

Friday, 1st August 2014

The Research Director
State Development, Infrastructure and Industry Committee
Parliament House
George Street
BRISBANE QLD 4000

Dear Sir / Madam,

Proposed Amendment to the Liquid Fuel Supply Act 1984

It is time for Queensland to mandate the use of Ethanol in petrol to gain the economic, social, public health, and environmental benefits, that the Ethanol Mandate will deliver.

The benefits an Ethanol Mandate can bring are well recognised around the world and as such mandates, are in place in 60 other countries (please see attachment #1), as well as New South Wales which implemented a Mandate in 2007. The NSW mandate has been very successful in driving investment in the NSW Ethanol Industry and improving air quality and public health in the Sydney Airshed.

The benefits of an Ethanol Mandate include:

1. Public Health Benefits of E10

Attached is a paper (Attachment # 2) put together by Associate Professor Ray Kearney PhD, OAM, which summarises some of the key information available on this topic. It is a very interesting document and some of the key points are;

- *"In Sydney, NSW Department of Health estimated that almost three-times more people die (up to 1400 deaths p.a.) from exposure to vehicle exhaust-pollution than from road accidents."*
- *"Children are more susceptible than adults (except the elderly) to the adverse effects of air pollution..."*
- *"When exposed to fine particles, children have slowed lung function growth, increased emergency room visits, increased incidence of asthma, bronchitis and crib death (CATF Report, Feb. '05)."*

- *"Gasoline is the largest source of man-made carcinogens"*
- *"...research [US based research] e.g., reported in 2002 showed that one-in-five lung cancer deaths is attributed to exposure to fine PM2.5 particles generated by the combustion of fossil fuels."*
- *"Ethanol is an oxygenate which helps petrol burn more efficiently and cleaner resulting in lower levels of particulate emissions (and other toxics) from cars."*
- *"Potential health cost savings for Urban Australia (Sydney, Melbourne, Brisbane and Perth) are estimated to be \$39 million for a 50% uptake (by ethanol compatible vehicles) of E10 in 2006 and \$42 million per annum for a 100% take up of E10 in 2011."*
- *"10% ethanol blended petrol reduces fine particulates by up to a qualified 50%"*

We commend the document to you as it neatly explains the health benefits of E10 blended petrol. We have also attached a Press Release that the AMA sent out in 2005 which the subsequent Premier Morris Iemma acted upon in 2007.

2. The Environment

The benefits for the environment, which is important in today's political climate include:

- a. Ethanol in petrol reduces hydrocarbon emissions by up to 30% and particulate emissions by up to a massive 50%,
- b. E10 petrol reduces greenhouse gas emissions by between 3% and 7% compared to regular unleaded petrol.
- c. Ethanol production in Queensland at the Dalby Bio-Refinery is a true sustainable and renewable energy business. From every tonne of locally grown Sorghum 400 litres of Fuel Grade Ethanol and 850 kgs of protein rich cattle feed is produced. The Queensland ethanol industry is an excellent example of clean renewables replacing heavily polluting fossil fuels.

3. Energy Security

As you would be aware BP Australia have announced the closure of their Bulwer Island refinery at Pinkenba. This further affects Australia's energy security as it comes on the back of the Shell and Caltex refinery closures in NSW.

In the US the Government took a very aggressive and conscious decision to encourage and mandate ethanol at 10%, in order to reduce its reliance on foreign oil. This has been very successful and in 2013 the US produced 50.5 billion litres of fuel grade ethanol, which is 9% of the total US petrol demand. The current level of production in the US is now at the point where the industry and Government are in discussions about the move from E10 to E15. Undoubtedly given the continued and sustained political instability in the Middle East the US Government will continue to increase its strategy of driving Ethanol Production investment.

The rate of increases in the price of oil over the past four years could be described as moderate. This moderation has been enjoyed by Australia for two key reasons. Firstly, due to the reduced demand in the world for oil because of the Global Financial Crisis. Secondly, due to the very strong Australian dollar which is both due to the strength of the Australian economy and the weakness of the US dollar. This situation will change over the next few years and the price of petrol to Australian consumers will climb quickly. The Queensland State Government's Ethanol Mandate will be an important market signal that will greatly assist Queensland and Australia invest and make changes to reduce our dependence on this foreign oil. The Proposed Amendment to the Liquid Fuel Supply Act 1984 will help transform the Queensland Oil Industry and prepare the economy to better weather the next oil price shock.

4. Consumer Choice

E10 Petrol is a superior product to regular unleaded petrol because of the oxygenate properties of ethanol. Ethanol is one third oxygen and it is the presence of this oxygen which makes the blended product burn more quickly and completely. As the fuel is burnt more quickly and completely motor vehicles perform better. The fuel is enhanced with a higher Octane and there is a 30% decrease in hydrocarbon emissions (unburnt fuel) leaving the vehicle tailpipe.

Even though E10 has a higher octane and is a technically better fuel, it is sold by companies such as United Petroleum at a discount of 4 cpl to the price of regular unleaded petrol. This petrol discounting saves Queensland consumers significantly on their weekly petrol bills.

Consumers in Queensland should be able to choose an E10 when they visit any Service Station in the State of Queensland.

