Submission to the Senate Alternative Fuels Inquiry

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by

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This paper is a submission by Boral Transport to the 2006 Senate Inquiry in Alternate Fuels. It does not seek to canvas the range of arguments for and against the use of various alternatives to traditional crude oil based transport fuels – as this is likely to be covered extensively by others. This submission is simply meant to relate Boral's recent and relevant experiences with the use of alternate transport fuels (in the context of being a very large user of traditional fuel) with a view to setting out what we believe to be some of the significant issues and barriers facing the development of the alternate fuel industry in this country.

Who is Boral ?

Boral Limited is an Australian publicly listed company operating in Australia, the USA and Asia. With over 15,600 employees, Boral is a leading supplier of construction and building materials including quarry products, cement, concrete, asphalt, bricks, blocks, pavers, roof tiles, plasterboard, windows and timber.

What is the nature of Boral's fuel use ?

In general, Boral's operations are energy intensive and draw upon a number of fuel sources including electricity, natural gas, coal, diesel, petrol and LPG. Natural gas consumption is presently of the order of 14 PJ per year.

All operating divisions of Boral use transport fuels to varying degrees in the manufacture and delivery of their products and services. The heavy vehicle fleets of Boral Transport and Boral Concrete are likely to be the most relevant to the terms of this inquiry. Boral Transport provides bulk transport services for both internal and external customers. It owns and operates approximately 470 heavy articulated vehicles nationally. Boral Concrete has a similar number of heavy rigid vehicles (agitator trucks) for the delivery of premixed concrete. Additionally, there are many hundreds of subcontractor drivers who work full time for the various divisions of Boral across Australia.

During 2005, Boral consumed approximately 123 million litres of diesel, 7 million litres of petrol and 3.5 million litres of LPG as fuel for transport at a cost of nearly $150 million. The consumption of this transport fuel is spread very thinly across the country with bulk diesel being delivered to approximately 450 Boral sites and purchased via 5,000 plus fuel cards at service stations. Caltex is presently Boral's national provider of all transport fuel and lubricants.

What is Boral position on alternate fuels ?

Boral is intensely aware of its contribution to the national generation of greenhouse gases. Since 1997 Boral's cement division (BCSC) has been a participant in the Federal Government's voluntary Greenhouse Challenge Program and more recently Boral was elected to be a benchmark participant as a Large User in the NSW Greenhouse Gas Abatement Scheme. Boral is committed to reducing the greenhouse gas emissions from it processes and facilities, and to improving its overall environmental performance.

See http://www.boral.com.au/Annual_Reports/Annual_Report_2005.asp?site=boral for access to Boral's 2005 Sustainability Report. The company's commitment

includes a program to reduce Boral's per unit consumption of transport fuel and generation of greenhouse gases & other harmful emissions. This shall be achieved via;

- Sourcing Management (the types of fuel we use),
- Demand Management (the amount of fuel we need to do the job), and
- Category Management (the application of resources and focus to the task).

As such, Boral has a vital and active interest in the investigation, development and use of appropriate alternate transport fuel technology.

What is Boral's experience with alternate fuels for transport ?

Boral Transport has a long history of extensive involvement and frontline research and development into the use of alternate fuels for heavy vehicles. This R&D has included:

- LPG – 1975 to 1992,
- Ethanol – 1991/92,
- Biodiesel 2002, and
- CNG – 1997 & 2003 – 2006.

Boral Transport is also heavily involved in alternate fuels for light vehicles. Boral Alternate Fuel Systems (BAFS) has successfully developed locally assembled Dutch technology to supply Ford Australia with LPG conversions for petrol engined passenger cars – approx. 90,000 units sold to date.

Boral Transport currently sees CNG/LNG as the most practical, logical and viable alternative to diesel fuel in heavy vehicles. As such our current focus is primarily on CNG and to a lesser extent biodiesel.

CNG

Boral Transport's most recent and relevant experience with CNG has been with a demonstration project conducted in partnership with the Australian Greenhouse Office under the auspices of their Alternate Fuels Conversion Program.

This project involved the purchase and in-fleet evaluation of 2 dual-fuel (diesel and natural gas) powered semi-trailers - one operating as tipper and the other as a powder tanker. The trucks were introduced into fleet operations during August and September 2003. In addition, a depot-based CNG refuelling station was installed at Boral Transport's Emu Plains (Sydney) facility in May 2004. Whilst providing valuable engineering, operating and economic data, it is fair to say that there were numerous difficulties experienced during the course of the project.

More recently, Boral Concrete has placed an order for the delivery of 5 CNG powered trucks for use in concrete agitator work in metropolitan Sydney. These are 8x4 Iveco's with dedicated 280hp spark ignition CNG engines (ie not dual fuel) supplied by Cummins. We expect to have these operational by August 06.

