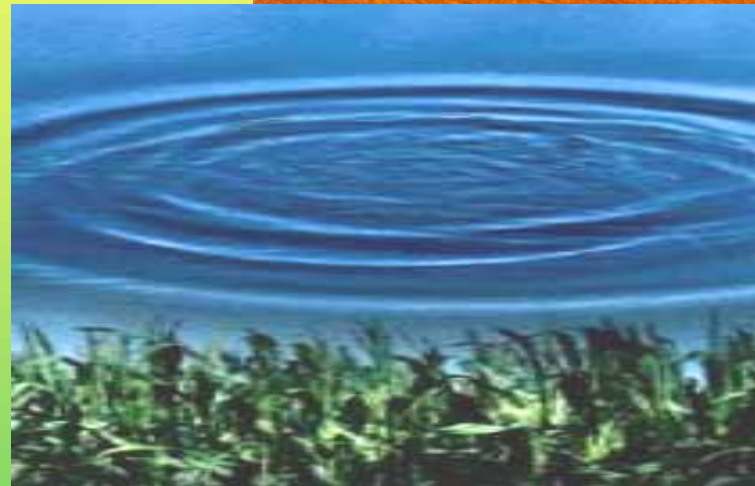




## **Presentation to Prime Minister's Taskforce on Biofuels**



# **Establishing a Future for Biofuels in Australia**



**July 2005**

- **BIOFUEL** is not a single product issue,
- It is a **TOTAL ECONOMIC, SOCIAL and ENVIRONMENTAL CONCEPT**
- The **BENEFITS** include:
  - Renewable fuel
  - Reduction in CO2 emissions
  - Improved Air Quality in our cities
  - Reduced Public Health Costs
  - Improved Balance of Payments
  - Fuel Supply Security
  - Stabilization and Rejuvenation of Regional Australia

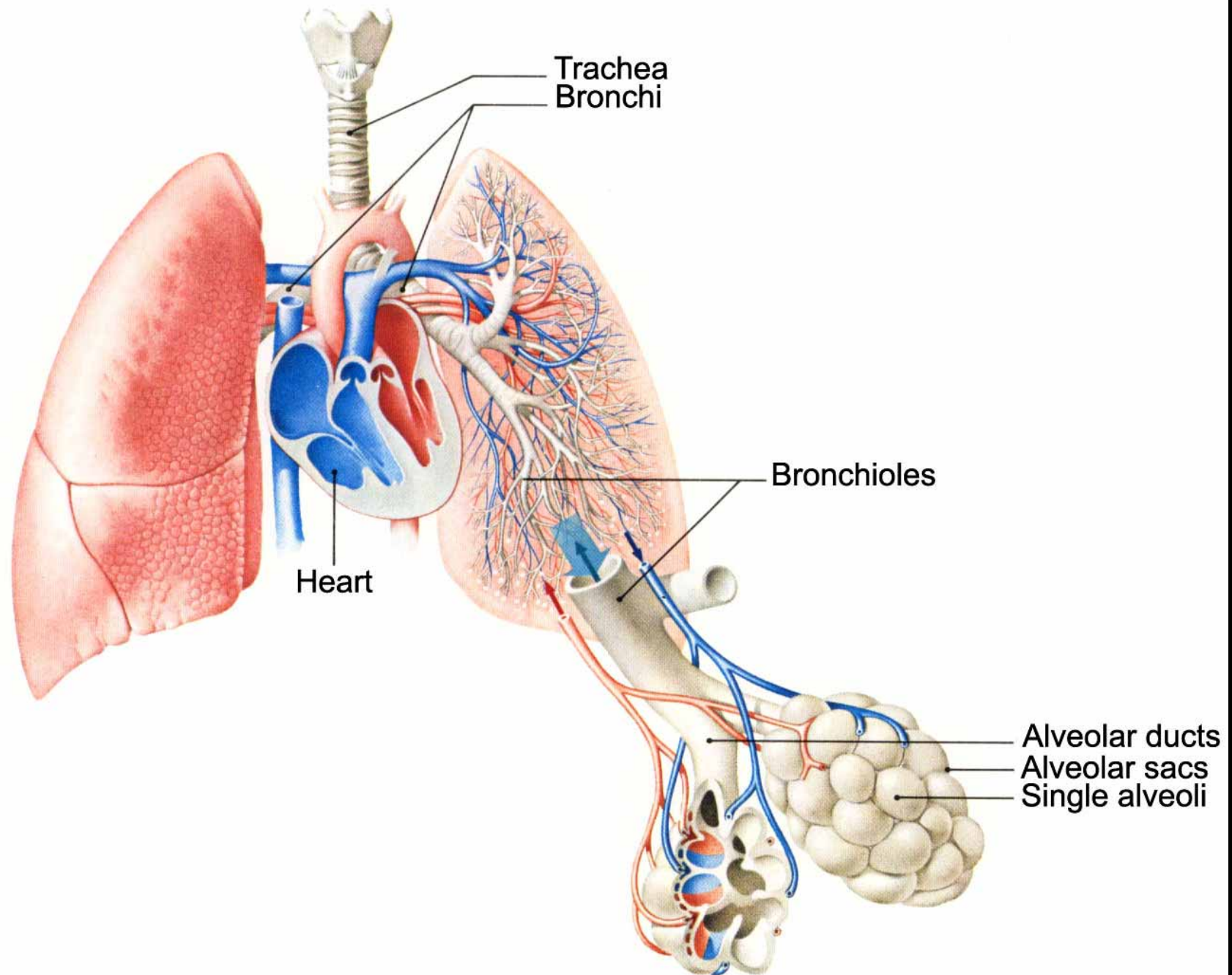
# **Health Impacts of Vehicle Exhausts**

