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The Secretary
Senate Rural and Regional Affairs and Transport
Parliament House
CANBERRA
ACT 2600

Dear Sir/Madam

Inquiry into Australia's future oil supply and alternative transport fuels

Australia, as part the global economy, is heavily reliant on imported fossil-fuel oil for energy as a key driver of the national economy. The expanding economy relies on expanding energy inputs, including fossil-fuel oil.

Worldwide the increasing demand for oil is forcing up the price of oil. Economic sustainability with rising prices is questionable. Environmentally, the already dangerously high and rapidly increasing levels of atmospheric Carbon Dioxide from the burning of fossil fuels is widely considered the most immediate threat facing humanity. (Refer to UK Prime Minister Tony Blair, 30th January, 2006, cited below).

The burning of fossil fuel oil is a major contributor to Greenhouse, and with peak oil production, must be considered jointly in the context of sustainability of the global environment and economy. There are profound implications for both. The age of cheap oil is over. Realignment of societies and the systems on which they depend are widely considered inevitable. Sweden is an environmentally progressive nation which has a target to totally end dependency on oil by 2020.

For example, Tasmania is geographically isolated from mainland Australia and is remote from markets for premium seafood. Export of perishable seafood product relies on air-freight. QANTAS CEO, Geoff Dixon blamed fuel price increases of 48% for the 10% profit slump, on 16th February, 2006. Seafood sector profitability is being severely eroded. (Aviation sector emissions also contribute significantly to Greenhouse).

Expanded Australian Government initiatives to promote alternative transport technologies, including fossil-fuel oil import replacement biofuels, are imperative. Terrestrial and marine sources of biomass for biofuels production should be given priority national focus. Local and regional production of biofuels is needed.

The Australian Government's "Climate Change Risk and Vulnerability – Promoting an efficient adaptation response in Australia" Report, March, 2005: "It should be noted that much of the climate change expected over the next 30 to 50 years will be driven by emissions that have already taken place." (Page vii).

Intergenerational environmental equity is enshrined in the Intergovernmental Agreement on the Environment, 1992. It is paradoxical that environmental protection and biodiversity conservation management, which aims to maintain ecosystem integrity, is not focused on greenhouse gas emissions, but on issues such as the application of the "precautionary principle" to the marine environment (by way of declaring marine protected areas) while the oceans are turning acid from CO₂ saturation – Intergenerational Environmental Equity?

On 30th January, 2006 British Prime Minister Tony Blair, in the foreword to a major climate report published by the UK Department of the Environment: "Avoiding Dangerous Climate Change," said it was clear that the risks of climate change may well be greater than we thought"....."It is now plain that the emission of greenhouse gases, associated with industrialisation and economic growth from a world population that has increased six-fold in 200 years, is causing global warming at a rate which is unsustainable".

Also on 30th January 2006, the chief scientist of energy giant BP, London-based Steven Koonin, said in an editorial published in the journal "Science" that biofuels could supply 30% of global demand.

Reference is made to "National Geographic," August, 2005. Michael Pacheco, Director of the US National Bioenergy Centre, part of the National Renewable Energies Laboratories, stated: "We're going to need everything we can get from biomass, everything we can get from solar, everything we can get from wind....and still the question is, can we get enough?" (Page 7)

Also the Special Issue Scientific American, Volume 293, Number 3, "Crossroads for Planet Earth" editorial states: "As described in this special issue, the world is now undergoing a remarkable set of transitions."

(There is an inevitable, decades long, transition to renewable energy technologies).

On "Energy", Amory B Lovins (Head of the Rocky Mountains Institute and advocate of a hydrogen economy) discusses inexpensive energy efficiency: "Inexpensive efficiency improvements and competitive renewable sources can reverse the terrible arithmetic of climate change which accelerates exponentially as we burn fossil fuels faster," and "the growth of renewables has routinely outpaced GDP; worldwide, solar and wind power are doubling every two and three years respectively. If both efficiency and renewables growth is faster than the economy, the carbon emissions will fall and global warming will slow – buying more time to develop better technologies for displacing remaining better fossil fuel use, or to master and deploy ways to capture combustion carbon before it enters the air."