5. Regional Development and Investment

The ethanol industry in Queensland must be encouraged if it is to survive. The supply chain of petrol into Australia continues to be controlled by the major oil companies. The major oil companies in Australia do not support ethanol and continually try to stifle its development and use .

The Dalby Bio-Refinery is one of the largest employers in the Dalby Township and generates a great deal of economic activity in the Region. The Refinery is currently operating at 50% capacity due to the lack of demand for ethanol. No major oil company purchases any of its ethanol product and as a result the volumes of E10 use in Queensland have fallen. United Petroleum is the Dalby Bio-Refinery's largest customer and without United's custom the Refinery would have certainly closed 12 months ago.

The Dalby Bio-Refinery is continually under threat of closure due to this lack of demand and unfortunately there is no prospect for growth in demand given the major oil companies stranglehold on the Queensland petrol supply chain.

There are a number of capital projects that the Dalby Bio-Refinery has planned but without demand these will not come to fruition. Similarly there are projects other companies have to build new refineries in Queensland, but without demand these will simply not occur.

6. Supports the Agricultural Industry

The Dalby Bio Refinery when it is running at full capacity buys 16,000 tonne of Sorghum from the Darling Downs farming community. This has significantly improved the incomes of the local farming community and has had the effect of setting a “floor price” under the Sorghum market. In the years prior to the inception of the Dalby Bio Refinery the farmers found from time to time the world market for grain could have them selling at prices below their cost.

Another spin off for the Agricultural Industry is the production of “Wet Cake” which is sold to local feedlots. The Wet Cake produced is around 38 % protein and is highly digestible by cattle. The feed is sold at a significant discount to the value of protein and is a cheap source of feed for the feedlots.

7. Setting the minimum ethanol content

According to the Australian Petroleum Statistics the current amount of ethanol sold in Queensland as a percentage of unleaded fuel volume is 0.955% (2012/13 Financial Year). Thus a mandate as set out in the Ethanol Bill of 5% would require a 4% increase in the use of Fuel Grade ethanol which amounts to 161.7 million litres per annum.

We believe that the correct decision is to mandate the following;

- From January 2015 Mandate by volume of 3%
- From January 2017 Mandate by volume of 6%

The additional volume of 80.8 million litres of fuel grade ethanol can be easily supplied by the industry now, and the increase of an additional 3% is easily achievable in that timeframe.

However, the issue that also must be taken in to account is that of compliance. In NSW despite having a 6% ethanol mandate the industry only actually achieves an ethanol percentage of 3.48%. The Mandate must be structured in such a way as to ensure that all Retailers must meet the targets so that the Mandate is achieved.

If the Mandate as proposed in the Bill of 5% is implemented in the same manner as NSW the resultant Mandate can be expected to be around 2.5% after the first 12 months of operation. In this instance the ethanol industry will be able to meet the demand.

The Queensland Government has a choice ultimately between encouraging the ethanol industry to grow and develop or not taking action and ultimately allowing the industry to disappear.

The Proposed Amendment to the Liquid Fuel Supply Act 1984 will help transform the Queensland Ethanol Industry and turn around the struggling industry and I believe should be supported for the reasons set out above.

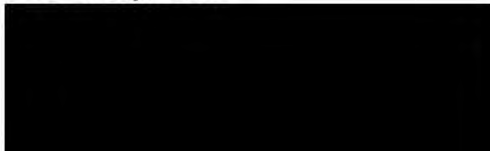
In summary, we strongly support the Proposed Amendment to the Liquid Fuel Supply Act 1984. We believe it is time for Queensland to realise the benefits that it will bring to the community which includes;

- Cleaner air to breathe and the health benefits this brings;
- Improved Energy Security for Queenslanders;
- Stronger regional economies due to investment and economic activity;
- Support for the Agricultural Industry in Queensland;
- Gives better consumer choice for Queenslanders;
- Helps to build a renewable and green energy industry in Queensland.

Yours sincerely,



David Szymczak



2013 WORLD BIOFUELS' INCORPORATION RATES



CANADA
NATIONAL Mandate
 Total Biofuel content in U.P. 5%. Total Biofuel content 5%.

UNITED STATES OF AMERICA
NATIONAL Mandate
 Renewable fuel: corn co-product 15.2 billion lbs. - 4.8 billion lbs. by 2016 and at least 1.8 billion lbs. a year by 2022. 15% for ethanol fuel.

SOUTH AMERICA

ARGENTINA
Mandate
 National 10% ethanol. 5% content by volume.

BRAZIL
Mandate
 Ethanol 17% in U.P. 21% in U.S. 2013. Fuel blend 14% increasing to 5% by 2013.

CHILE
Mandate
 15 Ethanol and 85 Biodiesel.

COLOMBIA
Mandate
 Ethanol content 15%.

COSTA RICA
Mandate
 Ethanol content 10% by volume and 22% for est.

JAMAICA
Mandate
 Ethanol content 15% by volume.

PANAMA
Mandate
 Ethanol 20% (vol.) at end of 2013.

PARAGUAY
Mandate
 Ethanol content 25% by volume.

PERU
Mandate
 Ethanol content 10% by volume.