Experienced gained from these and other projects has raised the following issues in relation to the use of Compressed Natural Gas in heavy vehicles:

1. Restricted choice of engines.

At this point in time there would appear to be a choice of just 2 engine models in Australia for heavy duty truck application (i.e. in the over 400 horsepower category). These are the Caterpillar C12 (12 litre) and C15 (15 litre) engines with gas conversion equipment supplied by Clean Air Power (CAP). Boral's project conducted with the AGO utilises the C12 engine. At present however, the C12 engine is no longer supported by the AGO.

The variety of heavy vehicle brands, models, applications, configurations and sizes in the Australian transport scene is enormous. These two Caterpillar engines are only available in a relatively small percentage of vehicles - ruling out many potential operators. A choice of just 2 engines from just one supplier is not particularly conducive to new entrants.

At present there appears to be little incentive indeed for engine OEMs to develop alternate-fuel engines (including CNG) for the relatively small Australian market.

> Engine OEMs (Original Equipment Manufacturers) must be somehow encouraged to take up the task of developing heavy duty CNG / LNG engines for the Australian marketplace. Without this development, progress will be very limited.

2. Lack of field support (in NSW)

The project highlighted the inadequacy of the industry to provide necessary minimum levels of service both prior to and after sale. Whilst we understand the situations in WA (Perth) and Victoria are somewhat more advanced, there is essentially no equipment service support available anywhere else in the country. Although we are no doubt faced with a "chicken and egg" situation here, it is presently very unconducive for new entrants, except for the largest of operators who could afford to train and carry the cost of CNG specialists for what initially may be very few vehicles.

> Expert resources (not wedded to any particular brand of engine or truck) must be somehow made available to transport industry operators in any region where we hope to kick-start and grow the use of CNG (or LNG). If this is not done, many projects are likely to start with enthusiasm and fanfare, only to end in failure and disillusionment as vehicles cannot be successfully kept on the road.

3. Relatively high capital costs

At present there remains a significant capital cost barrier to the uptake of natural gas for heavy vehicles. Each of the vehicles used in the AGO project were $49,000 (approx. 25%) more expensive than the equivalent standard vehicle. Each of the Iveco concrete trucks will be $40,000 (also 25%) more than the standard vehicle. These vehicle costs are in addition to the cost of training maintenance staff in new skills, the purchase & certification of new workshop equipment, and in Boral's case, the

installation of a depot-based refuelling system. The only means presently available for recouping this additional capital cost is via lower fuel costs over the life of the vehicle. However not all heavy vehicles are super-high-mileage interstate trucks. Boral Transport's fleet of vehicles typically do less than 100,000kms per year each and Boral Concrete trucks only do about 20,000 kms pa. At these levels of mileage and therefore fuel use, there is little chance of recouping costs during the life of the vehicle at today's price differential between natural gas and diesel.

The additional capital cost to purchase CNG (or LNG) powered heavy vehicles must be brought down to reasonable levels by OEMs. Presumably this will need to be achieved via standardisation and economies of scale. Unless this is done, only the very high mileage (ie 150,000 km pa) highway operators will ever be able to afford the cost of purchasing and running CNG/LNG vehicles.

4. Impact of higher vehicle mass

A CNG powered truck will typically be heavier than a standard diesel vehicle because of additional hardware and multiple high-pressure fuel storage tanks, piping and valving. The only way a commercial heavy vehicle earns money is through the cartage of product. The heavier the vehicle, the less it can legally carry, and the less it earns for the owner. For low mileage / high income per tonne vehicles like concrete agitators, the penalty for higher tare weights is extreme and can completely overwhelm the relatively small fuel cost savings.

If governments/authorities would seriously like to encourage the adoption of CNG / LNG by heavy vehicle operators, then the simplest, no-cost method is to allow mass concessions on gas vehicles compared to diesel vehicles. If for a given configuration the allowable Gross Combined Mass (GCM) on a gas powered vehicle were to be say 0.5 tonne greater, then the vehicle would not be disadvantaged and more easily overcome the negative impacts of both the higher vehicle mass and higher capital cost due to the gas engine and equipment. The attraction of this particular solution is that:

- it can be achieved at the stroke of a pen
- will not cost the government a cent
- requires no infrastructure, education or risk,
- provides improved transport efficiency,

The only counter argument may be that the slightly higher GCM equates to slightly higher road surface loadings per tyre and therefore slightly greater wear and tear on the road. However, 0.5 tonne spread over 12 to 34 tyres is so negligible as to make this counter-argument a complete nonsense.

