

AFTS Secretariat  
The Treasury  
Langton Crescent  
PARKES ACT 2600

**Australia’s future tax system**  
**The Treasury**

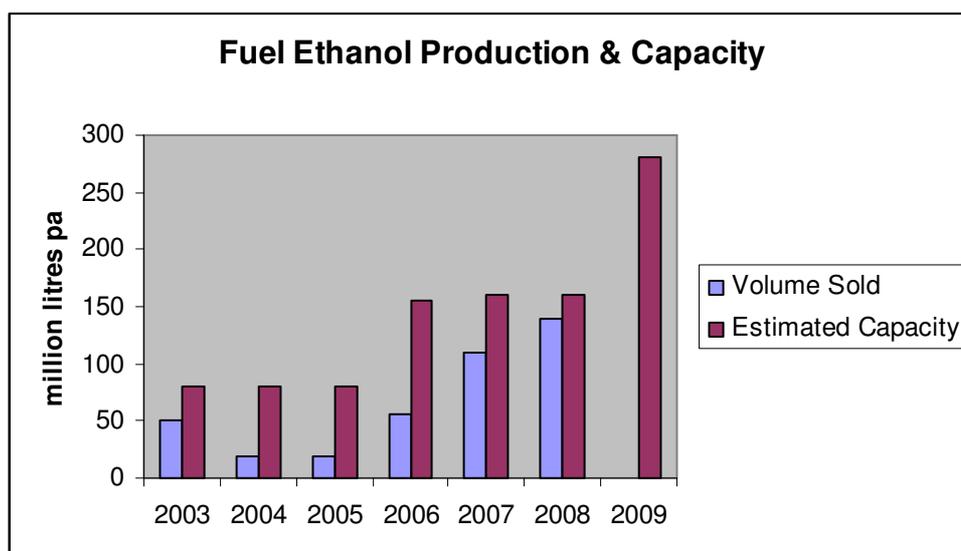
**1. Introduction and Background**

CSR Limited has been operating in Australia since 1855 and is one of Australia’s oldest companies. CSR is a leading diversified manufacturing company with operations throughout Australia, New Zealand and Asia. A Top 100 ASX company, CSR was originally established as a sugar company.

CSR has been producing ethanol in Australia for over 100 years. At the Plane Creek site near Mackay, CSR Distilleries owns and operates an ethanol production facility which produces automotive grade anhydrous ethanol. The company recently completed an expansion of the fuel ethanol capacity at this site. This has increased the capacity to produce only fuel grade product from 38mla to 60mla. The facility uses molasses as its feedstock drawn from CSR’s own operations in the immediate area and the Burdekin region together with product from other regional mills.

**2. Market Prospects for Fuel Grade Ethanol in Australia**

The recent history of fuel ethanol in Australia is best illustrated in the chart which shows actual sales of product into the fuel market and an estimate of production capacity.



Data estimated by CSR Ethanol

Early confidence was lost in the product around 2003/4 due to unfounded fears regarding the suitability of the fuel for car engines. With support from the Federal Government, standards were put in place and various studies have

confirmed the suitability of ethanol for most cars built after 1986. Demand has continued to grow with support from Independent Service Stations, the major oil companies and retailers. Significantly higher oil prices have increased the demand for the product and improved the viability of the industry.

### **3. Broad Policy Issues**

#### **a. Food versus Fuel**

The rapid increase in oil prices combined with the large expansion of corn based ethanol in the USA raised questions internationally about the impact this had on higher food prices. This is a complex issue with various opinions as to what caused a rise in certain food prices and it is not within the scope of this submission to review global food markets and their operation in detail.

As a policy consideration, however, CSR is mindful of the food versus fuel debate in relation to bio-fuels production. Molasses, or sugar for that matter, are not considered food staples by the Food and Agricultural Organisation of the United Nations. In recognised food studies, such as the UN World Food Program bulletin “Changes in Staple Food Prices in Selected Countries” Issue no 4 July 2009, which list the staple foods in 56 countries, sugar is not mentioned as a staple at all. Commonly sugar is categorised with coffee and cocoa. A July 2008 World Bank policy research paper, # 4682, “A Note on Rising Food Prices” by Donald Mitchell concluded that “sugar-based ethanol did not push food prices appreciably higher”.

Arguments against sugar based ethanol have been based on the need for additional land clearing or replacement of food crops. In Australia there is very little opportunity for more suitable land to be brought into sugar production. The biggest threat to sugar farming has been the forestry MIS promoters who have removed valuable prime agricultural land from sugar production and locked that land away for 15 to 20 years, probably never to return to sugar again. Some other regions are under threat from urban encroachment. Australia’s strict land clearing laws prohibit broad scale clearing of new land for agriculture, including sugar cane.