**Assoc. Prof. Ray Kearney**

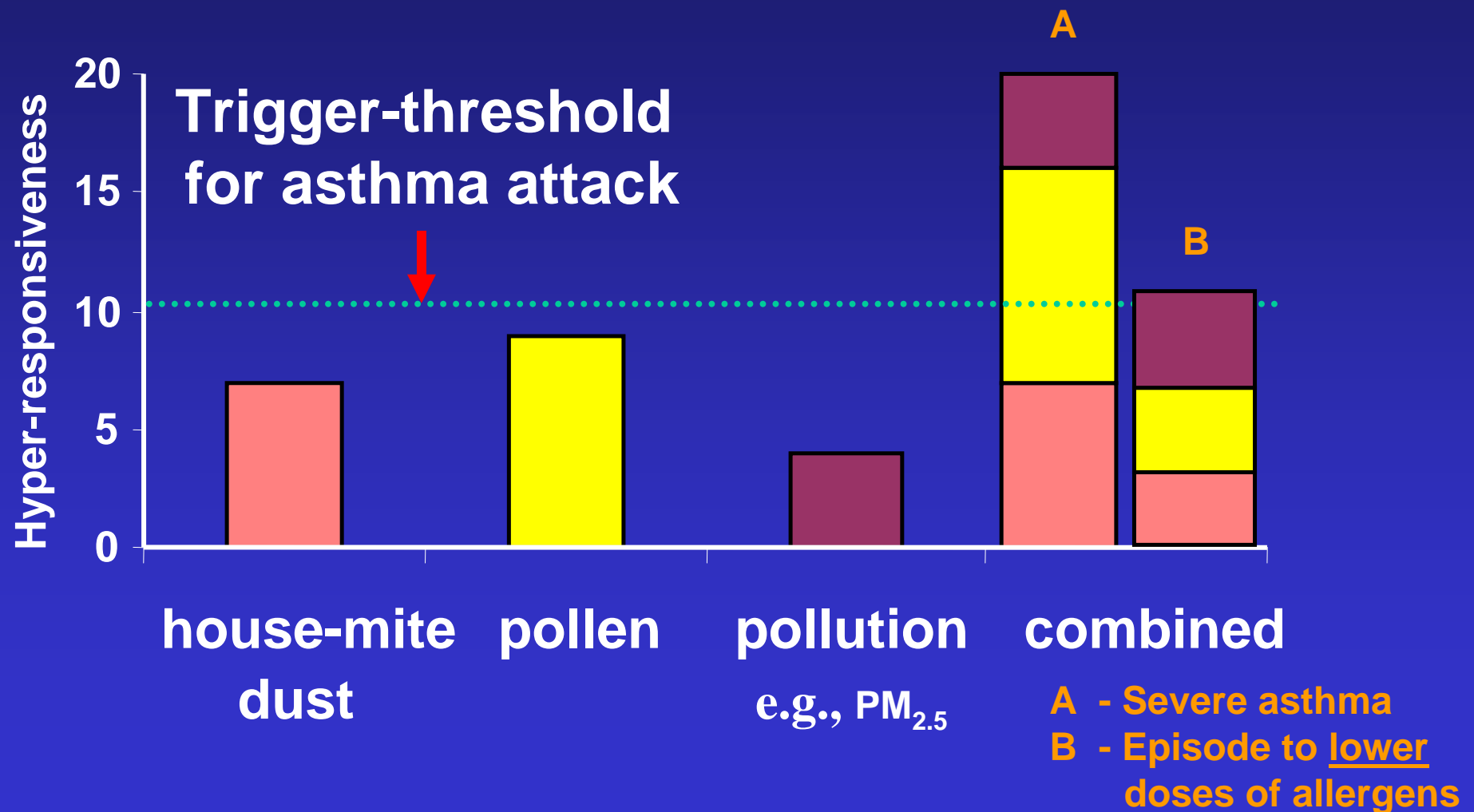
**Dept. of Infectious Diseases and Immunology  
The University of Sydney**

**Chairman  
Lane Cove Tunnel Action Group Inc.**

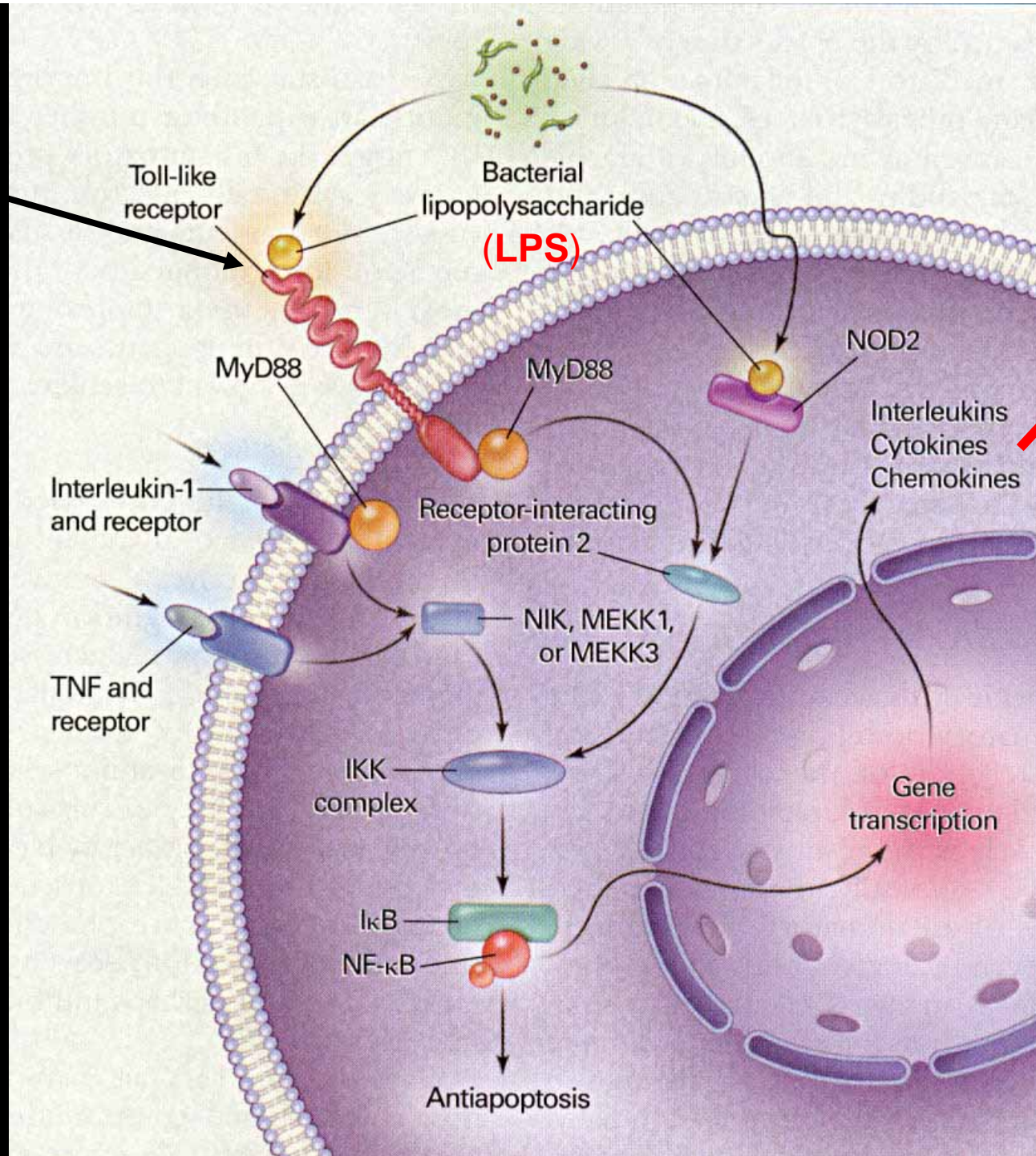
# THE RESPIRATORY SYSTEM



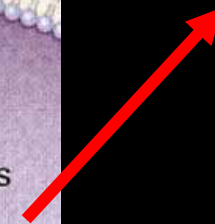
# Pollutants Enhance the Airway Response to Inhaled Allergens i.e., Hyper-responsiveness



