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**SUBMISSION**  
to  
**WESTERN AUSTRALIA'S TASK  
FORCE ON BIOFUELS**

**HEALTH IMPACTS OF TRAFFIC POLLUTION  
- A Case for Mandating Biofuels including  
Ethanol**

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## Summary Outline of Ethanol, Fossil Fuels and Health Issues

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### Purpose:

The intent of this Submission is to highlight the growing body of international and Australian scientific evidence of the risks posed to the public by traffic-related air pollution, especially coarse, fine and ultra-fine particles, gaseous irritants, and polycyclic aromatic hydrocarbons (PAH's) that contribute to, for example:

- lung cancer deaths and accelerated tumour growth;
- increased cardio-vascular disease and myocardial infarcts;
- limited blood flow and increased blood clotting;
- increased sensitivity to bacterial products in airways, and
- more severe common viral asthma.

In drawing these life-threatening risks to the attention of the Federal Government, the author, as a matter of urgency, urges the Government to put in place clear policies in support of measures that immediately address and substantially reduce these risks to human health. This would include:

- support for the increased production, distribution and use of ethanol as a clean renewable energy fuel;
- active replacement of toxic fossil fuels (diesel and petrol) with ethanol or ethanol-blended petrol, liquid petroleum gas (LPG) and biodiesel.
- reduction of highly toxic aromatics e.g., benzene, in existing petrol.
- Installation of in-tunnel filtration and gas-detoxification systems in vehicular tunnels in heavily populated cities

A clear, non-partisan policy, in support of the expanded use of renewable and alternative fuels such as ethanol, biodiesel, and liquid petroleum gas (LPG) and compressed natural gas (CNG) would represent the introduction of known and proven measures to reduce these risks posed to human health by petrol and diesel fuels. Ethanol is particularly suitable as it is renewable and is not a carrier of toxic particles etc found in petroleum fuels such as petrol and diesel.

### Background:

#### Issues of air pollution related to health impacts

- Traffic-related air pollution remains a key target for public-health action overseas including Europe, Britain, USA and India.
- Australia has been slow to act e.g. unlike overseas, Australia does not have health standards for a number of pollutants derived from the combustion of fossil fuel, e.g., carcinogenic 1,3 butadiene and toxic acetaldehyde. Only this year it introduced a benzene standard (3ppb) while UK has had a benzene standard for years that is now 1ppb. However, the States are given jurisdiction over the interpretation and application of the NEPC air-quality standards. For example, the NEPC state that the NEPM for PM<sub>10</sub> do not apply to canyons between tall buildings or to point sources, yet, NSW EPA and RTA, Health and DIPNR (Planning) apply them to point sources such as pollution from tunnel stacks.
- In a major study in Austria, France and Switzerland by Kunzli et al (2000), air pollution caused 6% of total mortality or more than 40,000 attributable cases per year. Traffic pollution accounted for more than 25,000 new cases of chronic bronchitis (adults); more than 290,000 episodes of bronchitis (children); more than 0.5 million asthma attacks; and more than 16 million person-days of restricted activities.

- Toxic diesel particulates account for at least 21,000 deaths annually in USA (CATF Report, Feb '05).
- In Sydney, twice as many people die from vehicle exhaust than die from road accidents. Cost of morbidity and mortality due to vehicle pollution in Sydney alone exceeds \$1.5 billion annually (ABRE Report, 2003).
- Vehicle emissions account for up to 65 % of urban air pollution. Most of the particulate pollution is in the fine mode PM<sub>2.5</sub> fractions that are soluble in the lungs and have PAH's adsorbed to their surfaces.
- In most States of Australia, the toxic fine particles in the soluble PM<sub>2.5</sub> mode are EXCEEDING the air-quality standards/guidelines set by the National Environment Protection Council (NEPC) and are generally increasing annually.  
See (a) NEPC (2002) *Exposure Assessment Risk Characterisation for the Development of a PM<sub>2.5</sub> Standard*. (b) NEPC (2002) *Impact Statement for PM<sub>2.5</sub> Variation*.
- Weight-for-weight, fine particles in fossil fuel combustion have an enormous surface area. For example, one billion 0.01 µm particles are equivalent to one PM<sub>10</sub> (10µm) particle but have 1000-times the surface area, hence an enormous carrying capacity for their carcinogenic cargo of PAH's.
- Alternative fuel use will continue to be driven by concerns over clean air and legislation to reduce exhaust emissions. However, generally lip-service is paid as illustrated by the NSW Carr Government's decision to replace its cleaner LPG-powered bus fleet with a new bus fleet powered by dirty diesel. In contrast, a Bill by the NSW National Party requiring all government cars be powered on 10% ethanol-blended petrol (E10) is a positive step.
- In USA, but not yet in Australia, diesel is classified as an air toxic. Diesel exhaust poses a cancer risk that is 7.5 times higher than the combined risk from all other air toxics (CATF Report, Feb '05).
- The risk of lung cancer for people living in urban areas is three-times that for those living in rural areas (CATF Report, Feb '05).
- A recent Case Study (June, 2005) established that the reduction of vehicle particle pollution in Tokyo was accompanied by a significant cost-reduction in mortality and morbidity. (*J. Risk Research* Vol 8, p 311-329; June, 2005)
- Ethanol as a 10% addition to petrol (E10) can reduce particulates by up to a qualified 50%, more in older cars (G. Whitten). See following links:  
<http://www.ethanolrfa.org/white991.html>  
<http://www.ethanolrfa.org/NEC-Whitten.pdf>  
<http://www.ethanolrfa.org/pubs.shtml>  
See also P. Mulawa et al. *Env.Sci. & Technology* Vol 31 p 1302 (1997)