#### **b. Ethanol and Fuel Security**

Australia imported 3533 MI of refined petrol in 2007/8, against a total demand of 19.2 billion litres. That equates to over 18% of demand being met by imports. It is unlikely that Australia will build any new or substantial refining capacity, and even if it did it would be reliant on imported crude oil. Universal usage of E10 blends by Australian motorists would reduce gasoline demand by approximately 1310million litres (adjusted for energy content, using National Greenhouse Accounting Factors), reducing demand for imports by 40%.

The Australian sugar industry would be capable of meeting this demand. Approximately 4 mt of raw sugar are exported annually and if this was all converted to ethanol the maximum potential ethanol production would be approximately 2.4 billion litres pa (1.6bla mogas equivalent). This would equate to 83% of all gasoline sales being E10. In reality premium grades might not contain ethanol and some sales may well occur as E85 as this market evolves and as more flex fuel vehicles enter the market place.

While sugar derived ethanol is not the single solution to liquid fuel security it can provide a significant short term improvement until other technologies such as second generation bio fuels are commercialised, combined with more fuel efficient and electric vehicle technologies are introduced). Furthermore it ensures the market for ethanol and the confidence in the product is well established ahead of production from other sources.

Expected ethanol capacity in Australia in 2009 is anticipated at about 290mla. CSR is of the view that it could produce an additional 250 mla from sugar sources (excluding molasses) within the next few years under the right policy settings. Other investment in the industry may well occur, but the prospect of over 500mla production would then be contributing significantly to Australia’s liquid fuel capacity. This would represent about 10% of Australia’s gasoline import requirements on an ethanol energy equivalent basis.

#### **c. Ethanol and Net Trade Benefits**

A simple trade balance analysis of exported sugar versus imported gasoline shows an improvement in the trade balance will occur at crude oil prices greater than \$75US/bbl WTI and FX 0.83. At long run forecast sugar prices, based on marginal economics of production, the sugar price is anticipated to average approximately \$A350/t. Thus export revenue foregone, on average would be \$1.4bpa. Imported gasoline displaced at say 80cpl Terminal gate Price less gasoline excise, would be \$1.4b. thus if crude oil increases above \$75US/bbl the trade impact will become positive.

#### **d. State Mandate Policies**

New South Wales has introduced a mandate under the Biofuel (Ethanol Content) Amendment Bill 2009. In effect this is a three month mandate as the requirement can be waived depending on market circumstances at the time. The intent of the bill is to require full use of E10 in ULP by July 2011 in New South Wales.

The Queensland Government has released draft legislation which if enacted would require 50% of ULP to be sold as E10 by December 2010.

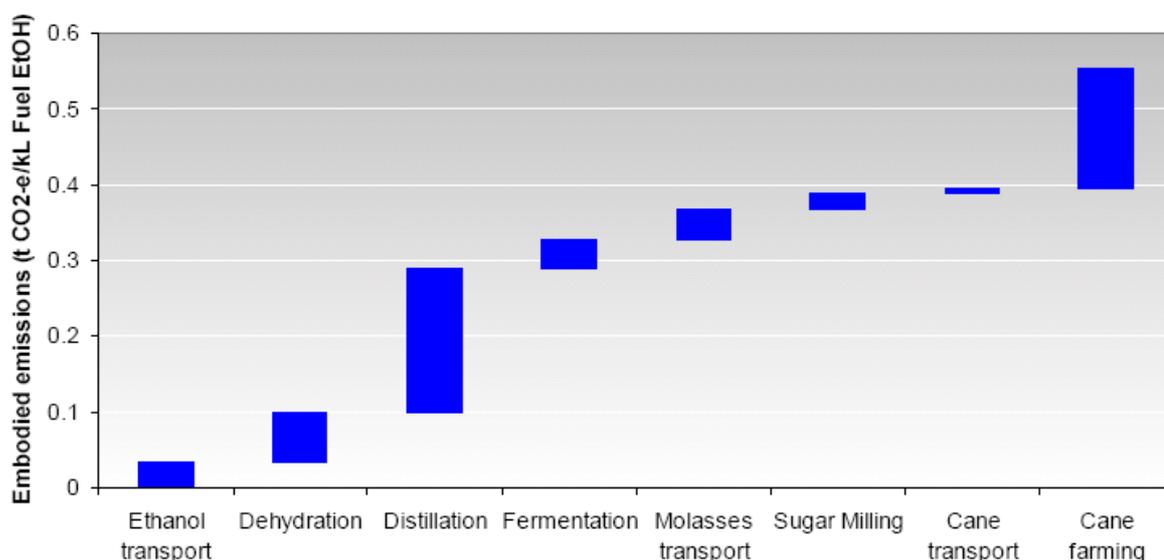
The intent of both bills is to encourage demand for ethanol, which could be met by new investment in plant and equipment in Australia or by imports.