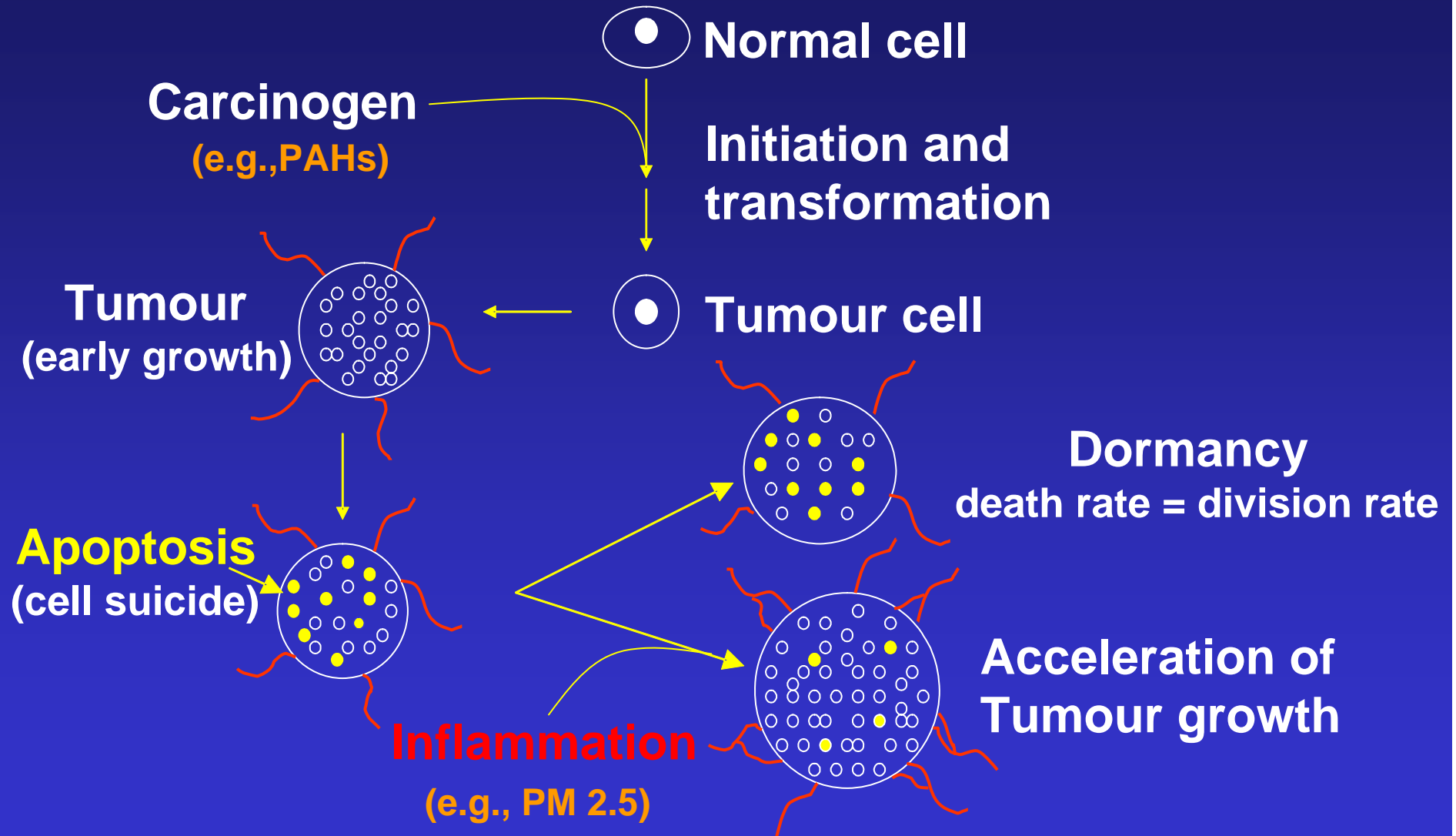
**Diesel Exhaust Particles (DEP) increase receptors for endotoxin (LPS)**



**Enhanced Inflammation**



# Tumour-Cell Growth and Death



# Unit Pollution Health-Costs<sup>1</sup> for Sydney<sup>2</sup> - BAND<sup>3</sup> 1

Pollutant	Tonnes/year <sup>6</sup>	Unit cost <sup>1</sup> \$/tonne	Total cost annually
Particles (TSP)	24,370	341,640	8,325,766,800
CO	533,700	3.0	1,601,100
NOx	88,600	1,750	155,050,000
VOC <sup>4</sup>	135,870	875	118,886,250
SO <sub>2</sub>	23,010	11,380	261,853,800
Benzene <sup>5</sup>	2,850	2,425	6,911,250
1,3-butadiene <sup>5</sup>	285	90,730	25,858,050
			8,895,927,250

1. Data from Table 23 in *Fuel Taxation Inquiry: The Air Pollution Costs of Transport in Australia* by Paul Watkiss (March, 2002)

2. Data (2002) provided by Chris Eiser

Manager Atmospheric Science

Department of Environment & Conservation (NSW)

Note: Data is for all sources (Mobile, Industry, Domestic/Commercial)