URUGUAY
Mandate
 Ethanol for 5% (vol.).

MEXICO
Mandate
 Ethanol content 5%.

FINLAND
Mandate
 Total Biofuel content 4% by energy content.

FRANCE
Mandate
 7% biofuels under share by energy content. 2% for ethanol fuel.

GERMANY
Mandate
 Bio-fuels 6.2% energy content. Minimum obligation ethanol 2.5% by energy content. Biodiesel 4.4% by energy content.

GREECE
Mandate
 Total Biofuel content 5.20% by energy content.

HUNGARY
Mandate
 Total Biofuel content 3.2% by energy content. Min. 4.6% for ethanol fuel.

ITALY
Mandate
 Total Biofuel content 5.75% by energy content.

CYPRUS
Mandate
 Total Biofuel content 2.5% by energy content.

CZECH REPUBLIC
Mandate
 Total Biofuel content 5.75% by energy content. Biodiesel 6% by volume.

DENMARK
Mandate
 Total Biofuel content of 5.75% based on energy content.

AUSTRIA
Mandate
 Total Biofuel content 5.75% by energy content. 2.4% for ethanol content.

BELGIUM
Mandate
 10% for ethanol (vol.).

BULGARIA
Mandate
 Biofuels under share of 5.75% by energy content.

IRELAND
Mandate
 Total Biofuel content 5% based on energy content.

LATVIA
Mandate
 Total Biofuel content 5.75% by energy content. 5% for ethanol fuel.

LITHUANIA
Mandate
 Biofuels 5.75% (vol.).

LUXEMBOURG
Mandate
 Biofuels content 2%.

MALTA
Mandate
 Total Biofuel content 2.20% by energy content.

NETHERLANDS
Mandate
 Min. 3.5% for ethanol fuel.

NORWAY
Mandate
 Biofuel content 7%.

POLAND
Mandate
 Total Biofuel content 2.74% by energy content.

PORTUGAL
Mandate
 Biofuels content 7.5% for ethanol fuel.

ROMANIA
Mandate
 Total Biofuel content 5% by energy content. 2% for ethanol fuel.

SLOVENIA
Mandate
 Total Biofuel content 6.5%.

SPAIN
Mandate
 Total Biofuel content 5% by energy content. 2.5% for ethanol fuel.

SWEDEN
Mandate
 Total Biofuel content 5.75% by energy content. 6.5% for ethanol fuel.

TURKEY
Mandate
 2% Ethanol content by January 2013. Increasing to 3% by 2014.

UNITED KINGDOM
Mandate
 Biofuels content 5.75% by energy content. 3.2% for ethanol fuel.

SLOVAKIA
Mandate
 Total Biofuel content 5.75% by energy content.

ANGOLA
Mandate
 Ethanol 15% (vol.).

ETHIOPIA
Mandate
 Ethanol 15% (vol.). Addis Ababa region only.

KENYA
Mandate
 Ethanol 10% (vol.).

MALAWI
Mandate
 Ethanol 11% (vol.).

SOUTH AFRICA
Mandate
 Ethanol 2% fuel. Legislation appears for minimum 2-2.5% ethanol. E.C. ethanol introduced.

SUDAN
Mandate
 Ethanol 5% (vol.).

ZAMBIA
Mandate
 Ethanol 15% (vol.). Fuel blend 2% (vol.).

ZIMBABWE
Mandate
 Ethanol 2% (vol.).

PHILIPPINES
Mandate
 Minimum Ethanol content of 10% total volume. E.C. introduced.

INDONESIA
Mandate
 Ethanol 20% (vol.). Biodiesel 2% (vol.). Generally increasing to 15%.

JAPAN
Mandate
 35% biofuels mandate. Currently 10% ethanol. Currently increasing to 15% by 2013.

CHINA
Mandate
 15% ethanol (vol.) in metropolitan city.

INDIA
Mandate
 Ethanol mandate 5% content.

INDONESIA
Mandate
 Ethanol 20% (vol.). Biodiesel 2% (vol.). Generally increasing to 15%.

VIETNAM
Mandate
 Ethanol 5% (vol.).

THAILAND
Mandate
 Currently E.C. mandate. Ethanol 20% compulsory for all.

TAIWAN
Mandate
 10% biofuels mandate.

THAILAND
Mandate
 Currently E.C. mandate. Ethanol 20% compulsory for all.

VIETNAM
Mandate
 Ethanol 5% (vol.).

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CHINA
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 15% ethanol (vol.) in metropolitan city.

INDIA
Mandate
 Ethanol mandate 5% content.

VIETNAM
Mandate
 Ethanol 5% (vol.).

AUSTRALIA
Mandate
 Ethanol 15% (vol.).

NEW SOUTH WALES
Mandate
 Ethanol 15% (vol.).



The University of Sydney
Department of Infectious Diseases and Immunology
NSW 2006 Australia

Assoc. Professor Ray Kearney PhD, OAM

13 June, 2012

1. Introduction:

This summary account aims to extend previous documents by the author that have more extensively developed the case for strong support of ethanol-blended unleaded petrol (ULP) as a cleaner, healthier fuel than ULP alone.