CSR has consistently questioned whether this legislation is the best way forward to develop the market. We believe that the ethanol industry can grow in a sustainable way without government mandates. One of the important factors enabling the growth of the ethanol market has been its ability to be competitively priced with imported petrol. At the moment ethanol has the same excise level as LPG and other alternative fuels. In our opinion this is more important for the growth of the industry than mandates.

Mandates are likely to lead to non economic investments with less than optimum outcomes from a carbon mitigation perspective. CSR has a clear preference for Federal measures which apply uniformly across the nation and which can drive multiple policy outcomes. A more robust policy could be developed using excise that would lower risk to industry investors and achieve a number of national interest objectives.

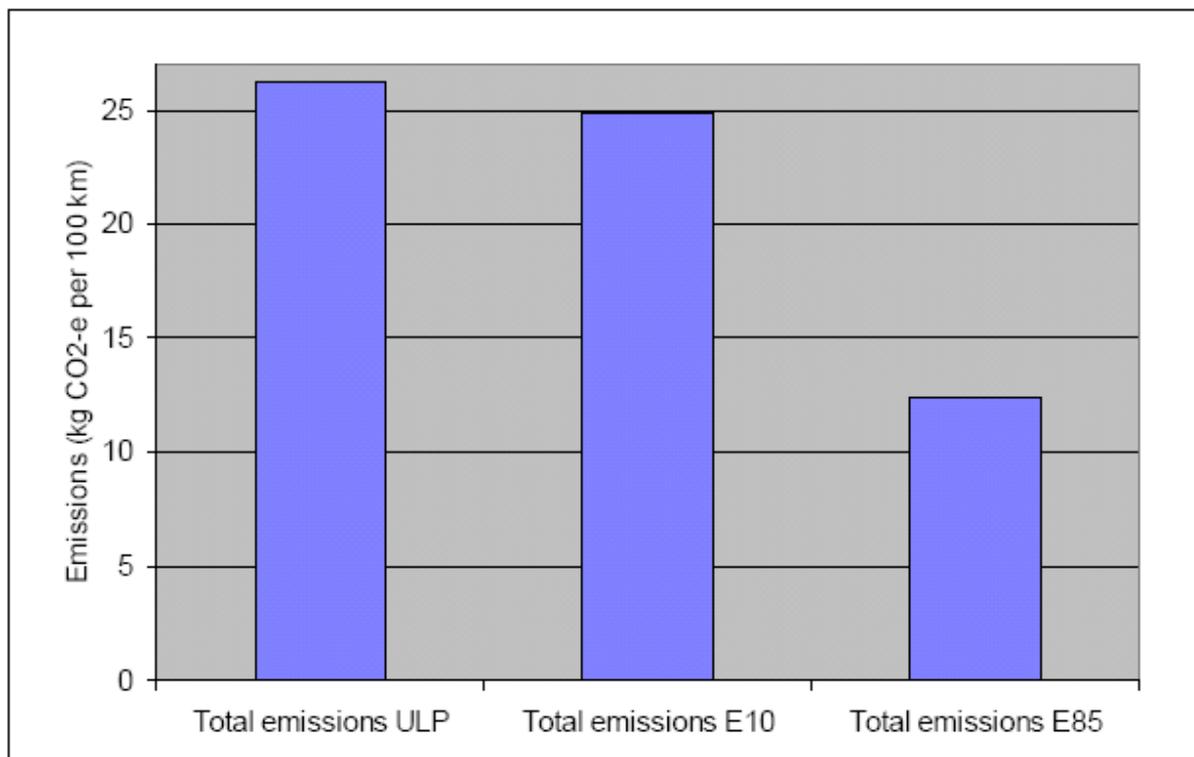
**e. Carbon benefits of bio-ethanol**

Based on a carbon footprint analysis of CSR Ethanol’s production chain conducted by Energetics Pty Ltd in 2008, one litre of CSR ethanol produces less than half the CO<sub>2</sub> emissions of one litre of petrol.