Nuclear power is also discussed in the context of energy efficiency. "In contrast, nuclear power is a slower and much more expensive solution. Delivering a kilowatt hour from a nuclear plant costs at least three times as much as saving one through efficiency measures." (Page 59)

The same rationale applies to oil as transport fuel.

Considering that the earth is finite, will not grow and is a closed system, with solar energy being the only constant external input (subject to the laws of thermodynamics), trusting in carbon capture technologies which have yet to be developed, against a background of a human population which is projected to

increase from the present 6.5 billion to between 9 and 10 billion in 2050 (while pursuing expanding fossil fuel based policies of economic growth), seems rash.

The Australian Government's "Climate Change Risk and Vulnerability – Promoting an efficient adaptation response in Australia" (referred to above)..... "explores the risks to Australia from the impacts of climate change over the next 30 to 50 years." (Page iii) What about the 50 years after?.....

CO2 emissions in Australia are expected to double by 2050 (ABARE), while the Prime Minister's Office on January 12th, 2006 stated that the Asia Pacific Partnership in Clean Development and Climate would lead to 20% less greenhouse gas emissions than would otherwise be the case.(AP6).

"E – The Environmental Magazine," January/February, 2006 has a feature article, which considers peak oil production, current and projected demand, and discussion of reserves:

"Exploration will have to be very productive indeed to keep up with world demand, which the (US) Defence Department's Energy Information Administration (EIA) believes will grow from 78 million barrels per day in 2002 (84 million – 2005) to 118 million barrels per day in 2025.

Are we on track to meet the growing demand? No says a report by L B Magoon for the US Geological Survey (USGS). "Technology is great," he wrote, "but it can't find what's not there. In the last five years we consumed 27 billion barrels of oil a year, but the oil industry discovered only 3 billion barrels a year. So only 1 barrel was replaced for every 9 we used! Annual oil discoveries have been declining since 1965". (Page 28).

US Oil industry assessments are optimistic and the approach is business-as-usual and "that neither renewable energy nor global warming will be a factor." (Page 33).

Assuming that biofuels can meet 30% of global fuel demands, a range of constraints will have to be overcome. These include physical, technological, biological, climatic and political factors – political will is necessary for change.

The availability of arable land is a major factor to be considered. Michael Pacheco, quoted above (pages 22/23): "Biofuels are the easiest to slot into the existing fuel system". The article in "National Geographic" says: "What limits biomass is land. Photosynthesis, the process that captures the sun's energy in plants, is far less efficient per square foot than solar panels, so catching energy in plants gobbles up more land. Estimates suggest that powering all the world's vehicles with biofuels would mean doubling the amount of land devoted to farming". Agriculture is energy intensive.

In the US in early 2005 there were 81 ethanol plants in 20 states, with an additional 16 under construction. (Thirty million tons of corn were used in 2005 for the production of ethanol. Four billion US gallons is the target for 2006) – Australia's near record 2005 wheat crop was 25 million tonnes.

Alternative technologies for ethanol production and bio-diesel production are being developed. President George W Bush on the 1st February, 2006 in his "State of the Union Address" referred to "America's Oil Addiction". There is to be a 22% funding increase for US renewable energy research.

Corn ethanol is energy-intensive to produce, but it has been reported that technological breakthroughs have made large scale cellulosic ethanol production feasible. Energy-efficient ethanol needs carbon standards.

(It is noted that Australia is heavily dependent on imported fossil fuel oil for motive energy, that consumption of diesel fuel, for example, is some 14 billion litres per annum and also that the national renewable energy target for biofuels in 2010 will meet less than 1% of requirements. Consumption of diesel fuel on King Island, in Bass Strait, is some 10 million litres per annum, with high demands from other remote regions).