Unlimited and free access to clean air of acceptable quality is a fundamental necessity and right.

Basic criteria for health:

- Survival
- Longevity
- Efficiency
- Well-being

In Sydney, NSW Department of Health estimated that almost three-times more people die (up to 1400 deaths p.a.) from exposure to vehicle exhaust-pollution than from road accidents. Cost of pollution-associated health impacts to the taxpayer for Sydney alone is between \$2-3 billion each year.

Particulate emissions, along with other toxins, have been linked to health problems related to air pollution.

Ethanol is an *oxygenate* which helps petrol burn more efficiently and cleaner resulting in lower levels of particulate emissions (and other toxics) from cars. An oxygenate analogy is a Bunsen burner where a lack of oxygen causes the gas-flame to burn uncleanly (yellow) while an increase in oxygen causes the gas-flame to burn cleanly (blue).

2. Evidence why ethanol e.g., 10 percent ethanol blended with ULP is a benefit

Spurious, untutored arguments continue to be used, especially by invested interests in the fossil-fuel industries, to thwart the introduction of ethanol as an alternative fuel on the grounds e.g., that research has not been undertaken in Australia “under Australian motoring conditions”.

However, as a result of recommendations by the Taskforce on Biofuels Inquiry (June, 2005), the CSIRO/Orbital undertook studies to test the emissions of ethanol/ULP in motor vehicles under Australian conditions. The CSIRO/Orbital Research Report (June, 2008) concluded:

See link:

<http://www.environment.gov.au/atmosphere/fuelquality/publications/pubs/ethanol-health-impacts.pdf>

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The overall finding is that there is a health benefit to the Sydney population arising from a move from ULP to ethanol blends in spark-ignition vehicles. Based on the average fleet make up in 2006 this value is approximately \$16 million for a 50% uptake (by ethanol compatible vehicles) of E10 and is \$17 million per annum for a 100% take up of E10 in 2011. Potential health cost savings for Urban Australia (Sydney, Melbourne, Brisbane and Perth) are estimated to be \$39 million for a 50% uptake (by ethanol compatible vehicles) of E10 in 2006 and \$42million per annum for a 100% take up of E10 in 2011.

.... The overall benefit of using ethanol blends is overwhelmingly dominated by reductions in particulate matter. Sensitivity analysis reveals that although these values can vary significantly, the overall conclusion in respect of a health benefit is robust given the assumptions of the model.

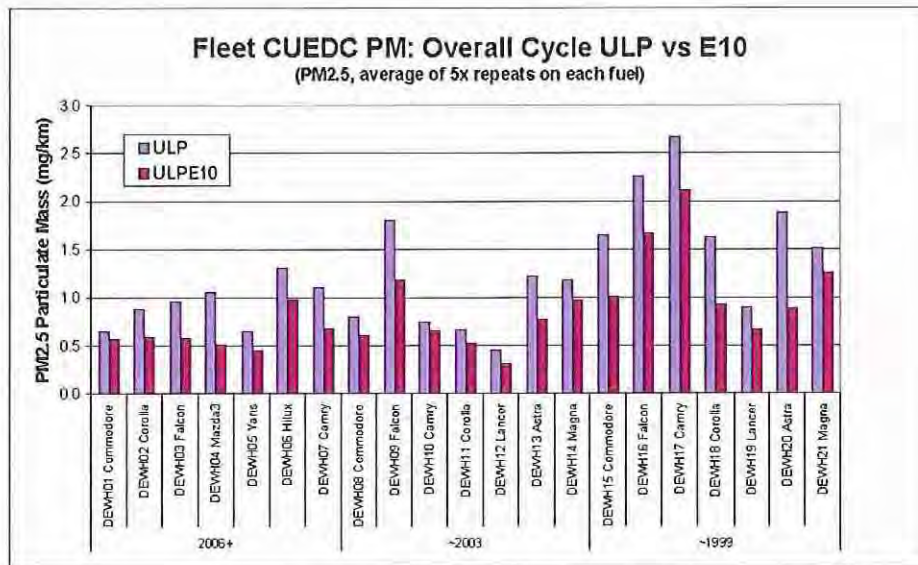
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- *The testing of vehicle exhaust tailpipe emissions shows that, in broad terms, PM_{2.5} emissions are reduced by operation on ethanol blends. The PM reduction with ethanol blends was often seen to be statistically significant for individual vehicles. The PM emissions when operating on ULP were generally seen to increase with accumulated vehicle mileage with many of the vehicle model pairs in the test fleet showing this behaviour. In absolute terms the PM emissions when operating on ULP over the cold start CUEDC drive cycle were found to be, generally, below 5mg/km (the limit set for Euro5 diesel and direct injected petrol passenger vehicles).*

- *PM_{2.5} emissions from the tailpipes of 2006+ model year vehicles that were tested showed a 19% decrease when using E5 and a 33% decrease when using E10.*

- *Particle size and particle distribution data suggest that approximately 94% of the PM emissions are present as PM_{2.5}, and approximately 85% as PM₁.*

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Figure 4-14 : Comparison of Fleet CUEDC PM_{2.5} for ULP vs E10

As a fuel additive, ethanol changes the emissions profile of unleaded petrol (ULP), creating a cleaner, safer motor fuel. Real-world evidence demonstrates that ethanol blending reduces municipal smog levels and cuts down on atmospheric concentrations of harmful toxins.