### **Adverse impacts on health and well-being**

Exhaust pollution including coarse, fine and ultra-fine particles, gaseous irritants (e.g., O<sub>3</sub> and NO<sub>2</sub>), and PAH's either alone or in combination, are known to be associated with, for example:

- inflammatory lung diseases e.g., asthma, bronchitis and alveolitis
- increased cardio-vascular disease
- increased risk of myocardial infarction in susceptible persons
- risk for exercise-induced heart damage
- limited blood flow and increased blood clotting
- increased mucous production and airway hyper-responsiveness
- 1/5 lung cancer deaths (USA) and accelerated tumour growth
- premature death
- symptoms of anaemia e.g., tiredness, headaches, fatigue and shortness of breath.
- low birth weight and small head circumference of neonate.
- intra-uterine growth retardation (for each 10 nanograms PAH's /M<sup>3</sup> increase)
- certain leukaemias e.g., from exposure to benzene.
- loss in productivity, absenteeism from work and school.
- Increased sensitivity to bacterial products in airways
- more severe common viral asthma
- reduced male fertility
- significant risk of ovarian cancer from exposure to vehicle pollution
- adverse effects on lung development from the age of 10 to 18 years

The effect is a major increase in sickness-care costs to the nation's health budget. In France, a study showed 2/3 of health care costs due to pollution resulted when levels of pollution were below the national standard for Particulate Matter (PM), less than 10 micrometre in diameter, i.e., PM<sub>10</sub> of <50µg/M<sup>3</sup>/24 hours.

### The Art of Perpetuating a Public Health Hazard – Fossil Fuel, the New Asbestos!

"Denial" of a hazard by an expert may not imply – *"the truth, the whole truth and nothing but the truth"*

M. Greenberg (*J. Occup. & Environ. Med.* 2005; Vol 47: 137-144)

To date, e.g., the NSW Health, RTA, EPA (now DEC) and Planning (now DIPNR) appear to adopt the **same strategies** used successfully to support the use of white asbestos (chrysotile) as a safe material (*J. Occup. Environ. Med.*, 2005; 47: 137-144). The same techniques are being used to subvert the community into thinking exposure to vehicle pollutants is without risk to health and well-being. It can be readily inferred from the highly critical Katestone Review (2004) of the NSW Health Report on health impacts from the M5 East tunnel emissions that, as with the asbestos scandal, a "denial" of the hazard of an agent by its protagonists, no matter how distinguished, may not correspond with *"the truth, the whole truth and nothing but the truth."*

The conclusion of NSW Health's findings of "no risk to health" seems consistent with a popular form of "denial" used by the advocates of asbestos and runs like: *"We did not find the evidence for a causal association between an agent and its alleged effects"* when the evidence is based on such factors as:

- Unsound "negative" results derived from flawed data, methodology and study-design.
- Concealment of data that effectively removes scientific rigour and renders reviewer powerless.
- Sampling (or questionnaire) is not properly conducted in the true exposure and breathing zones.
- Subverting the thinking of people by the release of false information, rather than a disclosure of the true facts publicly.
- Deliberately avoiding definitive answers to a number of important questions by failing to Establish and operate a long-term sampling strategy for determining the qualitative and Quantitative measures of hazard exposure of subjects in the study.
- Keeping opinions to themselves, when confronted with the facts, allowing government or Industry agents to effectively operate a policy of concealment by silence in the face of error while evidence of proven causal effects is kept confidential by agreement with management.
- Early denial is given authority when made by government or industry medical officers or by some medical consultants and others, often with 'conflicts of interest'. The significance of the hazard is down-played with a "so what?" attitude.
- Claiming to adopt "world's best practice" to imply, falsely, there are no risks to health.
- Omitting significant numbers of workers (receptors) and thereby introducing a 'negative' bias.
- Applying inappropriate standards or methods to effectively minimize the concentration of the hazardous agent in the exposure.
- By initiating an 'epidemiological survey', as a ploy, when faced with a health problem, or to simply ignore the problem. It buys time, similar to RTA's 'filtration trial.'
- Deliberately terminating studies at a stage when findings are suggestive.
- Failing to adopt Precautionary Principles to contain the toxic agent by not installing adequate environmental control technology.
- Suppressing highly critical 'audits of performance' for political expediency.

There have been too many studies world-wide which directly link vehicle emissions with mortality and morbidity for NSW Health to engage in a study where they would not be able to find the associations between stack emission and community health. It is now evident that these strategies used to hide the public health hazards of asbestos for over a century also feature in the techniques adopted by NSW Health to perpetuate the **myth** to the NSW Carr Government and its bureaucrats that the exhausting of vehicle pollutants from tunnel stacks, in residential areas, poses no health risk, either short or long term, for anyone. (See attachment of a selection of references of short-term effects)

In a recent document headed, *'Fuel Taxation Inquiry: The Air Pollution Costs of Transport in Australia'*, by P.Watkiss (2002) submitted to the Federal Government, data shows that for the inner parts of Sydney (covering 2.5 million), the annual health 'pollution' cost is about \$342,000 per tonne of particles and \$1750 per tonne for oxides of nitrogen (NOx). When this information is applied to current stack pollution from the **unfiltered** M5 East tunnel, the annual health-costs are about \$6 million. For the Lane Cove Tunnel (LCT) and using under-reported LCT EIS stack-pollution data for 2006, the annual health-costs alone are about \$5 million. Applied to Sydney, overall cost (including from other vehicle pollutants) on health exceeds \$3 billion.

It is high time lessons from asbestos, tobacco, exposure to radiation and the like are learnt and as the Hon Ms Sandra Nori, a Government Minister in the Carr Government and Member for Port Jackson said recently that action *"must be taken to protect our communities from the impact of car emissions by using the latest and best tunnel filtration technology available"*. Ms Nori should know the health impacts of vehicle emissions as she is Secretary of the ALP's Air Pollution Task Force.

#### **Health advantages to using ethanol-blends**

- Ethanol is non-toxic, water soluble and highly biodegradable.
- The American Lung Association of Metropolitan Chicago credits ethanol-blended reformulated petrol with reducing smog-forming emission in the city by 25 % since 1990.
- Ethanol reduces tailpipe carbon monoxide (CO) emissions by as much as 25 %.
- Ethanol reduces particulate emissions, especially fine particulates that pose a health threat to children, senior citizens and individuals suffering from respiratory ailments.
- Ethanol is an 'oxygenate' that permits a cleaner burn much like an open gas ring on a Bunsen burner allows the gas to combust cleanly with a blue flame.

#### **Federal Coalition 2001 Election Policy**

- The Coalition undertook to promote the production, distribution and transport use of ethanol and biodiesel, in the knowledge that it will provide new industries and jobs for rural Australia and cleaner air for our cities.
- The Federal Coalition is committed to maintain the fuel excise exemption for ethanol and biodiesel.
- The Federal Coalition also undertook to provide from 2002/03 a capital subsidy for new or expanded production infrastructure for biodiesel until total production is reached by end 2006/07.

#### **Current biofuels in Australia and overseas**

- In Australia, biofuels with commercial prospects are ethanol and biodiesel.
- Ethanol is mainly derived here from two renewable sources – fermentation from sugars in grains such as wheat and corn and from 'C' molasses.
- Fuel ethanol in Australia is used as a fuel blend comprising 10 % ethanol and 90 % petrol (E-10).
- Brazil is currently the largest producer of ethanol at 12-15 billion litres per annum. Additional 30 sugar and ethanol plants should be in operation with ethanol production increasing by 50% over 2004/05 levels to 2.7 billion litres. In 2005/06 ethanol production will be 16.8 billion litres.
- The U.S. produces 10 billion litres per year, with production expected to rise to 19 billion by 2012.