This analysis takes into account the full emission cycle across farming, harvesting, milling and delivery to market. The research was peer reviewed by the CSIRO and is summarised in the chart showing the sources of embodied Greenhouse Gas Emissions in the fuel ethanol from the Sarina distillery.



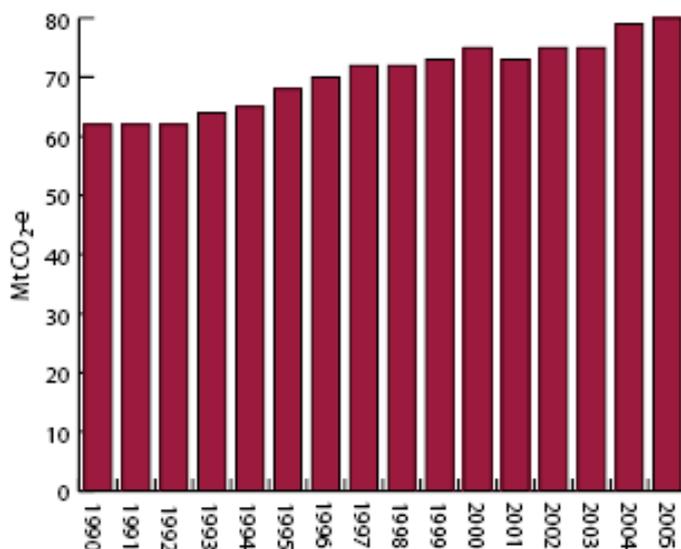


The Life Cycle Assessment (LCA) was used to compare the emissions of ULP, E10 and E85 on a per km basis. The basis for E85 is where the E85 is used in an engine designed for ULP, but data are adjusted for the respective energy contents of ULP and ethanol. This is conservative as the fuel economy for purpose built E85 engines is higher than assumed here.

The overall comparison on a full combustion cycle shows that the scope 1 emissions for combustion of petrol are much higher than the total emissions of the farming and production cycle for ethanol. Hence there is a substantial benefit to the carbon load on the environment by using ethanol rather than ULP. For E85, emissions of CO<sub>2</sub><sub>e</sub> are about 50% of those of gasoline.

Australia’s use of about 20 billion litres of petrol per annum, generates about 50 million tonnes of CO<sub>2</sub>-e every year or about 2.5 tonnes CO<sub>2</sub>-e per 1000l’s of petrol. Transport emissions overall represent about 15% of Australia’s GHG emissions and have grown 30% since 1990.

**Figure 7: Total transport emissions, 1990–2005**



Sugar based ethanol has the potential to reduce Australia’s transport emissions by 5.6 million tonnes per annum, almost equivalent to 5 years growth in emissions. This provides some breathing space for the introduction of more fuel efficient vehicles and other power technologies, which can also benefit from ethanol fuels.

**f. Health Benefits of bio-ethanol**

Orbital and CSIRO conducted an exhaustive study of the health benefits associated with the use of E10 in Australia and reported to the Department of Environment, Heritage, Water and the Arts in June 2008.

<http://www.environment.gov.au/atmosphere/fuelquality/publications/pubs/ethanol-health-impacts.pdf> . The report concludes that for urban Australia the health benefits to the community based on 2006 values are approximately \$39 million pa for a 50% take-up of E10.

The findings are supported by the Clean Air Alliance (Secretariat held by The Australian Lung Foundation) which quotes an article by Associate Professor Ray Kearney of the University of Sydney, "Health Impacts of Vehicle Exhausts, 2003". "Long-term particulate matter is documented to have an association with *respiratory* and cardiovascular disease as well as *one fifth of lung cancer cases* which is an enormous public health impact. A *30% reduction in these cancer-causing particulates* known as polycyclic aromatic hydrocarbons can be achieved through a *10% blend of ethanol and petrol*". Frighteningly 40% of the 7000+ patients diagnosed with lung cancer annually have either never smoked or are non smokers who have long since kicked the habit. (Australian Institute of Health and Welfare, 2008)

The Department did not assess the relative health benefits of the other alternative fuels which would be covered by the proposed policy



measures and which are likely to add to the health benefits already determined for ethanol.

#### 4. Biofuels and Excise

- The legislated excise policy for fuel ethanol sets excise at 38.143cpl. This is offset by a producer rebate grant of the same amount. The grant expires on 30 June 2011.
- As of 1 Jul 2011, ethanol will become an eligible fuel under the “Cleaner Fuels Grant Scheme”. Excise is phased in from 1 Jul 2011 at a discount of 80%, 60%, 40%, 20% so that by 2015, bio-ethanol will see a full level of excise at 38.143.