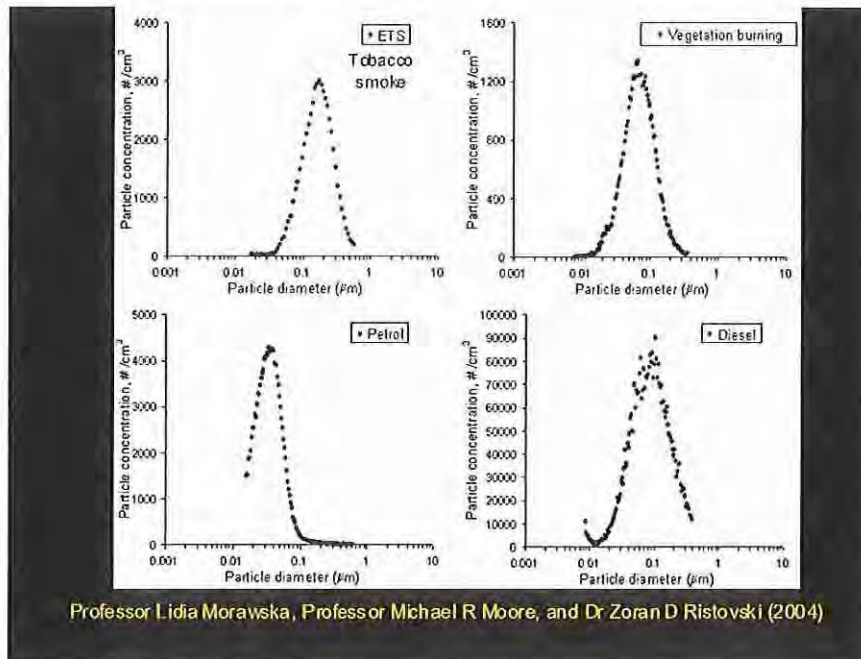
3. How valid are current standards for air-quality and health risk?

We are told by NSW Government politicians and their bureaucrats that “NSW has stringent air-quality standards”. NOT TRUE! The claim by former NSW Government that the PM₁₀ measure “is stringent” is refuted by the findings of Professor Lidia Morawska and colleagues who found that only 3% of combustion particles between 0.1µm and 1µm, representing more than 85% of tail-pipe particles, are present in PM₁₀ measurements.

Studies by Morawska & Thomas (2000) concluded:

“PM₁₀ measurements provide information almost entirely on particles generated from mechanical processes. In an urban environment, this could mean particles resuspended by vehicular traffic and mechanical wear and tear, but not on the emission of motor vehicles.”

L. Morawska et al 2004 reported the distribution of particles in cigarette smoke, diesel, petrol and bush-fire smoke as follows:



Therefore, PM_{10} measurement, as used for air quality, is not an instrument for evaluating traffic emissions. Today, nothing has changed!

The invalid PM_{10} data for measurements of traffic/industrial emissions implies the health risk "assessment" is also grossly under-estimated and flawed.

Morawska's research shows that PM_1 measurement provides very good information about contributions from the combustion engine and does distinguish "*traffic influence emissions*" from "*suburban background*", unlike PM_{10} .

By using PM_{10} measurements, the current air-quality particle measurements exclude virtually the bulk of the constituent particulates arising from the tail pipe. This exclusion then totally fails to acknowledge the existence of the enormous surface area (> 1000 fold) of respirable particles that carry toxins when only the PM_{10} mass/ M^3 measurements are made.

The following diagram illustrates the fact that weighing particles does not convey their toxin-carrying potential. Note that the CSIRO/Orbital report records measures of the fine $PM_{2.5}$ particles by weight and found a reduction of up to 33% in E10/ULP-blended fuel. This does not convey the enormous reduction in surface area of soluble fine particles as it would if numbers per unit volume were used as illustrated in the diagram below e.g., one-million soluble $PM_{0.1}$ particles are equivalent to one insoluble PM_{10} particle, but have 100 times the surface area.



	Fine Mode	Coarse Mode
Formed from:	Gases	Large solids/droplets
Formed by:	Chemical reaction; nucleation; condensation; coagulation; evaporation of fog and cloud droplets in which gases have dissolved and reacted.	Mechanical disruption (e.g. crushing, grinding, abrasion of surfaces); evaporation of sprays; suspension of dusts.
Composed of:	Sulphate, SO ₄ ²⁻ ; nitrate NO ₃ ⁻ ; ammonium, NH ₄ ⁺ ; hydrogen ion, H ⁺ ; elemental carbon; organic compounds (e.g., PAHs); metals (e.g. Pb, Cd, V, Ni, Cu, Zn, Mn, Fe); particle-bound water.	Resuspended dusts (e.g., soil dusts, street dust); coal and oil fly ash, metal oxides of crustal elements (Si, Al, Ti, Fe); CaCO ₃ , NaCl, sea salt; pollen, mould spores; plant/animal fragments; tire wear debris
Solubility	Largely soluble, hygroscopic and deliquescent	Largely insoluble and non-hygroscopic
Sources	Combustion of coal, oil, gasoline, diesel, wood;	Resuspension of industrial dust and soil tracked onto