3. Band 1: Inner areas of larger capital cities (Sydney, Melbourne, Brisbane, Adelaide and Perth) – P. Watkiss 2002.

4. Non-methane hydrocarbons

5. Data for 2000, Sydney (C. Eiser)

6. Data provided by C. Eiser



*SAE Australasia*

# Health and Action Issues Related to Biofuels

By

Prof. H C Watson

President Society of Automotive  
Engineers -Australasia



Head, Transport Energy Group

Department of Mechanical & Manufacturing Engineering

# Overview of the Presentation

- **Health Costs**

  - Focus on Particulates**

- **Biofuels benefits**

  - **Biodiesel**

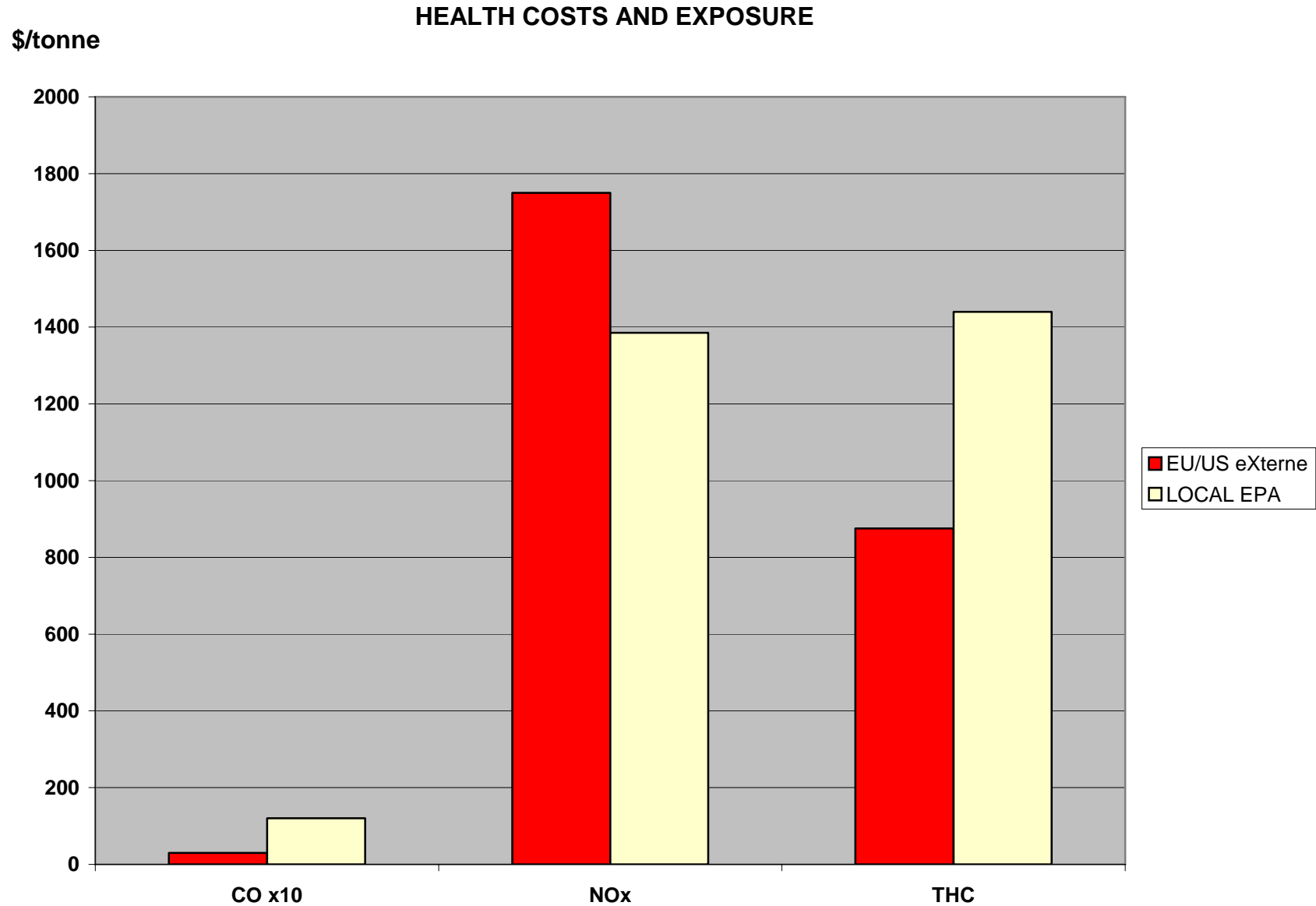
  - Latest results with current technology**

