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Ethanol-blended Fuels Policy

E10, is an ethanol-blended fuel comprising 90% regular (91RON) petrol and 10% ethanol, and is distributed through petrol stations in all Australian states. E85 (85% ethanol, 15% petrol) has very limited distribution.

Partial ethanol mandates to drive the use of E10 have at times been imposed by governments in NSW and Queensland, where the majority of Australia's biofuel is produced. Political parties have proposed a 10% mandate, meaning no ethanol free petrol would be available in that state.

Ethanol is an alcohol produced by the fermentation of sugar cane (esp. Qld) or other crops such as wheat (esp. NSW). As a renewable resource it reduces our reliance on imported oil, as well as supporting farmers with an alternative market for their crops.

The environmental benefits of E10 are unclear. The incremental improvement in urban air quality needs to be balanced against the energy, fertilizer, pesticides and chemicals used in production of the extra crops, and the run off from these chemicals is a risk to our waterways, including the Great Barrier Reef. There are also arguments that land production for fuel takes away from food production, increasing the price of food.

Of the two million petrol powered machines sold in Australia each year, only half of these are cars. The other half includes outboards and off road power equipment such as lawn mowers, chain saws, brush cutters and generators. Discussions to date have been myopic: focussed only on the automotive use of ethanol.

It is estimated that around 16% of the car fleet cannot cope with E10. For boats the number is closer to 100% and there are no Ethanol requirements in existing boat building standards, nor are there Australian standards for other small engines. For an ethanol mandate to be proposed, we must first have equipment standards, and then wait a generation, say ten years, before the majority of the engines in Australia are E10 compliant. Imposing a blanket or even 5% ethanol mandate has flow on effects which much of the discussion have failed to consider.

Any ethanol blended fuel is a significant risk for boats. The Qld government, NSW Maritime Safety and BP amongst others have all issued warnings against using E10 in boats. AMEC joins them, for several reasons:

- Ethanol is a powerful solvent. It is known to dissolve fibreglass fuel tanks, corrode aluminium, and perish some plastic fuel tanks, fuel lines and fittings. These components will eventually leak, risking fuel fires. But before they leak, the dissolved chemicals pass through the best filters, and become deposited inside the engine, causing catastrophic failure. According to the manufacturers, all modern outboards can cope with E10: but they cannot cope with dissolved plastics.
- Ethanol is chemically attracted to water. In a moist marine environment, in a boat that is used once a week or less, the ethanol bonds with the moisture and, in a process called Phase Separation, sinks to the bottom of the fuel tank. No amount of mixing or expensive additives will fix this problem. When the layer of ethanol builds up sufficiently, it gets picked up by the fuel feed, sending near 100% ethanol into a fuel system and engine that can at best cope with a 10% blend.
- E10 has a much shorter shelf life than regular fuel. In a car that is driven daily, this matters little. In a boat used perhaps one weekend a month, this stale fuel can cause engine failure at sea, with obvious safety implications. Repairing a gummed up engine is an expensive process.
- Ethanol has 30% less calorific value than petrol: that is, 30% less energy per litre. So E10 has 3% less energy and so 3% less range per fuel tank, reducing safety margins.

- E10 is priced at 3cpl less than regular fuel, but as it has 3% less energy it is overpriced. When petrol is \$1.30 / litre, E10 needs to be more than 4cpl cheaper to be value for money
- Where mandates have required all regular petrol to be replaced with E10, boat owners have been forced to pay an extra 11cpl to buy premium unleaded, just to avoid ethanol damage. Premium fuel offers no other benefits for marine engines, thus the mandate is an unfair and unreasonable “tax” on boat ownership. Following the mandate in NSW sales of premium fuel grew from 21.6% to 37.5% of the market as consumers paid a premium to avoid ethanol.
- Ethanol is effectively taxed at a lower rate than petrol (a combination of excise and grants). This subsidy distorts markets and reduces the government income at a time that Governments are looking to balance budgets.

While Ethanol has benefits for farmers and ethanol producers, it comes at a high cost to the economy and consumers.

Conclusion

A 6% mandate has proven to be unworkable in NSW. A 10% mandate would turn millions of boats, mowers and cars into scrap. Or more likely, continue to be used, with high risk of fuel leaks, fires, engine failure at sea and personal injury.

A Solution

AMEC would like to see the core benefits of renewable biofuels: lower emissions, less reliance on oil, fewer imports and secondary markets to support farming communities. However Ethanol is not the answer.

We are encouraged by the progress made with Biobutanol, a second generation bio fuel. Biobutanol is also a product of the fermentation of crops. However it is a longer, four link molecule, making it closer to petrol, and avoiding the disadvantages of ethanol. That means it can be used in more engines, and safely used at higher proportions than ethanol.

Bioethanol is a proven concept and Australia should be investing in this fuel now:

- DuPont and BP have formed a Joint venture and have commissioned a production facility in Hull, UK.
- In the USA, one of our members is already demonstrating Biobutanol powered boats at Boat shows.

Fuel	Energy density	Air-fuel ratio	Specific energy	Heat of vaporization	RON
Petrol	32 MJ/L	14.7	2.9 MJ/kg air	0.36 MJ/kg	91–99
Butanol	29.2 MJ/L	11.1	3.2 MJ/kg air	0.43 MJ/kg	96
Ethanol	19.6 MJ/L	9.0	3.0 MJ/kg air	0.92 MJ/kg	107