	atmospheric transformation products of NO _x , SO ₂ and organic compounds including biogenic species (e.g. terpenes) high temperature processes, smelters, steel mills, etc.	roads; suspension from disturbed soil (e.g. farming, mining, unpaved roads); biological sources; construction and demolition; coal and oil combustion; ocean spray
Lifetimes	Days to weeks	Minutes to hours
Travel Distance	100s to 1000s of kilometres	< 1 to 10s of kilometres

http://www.who.int/environmental_information/Air/Guidelines/Chapter2.htm

Research shows that the 75% of the toxins, including carcinogens among the polycyclic aromatic hydrocarbons (PAHs), are carried on soluble respirable particles < 2.5µm. Thus a 10% ethanol/ULP blend that reduces PM2.5 particles by 33% (CSIRO/Orbital 2008) has a significant health benefit.

Unlike overseas countries, Australia only has a standard for PM₁₀ but neither for PM_{2.5} nor PM₁ – only guidelines which, unlike standards, are *not enforceable*.

The relationship between air pollution, death and disease has been studied for decades, leading to the consistent conclusion that combustion of diesel and petrol is among the most toxic sources of emissions today (USA Clean Air Task Force Report, Feb. '05) viewed at the link:

<http://www.catf.us/publications/view.php?id=83>

See also NH&MRC Report (2008) on Air Quality Around Tunnels – link:

<http://www.nhmrc.gov.au/guidelines/publications/eh42>

These exhausts contain numerous dangerous compounds, ranging from respiratory irritants to carcinogens including a host of air toxics, particulate matter, carbon monoxide and nitrogen oxides.

The very fine particles adsorb toxic gases and liquids onto their surfaces. On a weight basis, a billion ultra-fine particles are about equivalent to one coarse particle 10 micrometres in diameter (PM10), but have 1000 times the surface area. The fine particles are mainly soluble and penetrate deep into the lungs. Health research indicates that the invisible exhaust may be the most dangerous of all. Technology exists to clean up emissions from these engines, by cleaner fuels such as E10 and to remove such toxics from road tunnels *by filtration*.

3. Health impacts

Children are more susceptible than adults (except the elderly) to the adverse effects of air pollution because:

- Children are more active and breathe more rapidly.
- They have more lung surface area compared to their body weight and inhale more air kgm-for-kgm than adults.
- They have higher lung volume to body size, higher respiration rates and spend more active time in the polluted outdoor environment.

- When exposed to fine particles, children have slowed lung function growth, increased emergency room visits, increased incidence of asthma, bronchitis and crib death (CATF Report, Feb. '05).

Queenslanders - Professor Lidia Morawska and Professor Michael Moore – writing in their excellent review state at the following link under 'Toxicology':

<http://www.deh.gov.au/atmosphere/airquality/publications/health-impacts/index.html>

"All of the studies available to us demonstrate that the primary determinant of the effect of ultrafine particles is their number and their surface area and not the weight of particles present. This means that the traditional use of PM weight measures is inappropriate in evaluation of the likely biological effects of ultrafine particles".

4. Adverse impacts on health and well-being

Exhaust pollution including coarse, fine and ultra-fine particles, gaseous irritants (e.g., O₃ and NO₂), 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 in 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 /M³ 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

Particulate Air Pollution and Blood

Exposure to PM₁₀:

- reduces RBC count (p<0.001)
- reduces platelet and factor VII (p<0.05)
- elevates C-Reactive Protein (p<0.01)

NOTE: RBC probably sequestered in lung by changes to endothelial cells

A. Seaton et al., Thorax (1999); 54:1027-1032.

The NEW ENGLAND
JOURNAL of MEDICINE

September 9, 2004

The Effect of Air Pollution on Lung Development
from 10 to 18 Years of Age

CONCLUSIONS

The results of this study indicate that current levels of air pollution have chronic, reversible effects on lung development in children from the age of 10 to 18 years, leading to clinically significant deficits in attained FEV₁ as children reach adulthood.

FEV₁ is the volume of air expelled in the first second of maximal forced expiration from a position of full inspiration.

Pollution 'increases risk of heart disease for women'

- The risk of post-menopausal women dying from a heart attack or stroke increases dramatically with higher concentrations of fine sooty particles from vehicles and factories.
- Researchers found that average particulate levels in and around 36 US cities ranged from about four to almost 20 $\mu\text{g}/\text{M}^3$ of air. **Each 10 $\mu\text{g}/\text{M}^3$ rise was matched by a 76% increase in the chances of dying from any cardiovascular cause.**
- For women living within, rather than between cities, the risk more than doubled, increasing by 128%, with each step up in pollution levels.

New Engl. J. of Med (Feb, 2007) v 356; p 447-58

Heart Attacks and Short-Term Exposure to Fine Particles

- Within hours of exposure to PM_{2.5} fine particles, at levels of 10 $\mu\text{g}/\text{M}^3$, can trigger a myocardial infarct in elderly persons at-risk with atherosclerosis.