- **E10**

  - **Particulate benefits**

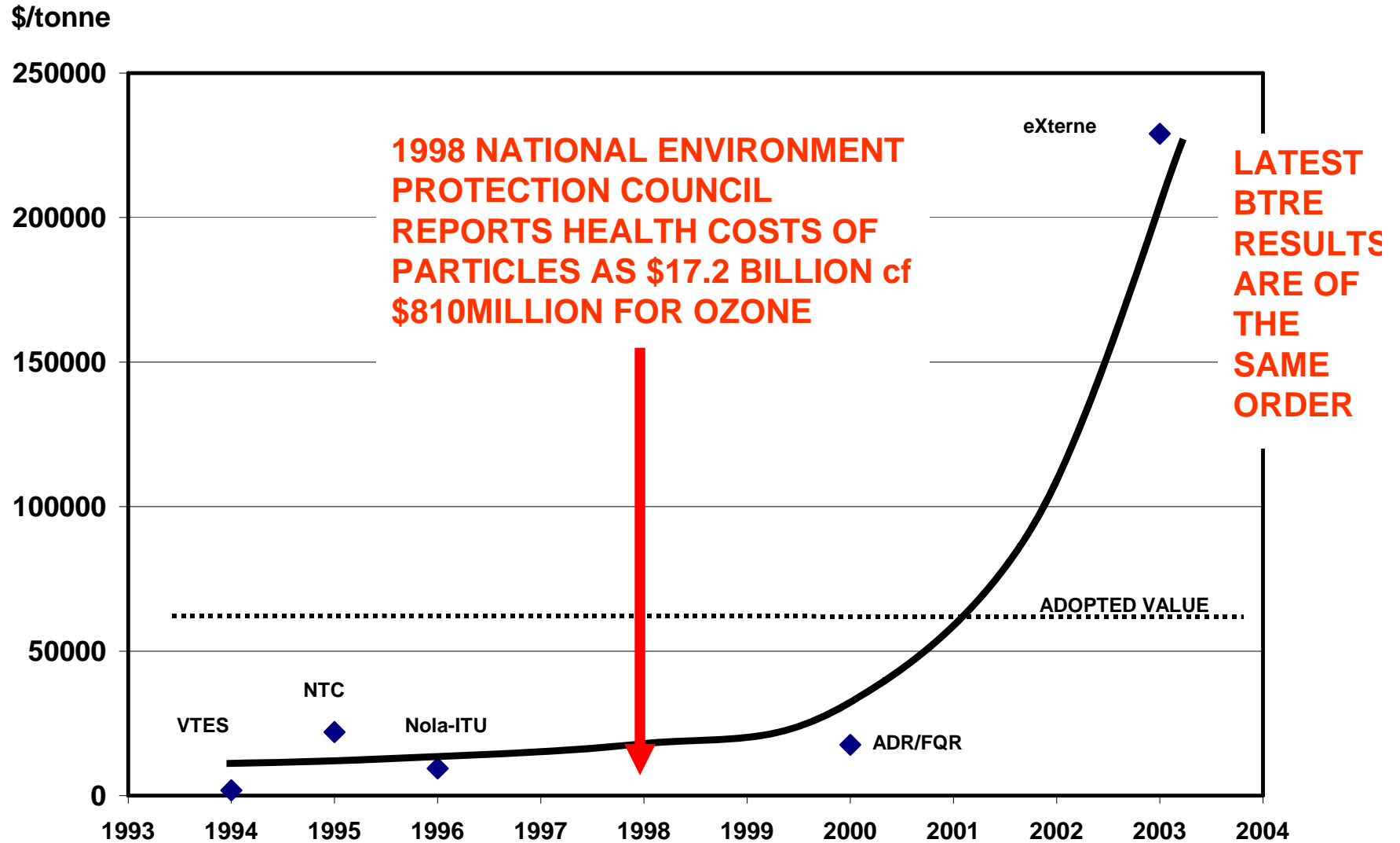
- **Conclusions**

# General agreement on the health cost of regulated gaseous emissions

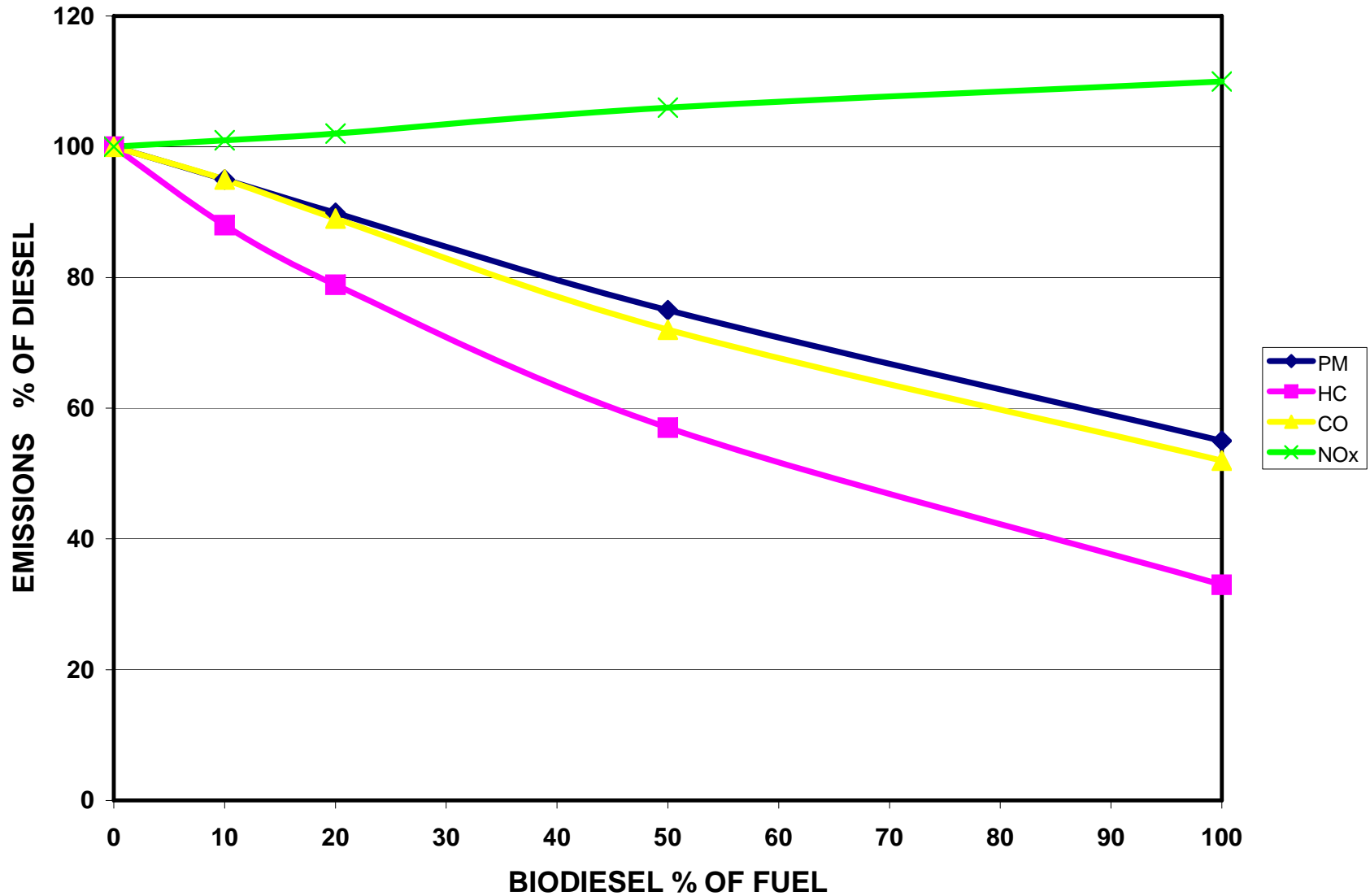


# Changing view of the health cost of particulate emissions

HEALTH COSTS ATTRIBUTED TO PARTICULATES FROM MOTOR VEHICLES

