and Atmospheric Emissions").

A recent McKinsey Consulting report rated sugar cane ethanol as among the leading important components of future *renewable* carbon emissions. ("A cost curve for greenhouse gas reduction", Per-Anders Enkvist et al., *The McKinsey Quarterly*, No 1, 2007).

In a carbon-trading system, carbon recycling will add value to ethanol made with the minimum consumption of fossil fuels.

Are there other high-value products from biofuels?

Already there is evidence that the biofuels industry will become something akin to the petroleum industry where fuel is just one of many profitable products ("Cooking up more uses for leftovers of biofuel production", Hillary Rosner, *New York Times*, August 8, 2007). Some include:

- Lignin, found in all plants including sugar cane, which burns for US\$40/ton to co-generate electricity, but which is also an attractive product for glues, sealants and detergents, potentially making it worth US\$300/ton;
- Distillers dry grain, a high-protein by-product of corn ethanol, is already a valuable stock feed, but it can also be used to produce hydrogen and PHA, a biodegradable product for surgical gowns and gloves;
- Distillers dry grain also has 10 per cent oil, capable of yielding 113 litres/ton of bio-diesel.

What are the health/environmental benefits from biofuels?

Fossil fuel motor vehicle emissions are likened to "the new asbestos", because of their detrimental health effects, by Associate Professor Ray Kearney, of Sydney University's Department of Infectious Diseases and Immunology. He has been in charge of monitoring the vehicle emissions from Sydney's road tunnels and estimates that vehicle pollution alone costs Sydney \$2-3 billion annually. About 1,400 Australians die each year from these pollutants, about three times Australia's annual road fatalities.

The main benefits for ethanol in fuel is reduced tailpipe exhaust emissions of carbon monoxide, hydrocarbons, 1-3butadiene, benzene, toluene and xylenes, as well as reduced full fuel life cycle emissions of greenhouse gases. These emissions induce other chronic illnesses like asthma, bronchitis and uvulitis.

The Australian Medical Association has strongly backed 10 per cent ethanol in petrol and 20 per cent biodiesel in diesel fuel. (Dr Margaret Chirwin, former AMA Public Health Director, *ABC 7.30 Report*, August 22, 2007). Associate Professor Kearney says 10 per cent ethanol in fuel cuts dangerous emissions by a qualified 50 per cent ("Health Impacts of Fossil Fuels: Ethanol-Blended Fuels are Mandatory", Queensland Ethanol Conference, 2006).

Diesel, with 15 per cent ethanol (diesohol), cuts particulate matter emissions by 35-50 per cent (*Setting National Fuel Quality Standards*, Paper No 7, Department of Environment and Heritage, 2004). Replacing diesel with 15 per cent ethanol would require 2,169 megalitres of ethanol, consuming about 46.1 per cent of the Australian sugar cane crop.

What are other countries doing with ethanol?

Brazil has been the world's leader in fuel ethanol production using sugar cane, which is soon to be supplemented by cellulose ethanol from sugar cane bagasse.

The US has recently surpassed Brazil as the world's biggest producer. The US target is to replace 30 per cent of fossil fuel gasoline with renewable ethanol by 2030. This is to be composed of 60,000-80,000 megalitres from corn and grains (up from 20,000 megalitres currently) and 170,000 megalitres from cellulose ethanol.

Many other countries are moving to create major ethanol industries or want to import large quantities of fuel ethanol, including many European nations, Japan, China, a host of Latin American countries and many emerging East Asian nations.

NSW has mandated 2 per cent ethanol in fuel rising to 10 per cent in four years. Queensland and Victoria are looking to follow suit.

Fair, Final Offer Arbitration

Deregulation of the sugar-cane industry under National Competition Policy has been an economic and social failure.

The right of cane farmers to voluntarily collectively bargain was retained under the Sugar Industry Act 1999 (as amended), however it is ineffective. Deregulation abolished final-offer arbitration. This has left cane-farmers, who are price-takers not price-makers, no bargaining power with millers, particularly proprietary millers. Unlike workers in a union who have the ultimate threat of withdrawing their labor, farmers cannot withhold supply. Withholding supply, even for a short period, would mean no income for farmers and banks threatening foreclosure, while the effect on the mill's operation would be minimal.