- Overseas ethanol-blended fuels may contain as much as a 85% ethanol. Car manufacturers Chrysler, Mazda and Ford are now marketing cars to compute automatically to any alcohol-blended fuel.
- Biodiesel is derived from treatment of vegetable oil or animal fats.
- Canola oil is our principal oil seed and is harvested in November and December.
- Biofuels, unlike fossil fuels, are climate and rainfall dependent.
- The European Union in 2001 introduced a proposal to promote biofuels such as biodiesel, bioethanol or hydrogen fuels. The Commission's goal is to increase biofuel use from 2% in 2005 to 5.75% in 2010 and 20% by 2020.
- Approximately 8% of diesel fuel sold in Germany is biodiesel.
- Australia's Federal Coalition in October 2001 made a commitment to promote the use of biofuels such as ethanol and biodiesel to ensure biofuels provide 2% of our transport consumption by 2010.
- More recently, it is evident that the Federal Government had become seduced by misinformation propagated by lobbyists and through the media by powerful invested interests and their associated 'dirt teams' coupled with flawed scientific commissioned reports.
- Fuel ethanol production and use is also being promoted in China, India, Thailand and Japan.

## Issues

### Energy Security

1. The global production of crude petroleum in 2005 was approximately 80 million barrels per day, or 29 billion barrels annually. Continued production at this level, based on total global reserves of one trillion barrels, and without any increase to accommodate increasing annual demand, would mean that global oil reserves equate to approximately **thirty five years** supply. General consensus asserts that crude petroleum is a finite resource, and global reserves are limited, compounded by a time when demand for crude petroleum starts to outstrip supply.
2. Coupled with this is the problem of spare capacity. In crude oil production terms, spare capacity is pumping capacity that is currently unused but can be turned on immediately if needed in a crisis. The days of spare capacity in the global crude petroleum industry are gone. What this means is that should global crises arise (natural disasters e.g., Katrina hurricane, or wars in oil-producing countries such as Iraq and Iran) supply will barely if at all keep up with rising demand.

It is highly significant that the USA war on Iraq was launched on the false allegation that Iraq had 'weapons of mass destruction'. Similarly, the current posturing by USA toward Iran is based on a pretext that Iran has or is planning to develop 'nuclear weapons'. But no war is ever prompted by one factor alone. Oil played a role in USA decision to invade Iraq. Iran has immense oil and natural gas reserves and will have a critical role in the world's future energy equation. However, major USA energy companies are prohibited from working with Iran by Executive Order, signed by President Clinton in 1995 and renewed by President Bush in 2004.

The truth is the current government of Iran has plans (as did former President Saddam of Iraq) to set up an OIL BOURSE i.e., an oil trading market based on the petroeuro rather than the current petrodollar. This poses a threat to USA's economic supremacy and to London's International Petroleum Exchange and Nymex in New York. Current membership of the proposed Iran Oil Bourse includes Russia, China and India. Iran has plans to open the Oil Bourse in 2006.

Tehran has the only military in the region that can threaten its neighbours (including Israel) and Gulf security. Thus, while publicly focusing on Iran's 'weapons of mass destruction', powerful western governments, led by USA, are thinking in geopolitical terms about Iran's role in the global energy equation and its capacity to obstruct the global flow of petroleum e.g., through the Strait of Hormuz. However, the economic threat of an Oil Bourse to the global economic supremacy of the USA is clearly the principal reason the USA will attack Iran and likely via an 'anti-nuclear' strike by Israel.

## The Situation in Australia

1. *Geosciences* has noted that Australia's consumption of crude oil and condensate in 2004 could be sustained by remaining economic reserves for only 9.3 years. These figures paint an alarming picture.
2. They suggest that Australia's appetite for petroleum products is rapidly outstripping our indigenous production sources. This equates to a remorseless increase in Australia's dependence on the highly volatile and insecure international crude oil market.

## Implications for Australia

The implications for Australia are simple, and alarming.

As a country very highly dependent on road transport for the movement of both goods and people, and as a country currently committed almost entirely to the use of products derived from crude oil to fuel that transport, Australia is in a position of great vulnerability. This exacerbated by the fact that Australia's indigenous reserves of crude petroleum are lower than the global average, and the rundown of Australia's oil reserves is occurring at a faster rate than the global average.