Post 1 Jul 2011 as enacted – no CPRS	2011	2012	2013	2014	2015
Excise prescribed in Item 10.20 of the Schedule, Excise Duties Excise Tariff Act 1921	38.143	38.143	38.143	38.143	38.143
Energy Fuel Scheme 2004, excise reduction applies	80%	60%	40%	20%	0%
Excise Reduction	30.51	22.89	15.26	7.63	0
Net Excise Payable	7.63	15.26	22.89	30.51	38.143

- The Coalition introduced a policy white paper in June 2004, “Fuel Excise Reform”. The nature of this policy was to adjust the excise rate applicable to fuels based on energy content relative to gasoline – so called energy neutrality. This resulted in fuels being grouped into 3 bands, high, mid, low energy. As an industry development measure this was halved for alternative fuels and was to be phased in over 5 years from 2.5cpl to 12.5cpl. The policy was never enacted in legislation, although significant investment was made in ethanol facilities based on the white paper. Since 2006, CSR invested almost \$50m in the Sarina distillery to produce high grade fuel ethanol. The company received a Federal Government Biofuels Grant and additional assistance from the Queensland Government to assist with the initial project.

Post 1 Jul 2011 policy, but not enacted and without CPRS	2011	2012	2013	2014	2015
Under White Paper, Government Policy, but never enacted, excise rate	25	25	25	25	25
Under White Paper, Government Policy, but never enacted, excise reduction rate	90%	80%	70%	60%	50%
Excise Reduction	22.5	20	17.5	15	12.5
Net Excise Payable	2.5	5	7.5	10	12.5

Consequential Amendments Bill to the CPRS Bill 2009 adjusts the excise level by an amount equivalent to the cost of carbon on diesel. As carbon prices go up, excise rates come down. This means the effective excise rate for ethanol will also adjust down. The phase-in will apply so that excise rates for gasoline and ethanol will end up being the same.

The impact of this has been constructed in the following table based on our best assessment of the draft bill. To test the impact a carbon price series was chosen, which included a fall in price.

**Under CPRS Provisions:**

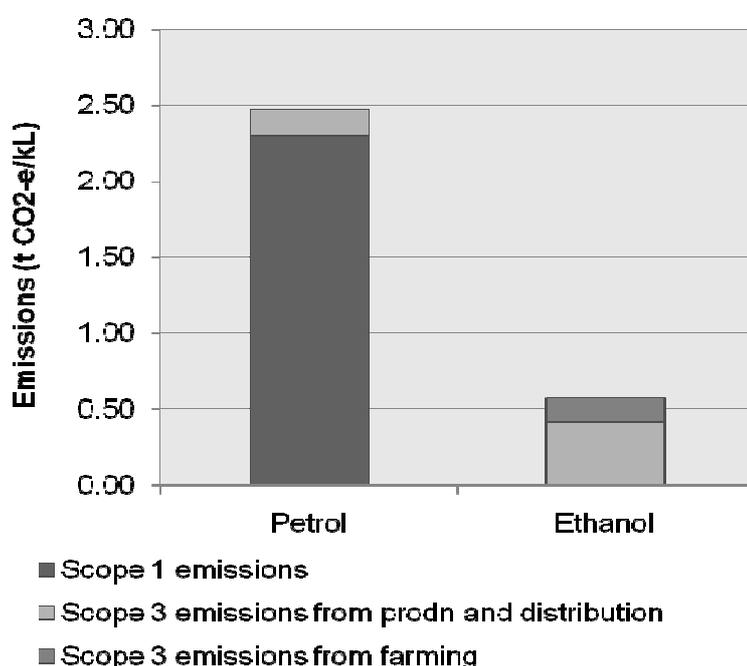
Possible Rate Reducing Day	1/07/2011	1/07/2012	1/01/2013	1/07/2013	1/01/2014	1/07/2014
Carbon Price \$/t for last 6 months (guess)	10	20	30	5	15	25
Previous rate reducing day?	no	yes	yes	yes	no	yes
Designated unit charge(prior 6 months)	10	10	20	30	10	15
6 month prior price	10	20	30	5	15	25
Test for current rate reducing day	0	10	10	-25	5	10
Rate reducing day if >0	no	yes	yes	no	yes	yes
Rate Reduction	0.000	2.455	2.455	0.000	1.227	2.455
New Excise Rate going forward	35.688	33.233	30.779	30.779	29.552	27.097
Carbon tax on gasoline at \$10/t	2.455					
Actual Carbon Tax at bowser - last 6 months	2.455	4.910	7.365	1.228	3.683	6.138
Add new excise rate gives bowser impost	38.143	40.598	40.598	32.006	34.461	35.689