5. Product availability / Fuel distribution logistics / Public refuelling

Perhaps the biggest barrier to be overcome here is product availability and distribution logistics. No doubt the existing diesel fuel distribution infrastructure is extremely well developed, efficient and attractive. Diesel is available anywhere at any time. Quite the opposite is the case for CNG. In Sydney there is now only 1 public service station that offers CNG (the 7 Eleven store at Moorebank). You would have to ask why

anyone but the largest of operators (with their own refuelling station) would want to convert from the convenience of diesel to CNG at this point in time.

> The government must continue to work with gas suppliers, the transport industry and potential retailers to facilitate the growth of public gas refuelling stations at strategic locations within larger cities and on major road freight corridors. Not unlike the Federal Government's present strategy with biofuels – ie working with the existing oil industry to incorporate distribution of biodiesel and ethanol, the most effective course of action may be to somehow integrate the distribution of alternate fuels such as CNG into the existing petroleum fuels infrastructure.
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> Government assistance with the installation of depot-based (in-house) refuelling stations is also likely to be an important element in the overall strategy for some time to come.

6. Durability and reliability of hardware

During the course of the AGO project, it has become evident that certain items of hardware that are required for use on a CNG powered heavy vehicle are simply not up to the task. The 2 principle items causing trouble for Boral have been high pressure gas regulators and the ECUs (Electronic Control Units). Numerous failures have and are still occurring. The current version of the high pressure regulator used by Boral costs about $1,200 each and last about 30,000kms before giving trouble. For a vehicle travelling 100,000 km per year, this is completely unacceptable.

> For the widespread adoption of CNG powered vehicles, all hardware must be manufactured to standards that will give trouble-free operating lives similar to other equivalent vehicle parts.

7. Engine OEM support levels

The Original Equipment Manufacturers of engines must be made to stand behind the converted engine. The potential customer will find it intolerable for the engine supplier to point to another company (the supplier of the gas conversion equipment) when there is an issue with the fuelling of the engine.

> It is up to the engine OEMs to either develop gas engines in-house or work with outside providers that result in a durable total package that they can stand behind and support so as to as give a single point of contact and redress for the customer.

Biodiesel

Biodiesel was originally trialled by Boral Transport in 2002. Product availability, product quality and price have precluded further serious investigation until now.

1. Availability

More recently Boral has worked with Caltex to organise the supply of a 5% blend of biodiesel in standard diesel (B5) as part of the normal fuel supply system. Whilst ever we were going to have to purchase biodiesel from one source and blend it ourselves

(either in the truck or in our storage tanks) with standard diesel, it was never going to work except in a short-term trial. The product must be made available from your normal fuel supplier as alternate product – and at worst, at the same price as standard diesel.

> The biodiesel manufacturers need to concentrate on simply producing product in large quantities (at the right quality and price) and ship it in bulk to the existing fuel distribution terminals where the oil company can store in dedicated tankage and mix with standard diesel in an in-line blender during the road tanker loading process. This will minimise the additional cost of logistics associated with biodiesel, provide blends in any ratio the customer orders (at no additional cost) and ensure quality control via normal oil company test procedures and product quality standards. The oil company will stand behind the quality of the blended product, and the end-user will not be exposed to potentially faulty fuel.

2. Quality

The biodiesel industry is clearly in its infancy. There are only 2 genuine volume manufacturers in Australia at present (both on the NSW central coast). Both manufacturers have had product quality issues and the current Australian biodiesel standard (largely borrowed from Europe) is inadequate. The major product quality problem with biodiesel is associated with the "cloud point" or "cold filter plugging point". If these values are too low for the fuel, it basically means that when ambient temperatures fall below a certain level, the biodiesel can start to wax or gel and block up the fuel system or filters in the engine. This makes the product and unacceptable risk for many operators.

Biodiesel is generally made from 3 different feedstock sources – animal tallow, used cooking oil and virgin crops such as canola. The cloud point is not so much of an issue when the biodiesel is made from crops or used cooking oil, but certainly is when made from tallow. It is more expensive to use crops than tallow as a feedstock, and much of the biodiesel produced now is from tallow. The present Australian standard for biodiesel does not specify a maximum cloud point level / cold filter plugging point (CFPP) – as it does for petroleum diesel.

> The government must immediately update the biodiesel standard in Australia to include appropriate maximum levels for the cloud point and CFPP. It should look to somehow encourage manufacturers of biodiesel to use feedstock that will always result in a fuel that is fit for purpose. Transport operators will not be willing to put their fleet at risk due to the use of fuel that is substandard.

3. Price

Biodiesel has lower energy content than petroleum diesel, and therefore and engine will consume a greater quantity of biodiesel for the equivalent task.

> Suppliers must be somehow encouraged to provide biodiesel and biodiesel blends at a price that is effectively cost neutral for the transport operator, or it is unlikely to be widely accepted.