C. A. Pope et. al., *Circulation*, (2006); 114: 2443-8

- A further increase in risk is gene-related

S. Y. Park et. al., *Circulation* (2006); 114: 2798-2805

5. Flaws in Monitoring of Air Pollution

Ayers *et al.*, (CSIRO, 2001) confirmed that a routinely used method of continuous sampling and monitoring PM₁₀ known as the Tapered Element Oscillating Microbalance (TEOM) *under-estimated PM₁₀ values*, below temperatures of about 15 - 17°C, by as much as 25%. The national automatic air quality monitoring networks employ mainly TEOM PM₁₀ samplers, together with some TEOM PM_{2.5} instruments.

The TEOM instruments are adopted because of their ability to provide measurement data in real time, as compared to measurements from traditional gravimetric methods, which are available only after the period required for collection and weighing. TEOM measurements, therefore, allow the provision of real time information to the public and input into research to identify sources of particulate matter. TEOM measures document elevated levels of particles during a.m. and p.m. peak traffic periods. In measuring PM₁₀ the divergence is typically of the order of 20%, but rarely exceeds 40%.

In addition, NSW air quality monitoring allegedly **does not incorporate an additional correction factor** for 'secondary particles.'

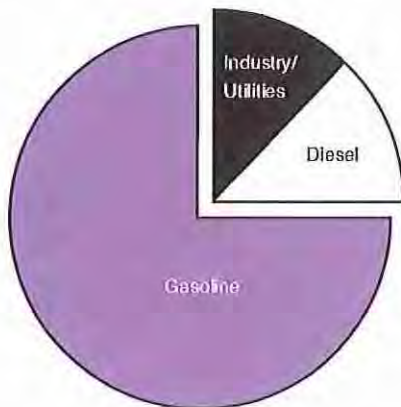
Background levels of PM₁₀ have been underestimated by 11–40%, dependent on meteorological and air quality conditions (Katestone Environmental Report 25.1.2002)

6. Fossil fuel is the largest source of man-made carcinogens.

See:

http://www.nce-ethanol.org/pdf/Health_Benefits_of_Ethanol_Fall_2010.pdf

Gasoline is the largest source of man-made carcinogens.



Source: U.S. Environmental Protection Agency

7. Benefits of E10

The USA Renewable Fuels Association (RFA) reports that ethanol can reduce tailpipe soot and particulate emissions by as much as a qualified 50% overall, with the greatest reductions being achieved in the highest-emitting vehicles. (Dr. G. Whitten: See http://www.ethanolrfa.org/page/-/objects/documents/69/nec_whitten.pdf?nocdn=1).

Given that the American Lung Association links these emissions to cancer, asthma, and heart attacks, ethanol blending can play an important role in improving public health.

Studies that depict ethanol as having a negative impact on air quality are based on *computer modeling of hypothetical scenarios*, and are consistently out of sync with on-the-ground results of ethanol blending mandates in states and cities across the US. A study by Stanford University' Mark Jacobson sparked debate about ethanol's air quality impact. However, Jacobson's study has been criticized by the RFA and the Natural Resources Defense Council for making unrealistic assumptions and omitting crucial factors that affect real-world outcomes. Jacobson's concerns simply are not reflected in the real-world data. For example, ozone exceedance days dropped 16% in Wisconsin after adoption of a 10% ethanol blend. See links:

http://www.ethanolrfa.org/page/-/objects/documents/1061/smog_reyes-jacobson.pdf

http://www.ethanolrfa.org/page//objects/documents/1071/reapresponse_jacobson85.pdf?nocdn=1

http://www.pacificethanol.net/site/index.php/media/straight_story_article/345/

7. 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 whose commissioned reports have, in some instances, been demonstrably biased against ethanol. 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.

8. 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 the problem.*"

This is the classic risk-based approach. Ignore the evidence so long as it is not 100% watertight. Use uncertainty as an excuse to delay. Wait for the dead bodies to pile, then slowly acknowledge the need for action. Precaution is not (yet) fashionable – Risk-assessment is!

- **If a substance e.g., petrol and diesel are known to be harmful, it should not be necessary to demonstrate 'scientifically' that they are actually causing harm before doing something about it.**

9. Willful blindness to the truth!

This WILLFUL BLINDNESS to the TRUTH has spread throughout all the government portfolios – Health, EPA, Planning and RTA as well as by anti-tobacco lobbyists and State Cancer Councils who do not want the community (or the Courts) to know that research e.g., reported in 2002 showed that one-in-five lung cancer deaths is attributed to exposure to fine PM2.5 particles generated by the combustion of fossil fuels. It is appalling to find that denial of a hazard by an expert may not be the truth, the whole truth and nothing but the truth! Real, fearless leadership in the health professions seems currently a priority and urgently in need.

See report of the article below:

Big city killer

If the cigarettes don't get you the traffic pollution will

UP TO a fifth of all lung cancer deaths in cities are caused by tiny particles of pollution, most of them from vehicle exhausts.

That's the conclusion of the biggest study into city pollution to date, which tracked half a million Americans for 16 years. It suggests the impact is far greater than feared.