Thus, Australia needs an urgent shift to policy settings to shift in demand from conventional fuels such as petrol and diesel to more sustainable alternatives, and thereby trigger commercially and socially viable outcomes.

## Problems of Diesel

- Complex engineering
- Environmental
- Medical / biological
- Legal
- Management
- Public health
- Ethical
- Public administration and good government
- Fairness and justice - those most harmed are those least able to defend themselves - children of the urban poor.

## The Risk-Based Approach to Diesel and Petrol

The principle is to adopt "business as usual."

- Has backing of powerful special-interest groups harnessing governments to deflect and stymie the search for least harmful alternatives. This includes not only the oil cartels but also to some extent, through patronage, by self-interested groups such as the CSIRO whose commissioned reports have, in some instances, been demonstrably biased and scientifically flawed. Patronage is the life-blood of politics and government funding!
- So long as the exact size of the problem is uncertain, risk assessors call for delay and more study. Research funding for some is a survival strategy where the aim in some cases is not to solve a problem but to create others. It all helps to maintain viability, personal and professional development, but often without a social conscience.
- Because consultants can be 'bought' or 'hired' to reinterpret old data to cast doubt on the nature of the problem, action can be stalled for decades.
- Doubt is a powerful helpmate when your goal is to maintain "business as usual."
- The risk-based approach waits for the holy grail of scientific certainty to emerge from the data, meanwhile do nothing.

## Why is the 'Precautionary Approach' not taken?

- Because the risk-based approach to public health continues to be adopted i.e., wait until the dead bodies can be counted.
- Whilst petrol and diesel fumes are known to cause lung cancer, health bureaucrats state they are "not yet sure" how big the problem is and "we have not identified the extent of

- Recent studies showed biodiesel can reduce emissions of particulate matter by 47% when compared with petroleum in unmodified diesel engines.
- USA EPA report verified a 67% reduction in unburned hydrocarbons and a 48% reduction in CO<sub>2</sub> levels with pure biodiesel (B100). Smaller reductions (12%) were obtained with 20% biodiesel and 80% petro-diesel.

#### **Assistance needed**

- Assistance is needed in the general development of the biofuel industry. This includes new storages, crushers, refineries and associated infrastructure.
- Need to legislate fuel standards to include renewable biofuels such as biodiesel and ethanol-blended petrol.
- Address the escalating costs of growing crops e.g., canola, grains and sugar-cane, because of enormous amounts of inputs, disease levels and diminished yields giving unprofitable returns.
- There is an urgent need to increase farmer confidence for canola, grains and sugar cane.
- Long-term excise relief (or domestic producers credit) is required to engender confidence that lenders will have debts/loans re-paid.
- Capital subsidy be provided for enhanced ethanol production to attract investment capital from prospective owners.

### **Recommendations**

- The author advocates the expansion of the market for domestically produced renewable biofuels to reduce Australia's dependence on imported petroleum, spur rural economic development creating new jobs and tax revenue, and improve environmental quality by reducing emissions of harmful pollutants and greenhouse gases.
- It is proposed in the light of the current global oil insecurity that within 12 years i.e., by 2020, at least 20% of current petrol and diesel usage to power vehicles to transport people and goods be replaced with clean sustainable alternatives, including natural gas and biofuels such as ethanol and biodiesel.
- The Federal Government is urged to enact a more aggressive Renewable Fuels Standard than is currently in the legislation, noting biofuels offer an immediate alternative to imported fossil fuels, are completely compatible with current transportation infrastructure as petroleum blending components of stand-alone fuels and in the longer term, are an ideal hydrogen source for fuel cells.
- Enact legislation to use ethanol as an oxygenate in petrol and to reduce levels of carcinogenic benzene.
- Enact legislation that allows durable excise rebates for the greenhouse credits, urban quality and health gains from ethanol and biodiesel in proportion to their proven environmental and health benefits.
- Enact legislation to require at least a prescribed percentage of vehicles transporting people and goods to be powered by clean alternate fuels other than those based on crude oil.
- The technology exists right now to clean up these emissions from existing fossil-fuel powered engines so that most of the adverse health impacts can be prevented or minimised. The introduction and manufacture of 'flexi-vehicles' capable of being powered by up to 85% ethanol should also be integral to the Federal Government's biofuels policy.
- The only thing that stands between us and dramatically healthy air is the political will at Federal and State levels to require these reductions and the funding to make them a reality.
- Because of significant documented conflicts of interest, the relevant Division of CSIRO be excluded from representation on any Biofuels Taskforce in Australia.

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