In the final instance, farmers are forced to take or leave the mill's final offer. This is especially true for proprietary mills. A farmer's only other option is to shift into producing some other product, which in turn requires expensive retooling of their farming enterprise and additional capital investment.

Since full deregulation of the industry last year, the low price that farmers have received for their cane reflects the corrupt world price of raw sugar, which is half the average world cost of production, due to heavy subsidies. (In contrast, Brazil has a five per cent premium on sugar sold into its domestic market.) Every proprietary mill has refused to include in the price of cane any significant return for profitable by-products like cogeneration of electricity from bagasse, molasses, ethanol or other by-products. Farmers cannot achieve a fair return on investment. Interest and bank charges are at a premium in the industry.

As a result, farmers are leaving the industry. Cane production in the Burdekin region has fallen from 9.4 to 8.3 million tonnes with other cane regions suffering similar falls. In some cases, high-value cane farms are being turned over to low-value grazing, or worse, tree plantations run by managed investment schemes, where the driving incentive is not market forces but tax concessions for wealthy city investors.

This represents the destruction of high-value agriculture, which is then replaced by low-value agriculture!

The underlying economic problem lies in the theory and practice of pricing within a monopsony, or a buyer's monopoly, that is, a situation in which there is only one buyer (a mill) for an undifferentiated product produced by many sellers (farmers).

In the face of a monopsony, voluntary collective bargaining has failed. Therefore a mandatory final-offer arbitration system must be reinstated to arbitrate on the price for sugar cane and all issues relating to supply agreements. This system must have a judge as arbitrator, advised by representatives of farmers, mills and a technical advisor nominated by the affected grower groups. The price for cane is to be based on actual prices achieved from the sale of all products derived from sugar cane. This policy can be achieved by direct federal legislation, or by an industry mandatory code of conduct.

Given that the two major supermarkets now dominate the petrol fuel market, there is a need to counter their monopsony market power over ethanol. As two dominant buyers of ethanol, the supermarkets would have the ability to set the price of ethanol from the mills.

Given that the two major supermarkets now dominate the petrol fuel market, a statutory marketing authority is required for the marketing of ethanol into the domestic market to ensure a fair price to ethanol mills and an equitable return to producers of ethanol feedstock crops.

Deregulation has had another negative economic effect. It saw the abolition of the single selling-desk for sugar on the world market. Since then, Australia's sugar mills have been bidding each other down in price on the world market, damaging returns to mills and farmers.

There is an urgent need to recreate the single selling-desk for the compulsory acquisition of all raw sugar produced in Australia, for sale onto the domestic and export markets. This will ensure that growers receive available price premiums which have been usurped by proprietary millers and refiners since deregulation.

A Green, Domestic Car Industry

Developed nations have either a high-tech chemical, aeronautical, electronics or motor vehicle industry or a combination of these. Australia has only a car industry, which it is at risk of losing.

Even though Australian car exports rose above \$5 billion in 2005, "that is almost insignificant compared with the automotive import bill.

"In 2005, Australia imported \$23.5 billion worth of vehicles and parts. Since 2001, imports have grown at about \$1.3 billion a year, but in 2005 they jumped by \$2 billion ...

"The proportion of the market taken by local cars has slumped from 40 per cent in 2001 to less than 30 per cent — the lowest share for any domestic automotive industry in the world." (Ian



Porter, "Wheels in motion for car industry demise," *The Age*, June 13, 2006).

The Australian car industry is winding down. If one manufacturer were to close down, it would probably trigger a chain reaction with huge losses of supply companies and jobs. It is likely in the next 5-6 years that at least one manufacturer will shut down.

Australia has gone from producing about 70 per cent of its cars, to now producing only about 340,000 units, or about 30 per cent of its annual demand for new cars, and importing the balance – despite the Federal Government providing about \$8 billion in support.

Craig Milne, of the Australian Productivity Council, a private consultancy, has proposed to the Federal government that:

Australia needs to develop a truly independent domestic car company aimed at increasing production to about 1 million units. A domestically-owned car company would provide better prospects for aligning the national economic and environmental interests with the interests of a domestic firm.*

Holden is already producing VE Commodores, which run on 24 per cent ethanol, for export to Brazil, where they are relabeled as the Chevrolet Omega. Australia could produce flex-fuel cars, which are better than hybrids, because the latter have higher production inputs of fossil fuels and shorter operating lives.