The study is important because it followed individuals, says British expert Roy Harrison of the University of Birmingham, allowing the researchers to separate the effects of smoking and pollution. "In the past, we have often just compared urban areas and rural areas. But more people smoke in cities, and it is difficult to compensate for that."

The research focused on particles less than 2.5 micrometres in diameter, known as PM2.5s. These fine particles are thought to kill by lodging deep in the lungs. The researchers found that the long-term death rate from lung cancer rose by 8 per cent for every 10-microgram increase in the average concentration of PM2.5s per cubic metre. The increased risk is comparable with the risks to long-term passive smokers.

Typical PM2.5 levels in the US are 20 micrograms in Los Angeles and 16 micrograms in New York-the limit set in 1997 by the Environmental Protection Agency is 15 micrograms. British levels are similar, though one PM2.5 monitor at Marylebone Road in London records an average of 32 micrograms. "I'd say London has a special problem because of the high proportion of diesel fumes," says George Thurston of New York University, co-leader of the study.

The implications are bleakest for developing countries. In heavily polluted cities such as Beijing or Delhi, particulate levels average over 300 micrograms and most of this is probably PM2.5s.

Further reading:

- More at: *The Journal of the American Medical Association* (vol 287, p 1132)

Fred Pearce

From *New Scientist* 09 March 2002.

<http://www.newscientist.com/hottopics/pollution/pollution.jsp?id=23331100>

- *The same techniques to support the use of white asbestos as a safe material are being used to subvert the community into thinking exposure to vehicle pollutants is without risk to health and well-being. Similarly the manner by which ethanol is being 'demonised' for political and corporate expediency depends on an unconscionable 'willful blindness to the truth'.*
- *"Oil and car industries have acted again and again to deceive regulators about the hazards of their products and have used their wealth to hamstring attempts by state and federal legislators to make laws that address such threats." Why do we still do not have a standard (only a guideline) e.g., for fine particles and benzene?*

10. What are the advantages to using ethanol-blends?

Conclusion:

- Less dependence on imported crude oil
- Extends Australia's dwindling domestic supply of light crude petroleum used to produce transportation fuels.

- Expanded market opportunity for Australian farmers
- Rural economic development
- Displaces dangerous components in petrol, such as benzene
- Ethanol is made from renewable resources, whereas petroleum comes from limited fossil energy sources.
- Cleaner environment (lower carbon monoxide and smog-causing emissions)
- Cleaner burning engines
- Improved vehicle performance. Saab Motor Manufacturer (Sweden) claims more power is generated from its new engines designed for ethanol-blended petrol than straight petrol.
- Bioethanol fuel shows better performance in reducing volatile organic chemicals (VOC), PAH, benzene and butadiene, relative to petrol.
- 10% ethanol blended petrol reduces fine particulates by up to a qualified 50%
- Reduced health impacts.

Addendum:

Evidence is shown below of metabolic disruption of a mushroom species by petroleum products (e.g., diesel fumes) in an inner Sydney – Lane Cove Bushland Park. The phenomenon is known as ‘rosecomb’. The epigenetic effect on morphogenesis – to cause gills to appear on the top of the fungus - is analogous to the effects of thalidomide and is an example of another metabolic disrupter in our environment.

Disruptive selection

Increases the two extreme types in a population at the expense of the intermediate or hybrid forms.
An example of disruptive selection in action is in studies of species of *Hygrocybe* growing on soils and creek banks exposed to heavier pollution



Low pollution



High pollution

Hygrocybe reesiae

'Rosecomb'
due to petroleum products

Abnormal changes (fungal teratology) in
Hygrocybe reesiae
Analogy is the effect of thalidomide





Australian Medical Association (NSW) Limited

Media Release

27 July 2005

AMA (NSW) pleads with Federal Government over Ethanol

AMA (NSW) is backing the introduction of ethanol in fuel as a practical way to reduce air pollution and improve the health of city dwellers.

After reviewing scientific and medical research, the association has made a submission to the Prime Ministerial Taskforce on Biofuels in support of supplementing fossil fuels with ethanol and other biofuel blends.

AMA (NSW) President Dr John Gullotta said the disgusting brown pall that often lingers on the Sydney skyline is ample evidence that air pollution is a serious problem that must be addressed.

"The Federal Government is considering introducing a compulsory 10 per cent ethanol to fuel, and on health and environmental grounds, we strongly support that," said Dr Gullotta.

"The arguments about ethanol damage to engines or loss of performance are not a concern of the AMA. As a medical body, we are more concerned about the human 'engine' and the health of our population and the environment.

"For a start, the commuters who brave the M5 tunnel every day would be far better off because of lower pollution levels from ethanol," said Dr Gullotta.

"Ethanol has been successfully used in Brazil, Canada and the US for more than 20 years and their petrol companies proudly promote the ethanol content of fuel."

"I congratulate Bob Carr for his announcement last month that ethanol-blended fuel will be used in the NSW Government vehicle fleet when the current contract expires next July. This is a smart move, and the Queensland Government is already using ethanol for its fleet."

Media Contact: Melissa Schwalger 0407 910 123 / (02) 9439 8822

The Voice of Our Profession