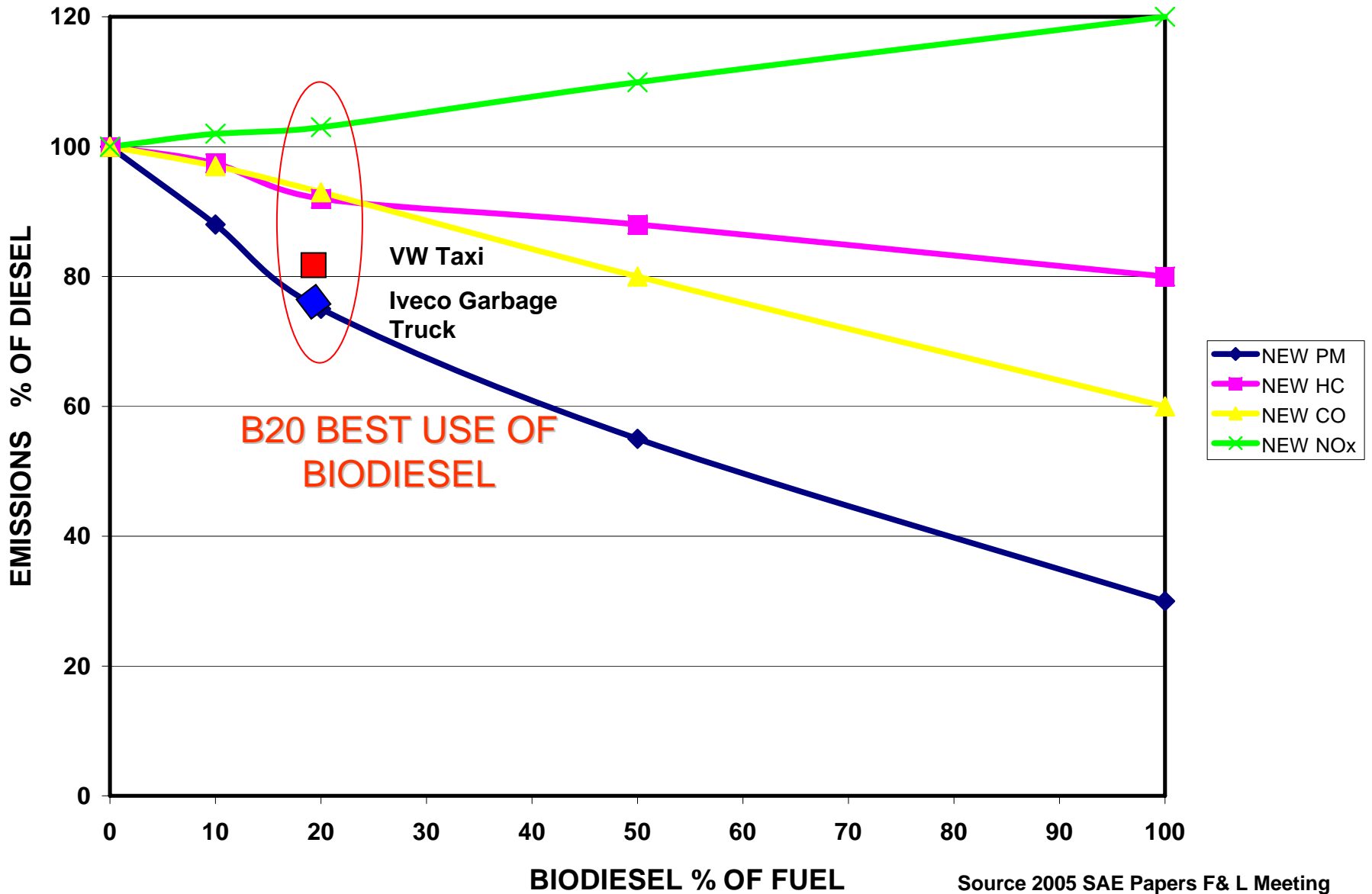


# DIESEL Biodiesel reduce emissions (except NOx) US EPA Data - 90's ENGINE TECHNOLOGY



# DIESEL Biodiesel reduce emissions (except NOx)

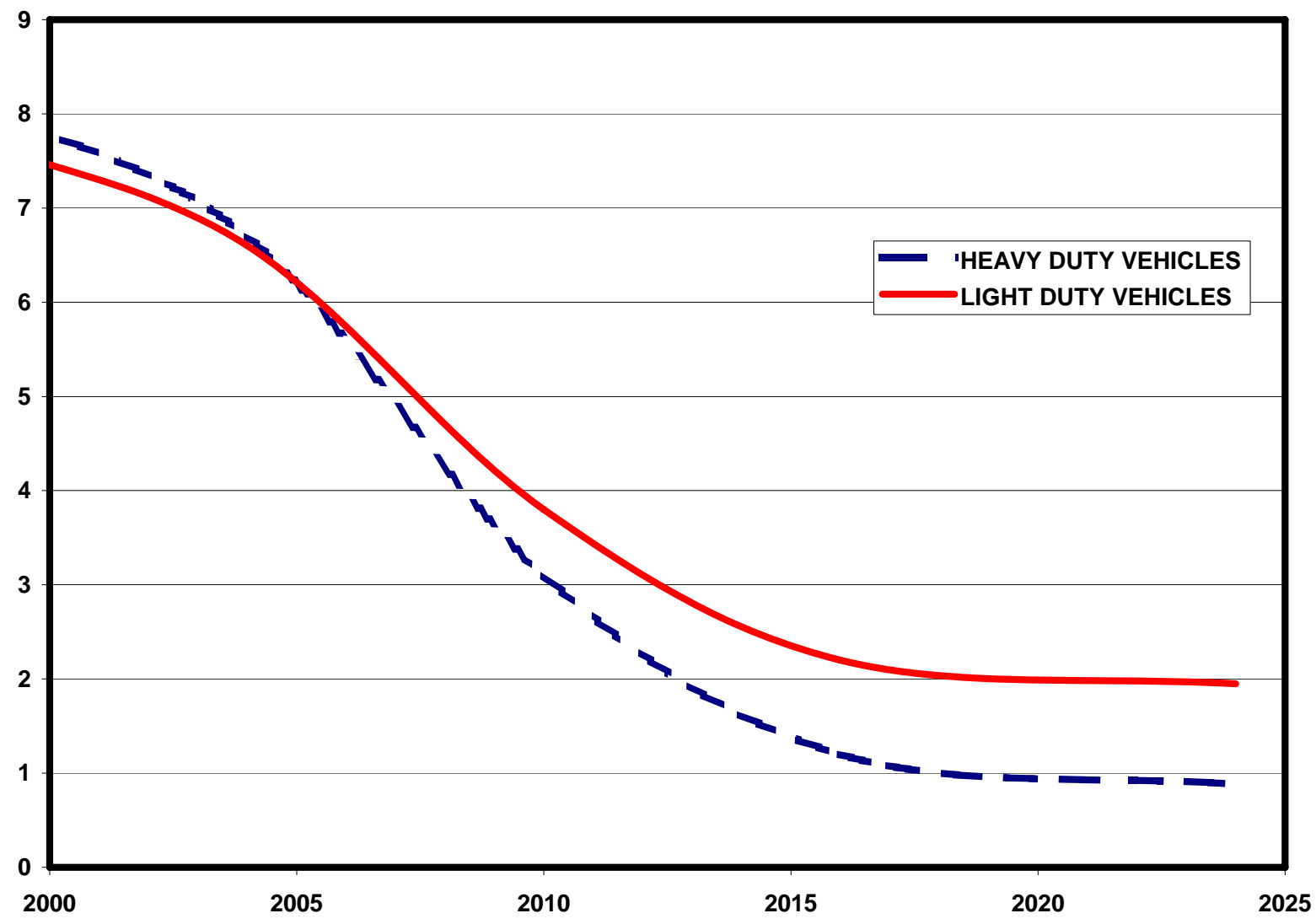
## CURRENT ENGINE TECHNOLOGY Cummins & DDC