The new excise rate going forward also becomes the new rate for ethanol under the provisions of the draft bill. Under the CPRS provisions ethanol retains an incentive equivalent to the carbon tax on gasoline, but **only** when the carbon prices rises. If the carbon price falls there appears to be a disincentive for ethanol because the excise is only adjusted down and not up. The policy intent going forward is not clear and could take two pathways. The first is to apply the provisions of the “Cleaner Fuels Grant Scheme” and the second would be to enact the principles of the June 2004, “Fuel Excise Reform”.

- The incentive for ethanol through this program in the long run is small or can be nil depending on the relative movement of carbon price and excise rates. This does not provide a suitable basis for ongoing green fields investment in the industry.
- The policy landscape has changed.
  - Ethanol producers are more aware of their carbon footprint, CPRS is imminent.
  - The community is concerned about fuel security.
  - Consumers are more confident about the suitability of ethanol blends in petrol, with E10 being heavily promoted and E85 (an 85% blend of ethanol and petrol) being adopted by the V8 Supercars circuit.
  - It is timely to consider an approach which could promote the national interest, resulting in regional investment in green fields production facilities.

## 5. Ethanol and Carbon and Excise

There has been considerable debate about the environmental merits of ethanol and its carbon credentials. Based on the Energetics Life Cycle Assessment we can see the full benefit of ethanol versus ULP petrol.



The embodied scope 3 emissions from production and farming for ethanol are greater than the scope 3 emissions from the production of gasoline. There are minimal scope 1 emissions from the combustion of ethanol. This

means that overall emissions from CSR ethanol are less than half of those for gasoline on an energy adjusted basis.

***It becomes possible then to link excise to the carbon footprint of the bio-ethanol manufacturing process.*** The current policy does not differentiate between the “Carbon Intensity” of the ethanol being produced.

CSR proposes that the excise discount be linked to the Carbon Intensity performance of the ethanol by way of a Greenhouse Gas Emissions factor.

For instance this could simply be:

(Energy content excise rate under the draft CPRS amendment) x (GHG factor)  
= *Fuel Excise*

- The GHG factor is the *ratio of the embodied CO2e emissions of the ethanol / as compared to its fossil fuel equivalent.*
- Administratively this could be easily accommodated within the existing excise framework with a straight forward amendment to the Excise Act, with factors set in regulation. Much of the data are contained in NGER and standard determination methodologies are available.

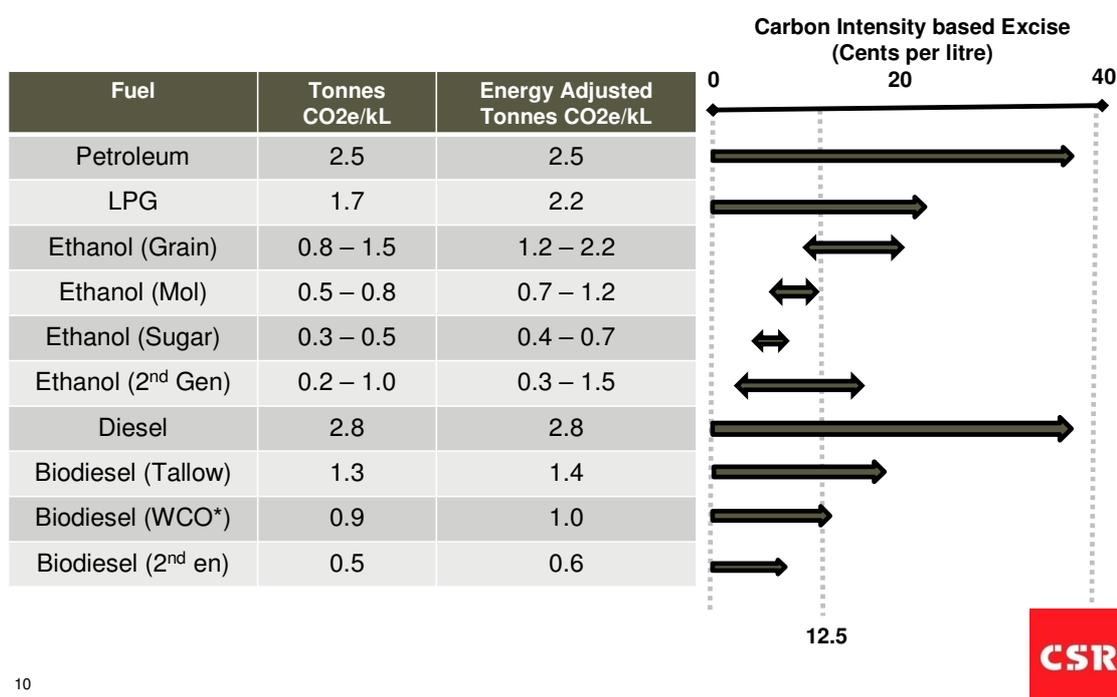
The working principle in effect becomes:

**The lower the carbon footprint – *the lower the excise rate.***

**Furthermore the model can be extended to all fuels under the energy bands.**

Based on 38cpl excise rate, a summary of the proposal for the different fuel types and different manufacturing processes, taking into account their carbon footprints as assessed by CSR provides an outcome similar to that under the June 2004, “Fuel Excise Reform”.

**Principle:**  
**The lower the carbon footprint – *the lower the excise rate***



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Under the CPRS amendments the same principles would apply. The emissions intensity factor or carbon footprint of the process relative to petroleum, which is one, would be applied to the excise determined by the method in the draft consequential amendment bill. It is interesting to note the much favoured second generation technologies for ethanol can have a higher emissions footprint than traditional sugar and molasses based technologies. CSR Ethanol has ongoing interest in new technologies for the production of bio-ethanol.

The carbon footprint can be determined using modelling techniques which are now accepted globally. This is an area of interest to the WTO or the Global Bio-Energy Partnership. To simplify the process Government could regulate proxy methods. It is not anticipated that there will be a large number of facilities in Australia and therefore the burden is not expected to be onerous for industry or the regulator. Biofuels suppliers to certain economies are required to conduct similar studies to that proposed e.g. the EU and California have similar requirements, although California has taken a complete sustainability approach which makes their process complex and somewhat judgemental.

In this way the excise regime is updated to reflect the contemporary issues associated with climate change and provides an incentive to adopt the lowest carbon footprint technology for the production of alternative fuels. It overcomes the shortcomings of the CPRS which provides little incentive to industry or the consumer to use alternative fuels.



## 6. Excise and Treasury Revenue

At this stage CSR has not committed resources to fully cost the proposal. The expectation is that it would be revenue neutral, or could be slightly positive depending on the detailed construction of the policy on a straight excise basis. There are other benefits to the economy such as improved health outcomes, regional development and new job creation combined with benefits for Australian fuel self dependence and security.

The appendix contains assumptions used to draw these conclusions. In particular the excise equivalence are determined where known for a range of road transport fuels. These can then be compared with scenarios generated in the Treasury modelling of the CPRS “Australia’s Low Pollution Future the Economics of Climate Change Mitigation.

The impact of fuel mix of the CPRS over time should be attributed to that legislation and not excise policy. By inspection of the two road fuel scenarios, CPRS-5 and CPRS -15, and the excise differentials in the table it is clear that while LPG is part of the fuel mix the excise revenue under the proposed carbon footprint is likely to increase. As LPG phases out of the mix and ethanol is assumed to increase, the revenue may decline very slightly by 2024, although the actual ethanol excise footprint will depend on the technology adopted. It could well be neutral.

## 7. In Summary:

- ✓ *Aligning excise tax to carbon emissions is one way of immediately encouraging the community to lower carbon fuel emissions without raising petrol prices*
- ✓ *Aligning policy to sustainable investment also sends the right signal to the investment community*
- ✓ *This approach has broad application as it can be applied to all fuels not just Ethanol*
- ✓ *Policies that support the development of a sustainable alternate energy industry will also have added benefits of improving energy security, regional economic development and reduce imports*
- ✓ *The measures can be implemented easily*
- ✓ *It is anticipated the measures are effectively revenue neutral to Government*

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**Appendix**

**Assumptions Regarding Excise Impact**

**Latest communicated Policy - Energy White Paper 2004**

High Energy Fuel Excise	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14
High Energy Fuel Excise (with 50% discount for Alternate Fuel)	0	0	0	0	3.8	7.6	11.4	15.3	19.1	19.1	19.1
Mid Energy Fuel Excise (with 50% discount for Alternate Fuel)	0	0	0	0	2.5	5.0	7.5	10.0	12.5	12.5	12.5
Low Energy Fuel Excise (With 50% discount for Alternate fuel)	0	0	0	0	1.7	3.4	5.1	6.8	8.5	8.5	8.5