On 7th November, 2005 it was announced that as part of its (US) 118 billion dollar renewable energies investment in the next 15 years China will develop biomass energy and hopes to replace 10 million tons of petroleum with renewable energy annually.

The Australian Government has only seriously attempted to develop a biofuels sector in the past year and Australia is 30 years behind Brazil – 4.3 million vehicles using hydrated ethanol (95.5% ethanol by volume) and another 17 million vehicles using ethanol blends. (40% of Brazil's fuel is ethanol). The Brazilian experience has relevance to the development of ethanol production in Australia.

Rueters, on the 9th February, 2006 reported on ethanol production in Brazil, from sugar-cane. "Flex-fuel" vehicles which can run on varying blends of ethanol and petroleum were discussed. Brazil's ethanol exports in 2005 reached 2.4 billion litres. Drought is a risk and international sugar futures can tend to attract mills towards sugar production, diverting sugar from ethanol production. Drought, attributed to climate change, affected the Amazon basin in 2005.

"There is huge demand for direct shipments of anhydrous ethanol from Brazil to the US even with the 54cent (per gallon) tariff." (3.785 litres per US gallon). The taxpayers are funding ethanol production, not the motorists, in the US.

Production of biofuels (ethanol and biodiesel) exceeded 33 billion litres in 2004, when ethanol displaced some 3% of the 1,200 billion litres of gasoline, world wide. The demand for transport fuels is gargantuan, and increasing.

Palm and soya oil are increasingly being utilised as "green energy" sources but with associated environmental problems ("New Scientist", 19th November, 2005 (page 19 refers). Demand is encouraging the destruction of tropical rain forests for palm and soya oil production. Soya is cited as the largest single cause of rain forest destruction in the Brazilian Amazon. Europe is turning from domestic canola oil because of food market demands which have raised the price. "This has led fuel manufacturers to opt for palm and soya oil instead. Palm oil prices jumped 10% in September (2005) alone and are predicted to rise 20% next year, while global demand for biofuels is now rising at 25% a year."

Powering electricity generation plants in First World countries with "green" palm oil is exporting environmental problems to the Third World.

At the December, 2005 Montreal conference on the Kyoto Protocol, a coalition of rain forest nations, including Brazil, Costa Rica and Papua New Guinea, saw passage of a plan to preserve rain forest in exchange for international carbon credits. Australia is not a signatory to the Kyoto Protocol.

Deforestation world-wide accounts for about 25% of the world's greenhouse gases. Forestry and land use patterns in Australia may also be unsustainable with climate change.

Of concern is a first model of calculations for the future of the climate presented by the Max Planck Institute on 29th September, 2005. "According to the calculations in the next 100 years, the climate will change more than ever". Of particular concern, the project leader of the model calculations said: "Almost everywhere on earth, the forestry industry will have to husband different types of trees than it has until now". Also included are regional results and the effects on land and sea ecosystems, hydrology, air quality and socio-economic systems. The global activities of humans are also adversely affecting the oceans.

The UK Royal Society, on 29th June, 2005 released the report on "Ocean acidification due to increasing atmospheric carbon dioxide".

"The oceans are currently taking up about 1 tonne of CO₂ associated with human activities per year for each person on the planet. (IPCC 2001). Almost half of the CO₂ produced in the last 200 years by burning fossil fuels and cement manufacture has been absorbed by the oceans. This has already resulted in a change to ocean chemistry reducing surface seawater Ph by about 0.1 units, which corresponds to an increase of about 30% in the concentration of hydrogen ions". (Page 13) The Southern Ocean is predicted to be worst affected.

Royal Society Chairman John Raven called on the July, 2005 meeting of the G8 Nations to commit to "decisive and significant" action to cut greenhouse emissions. "Failure to do so may mean there is no place in the oceans of the future for many of the species and ecosystems we know today".