# Changing importance of particulate emission source

RELATIVE LIGHT TO HEAVY DUTY VEHICLE PARTICULATE EMISSIONS PM10

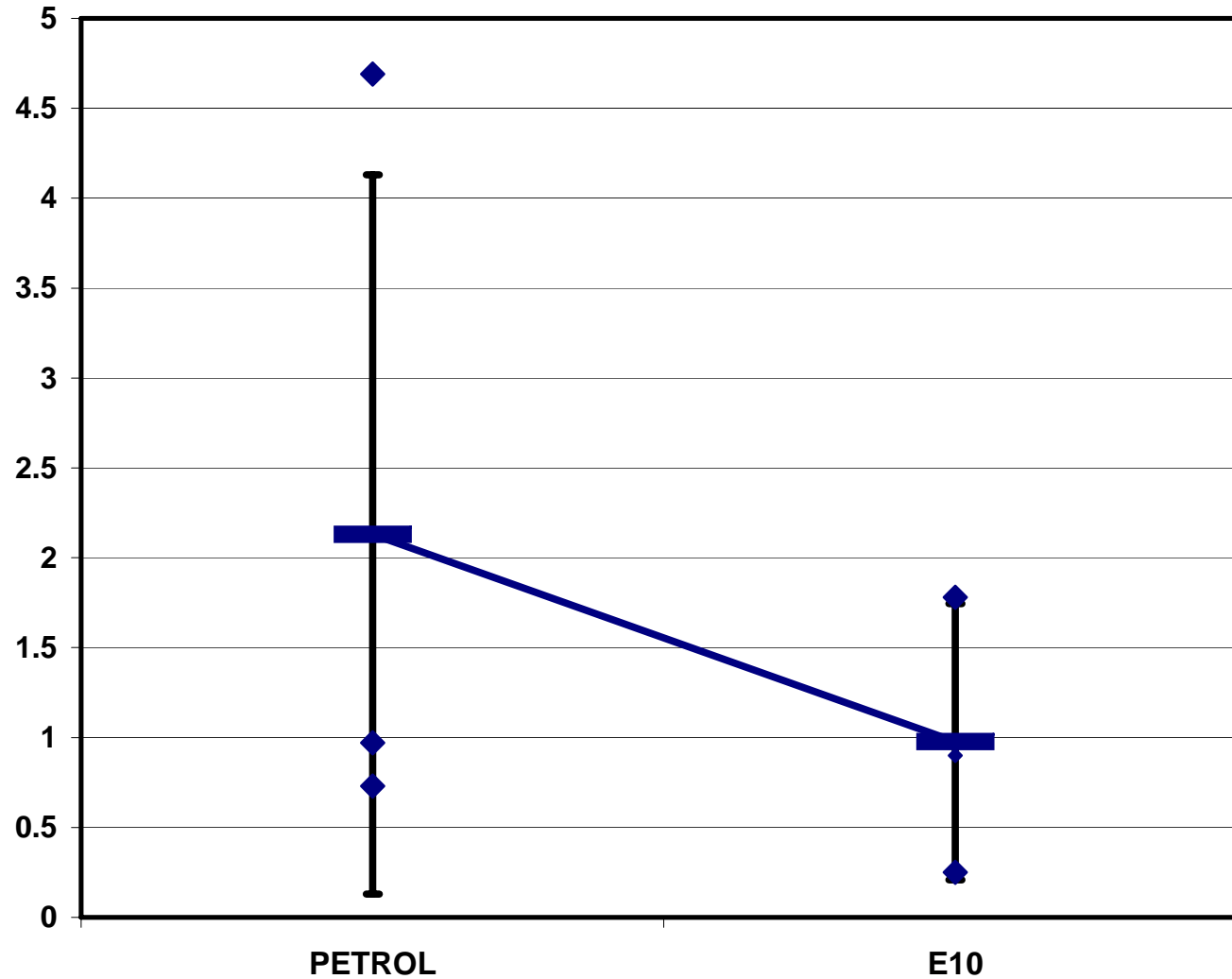
PARTICULATES ktonnes



# E10 - ITS PARTICULATE BENEFITS

PARTICULATES  
mg/km

PARTICULATES REDUCED BY 50% AT 24 degC (64%@2 degC)





## Conclusions

- **The smaller fuel molecules with no ring compounds (Benzene PAH etc) of biodiesel and ethanol inherently reduce particle emissions**
- **Particularly significant - although whilst the mass emissions of PM10 are being reduced by engine technology - several reports suggest that reductions of PM2.5 and smaller particles are not reducing**
- **Biodiesel and E10 can make an immediate impact on particulates without waiting for further improvements in vehicle technology with consequent benefits to health**

- Professor Barry Batts, BSc,  
PhD, CChem,FRACI
- Macquarie University

- Emissions
- Driveability/ Operability

# Driveability and Damage: 1

## **MANILDRA PARK PETROLEUM**

**Since 1992 this company has blended 326 million litres of fuel ethanol.**

**No cases have been reported where the use of this fuel resulted in mechanical problems or engine damage**

# Driveability and Damage: 2

## NRMA

**Despite a well advertised campaign of its members asking for examples of damage to cars, not one case was produced where a problem could be attributed unequivocally to the use of ethanol blended petrol.**

ERDC Project N0. 2511

**Intensive Field Trial  
of  
Ethanol/Petrol Blend in Vehicles**

Executive Summary

Prepared by  
Apace Research Ltd  
December 1998

# **Market Barriers to the Uptake of Biofuels Study**

**Vehicle emissions testing to determine the impacts of a 10%  
Ethanol Gasoline Fuel Blend on the Greenhouse Gases  
emitted from the Australian Passenger Vehicle Fleet**

*Report to*

**Department of Environment and Heritage**

**ORBITAL ENGINE COMPANY**

**6<sup>th</sup> April 2004**

## **APACE FINDINGS: 4**

### **◆ DRIVEABILITY and DAMAGE**

#### **Fuel consumption:**

~ increases by 2.6 % for the City and the Highway cycles

#### **Hot and Cold Driveability:**

~ reduces tendency for 'knock' under both hot and cold conditions

#### **Materials compatibility:**

~ no discernible effect on plastic or elastomer materials

#### **Engine wear:**

~ no additional or unusual wear other than that normally expected

◆ **REGULATED EXHAUST EMISSIONS:**

- ~ CO decreases by approximately 32 %
- ~ THC decreases by approximately 12 %
- ~ NO<sub>x</sub> increases by approximately 1 %