The 2008 model of the E24, VE Holden Commodore exported to Brazil as the Chevrolet Omega.

Australia is one of only nine countries capable of designing and building world-class cars from scratch. The others are the US, Japan, Germany, Sweden, France, the UK, Italy and South Korea.

However, no country with a car manufacturing industry has developed its industry without government help of one kind or another. Unlike the mining industry, comparative advantage in car manufacture does not derive from any natural endowment; rather it is created with the help of government. That has been so for Europe and Japan, as much as for the newly emerging producers.

Australia has suffered from the lack of a domestically-owned car company. Being foreign-owned has compromised local market objectives with the global objectives of its parent companies. This has inhibited the ability of local firms to respond to domestic and international opportunities. Local industry has focused on the production of large cars, to the neglect of small and medium sized vehicles. Further, the four-way split of the industry has hampered achieving economies of scale. These factors have led to an increasing reliance on imported vehicles at the expense of the domestic industry.

If Australia were to produce per capita what other car manufacturing nations produce, it would be producing 1 million cars, worth about 3 per cent of GDP. Then, instead of producing about 340,000 units, which limits production scope to one-and-a-half models with international competitiveness, Australia would be able to build three or four models that are world competitive. The optimum economies of scale for car production are now 200,000 to 300,000 units. This would put Australia in the middle range of mature automotive manufacturing nations.

The plan would be to facilitate the buying out of one or two of the current producers by a domestic consortium, which would cost less than the current subsidies and deliver more in return to the economy. This would then facilitate a steady enlarging and restructuring of the domestic industry into a form that would build a wider and more diverse range of vehicle models and sizes. While this industry could still comprise a number of firms, or "prime contractors", to use an aerospace term, they would share three or four different-sized vehicle platforms between them.

A platform is a set of mechanical and base structure parts. These parts do not constitute a complete car in themselves but the set of key under body pressings, drive train and suspension components that represent the most expensive and scale intensive parts of the vehicle to develop. Quite different cars can be built off this set of parts. For example Ford Focus, Mazda 3 and Volvo S40 all share the same platform. The Holden (Opel) Vectra shares with Saab 9-3 and Cadillac BLS, and the VW Golf shares with Skoda Octavia, Seat Leon and Audi A3 and TT.

As the Australian industry is currently organised, no individual firm can prepare a convincing business case for a small or medium platform vehicle, but with industry-wide platform collaboration, possibly within a mixed-marque manufacturing model, each firm could build small and medium vehicles. Thus firms could offer a wider range of locally built vehicles, as they once did. Then Australia would have a much larger and more productive car industry, better able to stand up against international competitors. Platform sharing is not the same as model sharing, a policy that failed under the Button Plan, because it permits individual firms to configure products to their own design values and corporate styles.

Platform sharing enables economic volumes to be built off the most expensive, but unseen, parts of the vehicle. Because these parts are shared across the whole industry, they can justify world-competitive levels of engineering development, in their level of innovation, technical design and the capital intensity of the manufacturing solutions applied to bring them to fruition. Such an industry model would complete the virtuous circle of reducing costs, improving design, technology and quality while enlarging output. It would provide a basis for the Australian industry to compete through productivity, the Philosopher's Stone that has, for every successful firm in the history of the industry, turned the base metals of automotive manufacture into gold.

A domestically-owned local motor vehicle firm would catalyse and eventually transform the dynamics of industry structure, supplier relationships, operational style, brand management and the Australian product design culture into a form more conducive to achieving the output potential of the whole industry. The existence of this firm would place consequent pressure on the remaining foreign firms to adjust their dealings with Australian suppliers, while fostering a more independent role for their local managers.

Apart from securing a future for the industry and reversing the current debilitation of the supplier base, with the loss of businesses, technical capabilities, skills and jobs that this entails, a productivity-based enlargement would be highly beneficial for Australia's present and future net exports position.

* Submission to the Parliament of Australia, House of Representatives Standing Committee on Employment, Workplace Relations and Workplace Participation, by the Society for Australian Industry and Employment, February 2006. Available from: www.aph.gov.au/house/committee/ewrwp/automanufacturing/subs/sub10.pdf