**Carbon Intensity Excise Alternate Framework**

	CO2E/kL	Energy GJ/kL	CO2e adj for energy	Alternate Fuel excise factor	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Petroleum	2.3	34.2	2.3	1	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14
LPG	1.5	25.7	2.0	0.9	0	0	0	0	4.5	8.9	13.4	17.9	22.3	22.3
Ethanol G	1.4	23.4	2.0	0.9	0	0	0	0	4.5	8.9	13.4	17.8	22.3	22.3
Ethanol M	0.6	23.4	0.9	0.4	0	0	0	0	1.9	3.8	5.7	7.6	9.6	9.6
Ethanol S	0.4	23.4	0.6	0.3	0	0	0	0	1.3	2.5	3.8	5.1	6.4	6.4
Ethanol 2nd Gen	0.3	23.4	0.4	0.2	0	0	0	0	1.0	1.9	2.9	3.8	4.8	4.8
Diesel	2.7	38.6	2.7	1.0	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14	38.14
Biodiesel Tallow	1.3	34.6	1.5	0.5	0	0	0	0	2.1	4.1	6.2	8.3	10.3	10.3
Biodiesel Cooking Oil	0.9	34.6	1.0	0.4	0	0	0	0	1.4	2.9	4.3	5.7	7.1	7.1

**Assumes 5 year phase in policy retained for biofuels**

Figure 20 Road fuel use in petajoules in the CPRS -5 scenario

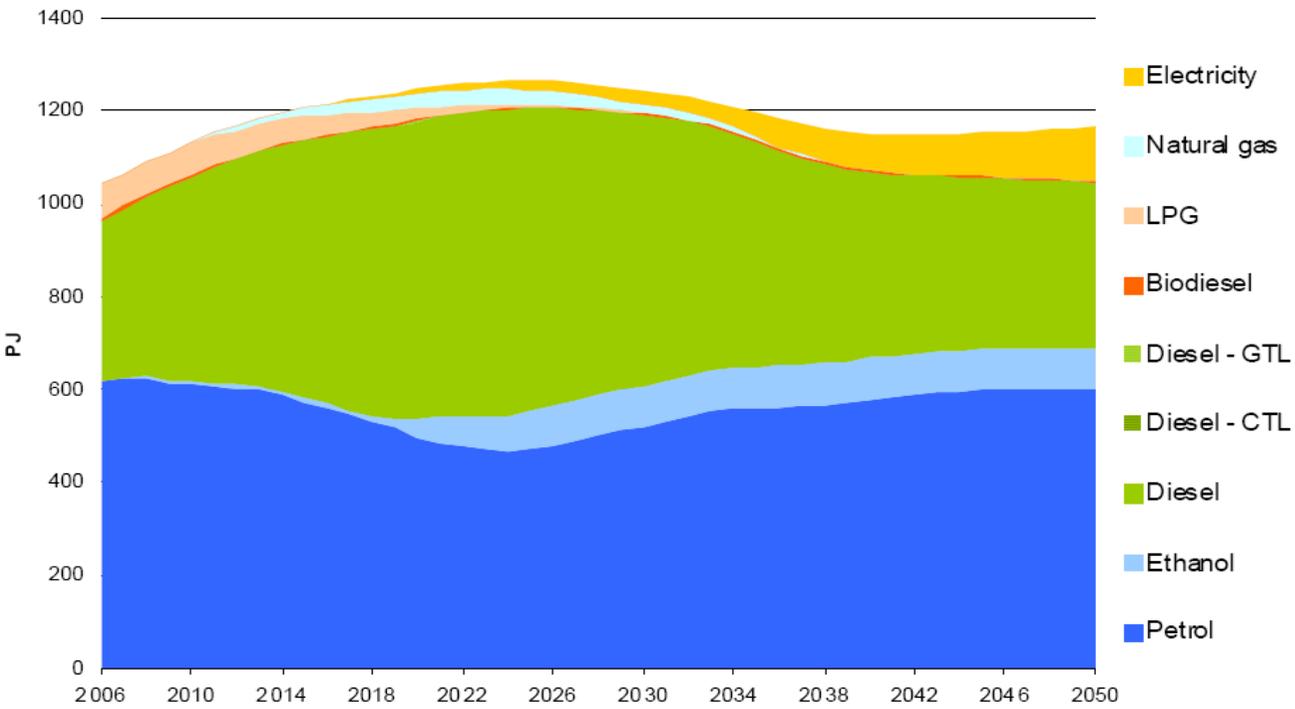


Figure 21 Road fuel use in petajoules in CPRS -15 scenario