◆ **NON-REGULATED EXHAUST EMISSIONS:  
“TOXICS”**

- ~ 1-3 butadiene decreases by approximately 19 %
- ~ benzene decreases by approximately 27 %
- ~ toluene decreases by approximately by 30 %
- ~ xylene decreases by approximately 27 %

◆ **CARBON DIOXIDE**

- ~ net CO<sub>2</sub> emission decreases by up to 7 %  
on full carbon cycle basis



## ◆ GREENHOUSE GAS REDUCTIONS

CSIRO study on Gunnedah shows savings of 12% (E10) which agrees closely with recent most conservative figure of Argonne National Laboratory

## ◆ PHOTOCHEMICAL SMOG - OZONE

Recent CSIRO study shows that even at 100% penetration of E10 effect would be minimal

## ◆ PARTICULATES

Major reductions of fine particles

# Western Research Institute

## *Economic Issues*

- International Context - Oil Situation
- Health and Greenhouse Gas
- Regional and Rural Benefits
- Economic Benefits clearly positive (April 2004 and the government energy policy June 2004)
- No supply constraints/ Investment backlog
- Overseas experience to solve market access

# What has changed since 2003/04?

- The perception of energy security in relation to oil supply globally, and in Australia has changed dramatically with energy security uncertainty replacing confidence in Australia.
- Globally there is widespread uncertainty over the capacity of traditional suppliers to meet rising demand from billion plus people economies (China, India).
- Geoscience Australia estimates that current proven oil reserves will only last 9 years on present use ratios.

- The 2004/2005 oil crises has pushed the price of a barrel of oil past US\$60 per barrel making alternative fuels (ethanol and biodiesel) increasingly competitive with petroleum fuels (petrol and diesel).
- Countries that have developed renewable fuel industries over the past 30 years are producing ethanol at US\$30 per barrel (Brazil) and within US\$40 range in the USA.
- With time Australia is well placed to establish a future renewable transport fuel industry that is competitive with petrol and diesel.

# Cleaner Burning Fuels

- Major Benefits in reducing Greenhouse Gas and Exhaust Emissions = Major Contribution to Global Warming and tailpipe emissions that pose a major risk to public health.
- Ethanol and biodiesel reduce GHG emissions from petrol and diesel – and toxic and cancer causing emissions (particularly PM) from both fuels.
- Petrol and diesel will never be clean fuels, but ethanol and biodiesel can make them cleaner burning fuels.

# GHG Emissions in Australia

- Data flaws in relation to ethanol identified in the 2001 CSIRO comparison of transport fuels study have corrected misconception about the greenhouse benefits of ethanol production in Australia.
- Actual life cycle analysis (LCAs) by industry in Australia have shown the ongoing benefits linked with advances in ethanol production technology.
- Current CSIRO studies in Australia and by the International Energy Agency (IEA) and US Government Scientific Laboratories show Greenhouse benefits from ethanol exceeding 80% in Australia and elsewhere.

## 2003/04 CSIRO/ABARE/BTRE studies

- Major rises in crude oil prices and flaws in arbitrary assumptions included in the 2003/04 report clearly show that the world has moved in a different direction to that predicted in the reports.
- Economic and balance of payments assumptions were a prominent example.

# Transport fuels health impacts

- The body of scientific evidence showing the public health costs and risks associated with petrol and diesel emission in older and modern vehicles has grown significantly since 2003.
- Introducing ethanol (E10) and biodiesel (B20) blends with petrol and diesel could save Sydney alone \$900 million per year in health costs.
- Clearly the 2003 estimate of \$3 million in health saving in Sydney was a gross understatement.



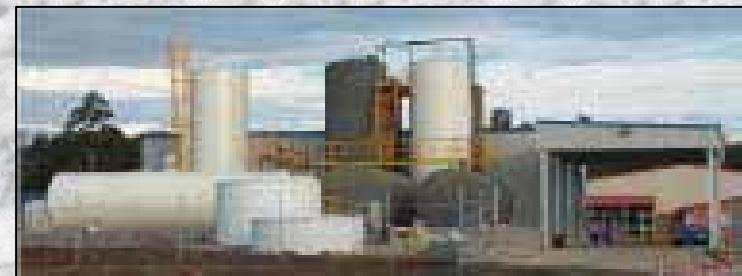
# Vehicle Drivability and Operability

- Over the past 13 years there have been no demonstrated drivability or operability issues associated with the use of E10 in the Australian vehicle fleet.
- Both the 1997/98 Commonwealth funded E10 trials (ERDC Project Nb 2571) and the Orbitol Engine 2004 trials of E10 and E20 are in remarkable general agreement on this issue.
- Beer (CSIRO) has noted that the fuel economy of 100% ULP and E10 blend are substantially equal, while the use of theoretical energy values of 0.68 for ethanol discriminated against, and puts zero value on ethanol as an oxygenate and octane enhancer.



## Biodiesel Industries Australia Pty Ltd Overview of Activities

- Inspired by 2001 Election Promise
- Opened 2003 By Minister McFarlane
- Sales in 3 States
- Tripled Capacity in 2005
- Received 25% of BCGS June 05
- Set very conservative targets due to market uncertainty.
- Would support some form of mandate or regulated use.



# Dalby Bio-Refinery Limited

## Dalby Bio Refinery Project Summary

- Commenced early 2001
- Committed following Sept 2001 Government's policy announcement of 350mlpa by 2010
- Capacity – 80mlpa at full production
- Location – Dalby SE Qld – 215 km west of Brisbane
- Construction – Leighton contractors
- Feedstock – Sorghum and wheat
- 72,000 tons of high value animal feed Dried Distiller's Grain
- Technology – Delta T Corporation, USA
- Development Approval secured
- Promoters have over 25 years industry experience as independent fuel distributors

All practical requirements completed to enable construction to commence.

# Australian Ethanol Limited

- Background to Australian Ethanol
  - Listed Public Australian Company
  - Over 2000 Shareholders
  - Five Point Corporate Strategy
- Planned Australian Projects
  - Swan Hill
  - Coleambally
  - Forbes
  - Mossman
  - Lake Grace



# Australian Ethanol Limited

- Swan Hill Ethanol Project
  - Capital cost \$80 million
  - Staged to 90ML per annum
  - Feedstock Corn, Wheat, Barley, Sorghum
  - 250,000 tonnes per annum grain
  - Wet Distiller's grain 80,000 t/yr
  - Carbon strategy
  - 45 direct, 120 indirect jobs
  - \$50 million per annum into regional economy
- Definitive Feasibility Study complete January 2005
- Project Finance
  - Extensive discussion debt and equity groups
  - Debt not possible without firm offtake