The United Nations has expressed similar grave concerns. The UN Millennium Ecosystem Assessment Report (4th April 2005) reports "that approximately 60% of the ecosystem services that support life on earth – such as fresh water, capture fisheries, air and water regulation and the regulation of regional climate, natural hazards and pests – are being degraded or used unsustainably. Scientists warn that human activity is putting such pressure on the planet that its ability to sustain future generations cannot be guaranteed".

Additionally, soil organic carbon loss (SOC) was reported on in "Nature", Vol 437, 8th September, 2005. Soils "store the equivalent of about 300 times the amount of carbon presently produced annually through the burning of fossil-fuels". It now appears that SOC is not inert and is being released due to global temperature increases and patterns of land use.

"They (Bellamy et al) find SOC losses of an alarming magnitude." Annual losses for the entire United Kingdom are estimated at 13 million tonnes, which is equivalent to 8% of UK emissions of CO₂ in 1990, "and is as much as the UK reduction in CO₂ emissions achieved between 1990 and 2002" (12.7 million tonnes of carbon per year).

These losses thus completely affect the past technological achievements in reducing CO₂ emissions, putting the UK's success in reducing greenhouse-gas emissions in a different light....."

The cultivation of natural ecosystems results in degradation of soil fertility, intensified soil disturbance and reduced carbon input, causing loss of SOC (Page 205). Agricultural production of crops for biofuels needs to be carbon-audited.

Global production of methane and CO₂ are linked. Maria Gilardin, in a radio broadcast on 21st September, 2005: "Apocalypse Now – How Mankind is Sleepwalking to the End of the Earth," said: "And as irrecoverable time passes, more bad news of ecological land slides emerges. In early August 2005 the "New Scientist" reported that in Western Siberia, a permafrost area, the size of France and Germany combined, is thawing for the first time since the Ice Age, 11,000 years ago. What was until recently an expanse of frozen peat is turning into a broken landscape of mud and lakes, some more than a kilometre across. The area's peat bog contains an estimated 70 billion tons of methane, a greenhouse gas 20 times more potent than CO₂, which, if released, could dramatically increase the rate of global warming. (Similar concerns relate to 200 billion tonnes of carbon estimated likely to be released from the Canadian tundra – SBS 18/02/06).

Even in a best-case scenario were the methane to be released slowly over a period of 100 years it would effectively double atmospheric levels of the gas, leading to a 10% to 25% increase in global warming, said scientists at the Hadley Centre in Exeter, UK".

Worldwide there are 1.4 billion head of cattle, each producing 400 – 500 litres of methane per day and accounting for some 14% of methane emissions. Methane and CO₂ emissions are inextricably linked. Australia is a major cattle producer. The cattle industry is heavily dependent on transport fuels.

In Australia, CO₂ emissions per head of population are 27.6 tonnes per annum (Australian Greenhouse Office, 2002), which is increasing. World Bank data shows 20 tonnes per capita per annum, for the US; 8 tonnes for the European Union; 2 tonnes for China and zero for Nigeria (which produces 2.5 million barrels per day and where the US sources oil). (see above)

The Australian Greenhouse Office's National Summary (2002) states (page3) that ".....the land use and forestry sector was a net sink in Tasmania (for example) – and reforestation, both as plantations and revegetation, has been increasingly contributing to this sink since the 1990 base line year."

It is noted that per head of population, Tasmania is rated as having the lowest per capita CO₂ emissions per annum, at 15.2 tonnes. (23% was attributed to transport and 28% to agriculture) (c.f. European Union). The efficient use of energy is seen as critical Australia-wide.

Also of concern, another first research paper from the Max Planck Institute indicates that, previously unknown, aerobic production of methane by plants is of the order of 10% to 30% of global emissions. This was reported in "Nature" on Jan 12th, 2006. In their investigations, scientists found that living plants release some 10 – 1000 times more methane than does dead plant material.

"Following up on this discovery the scientists will now continue laboratory work, as well as field and remote sensing studies, to better quantify the strength of these methane emissions. A related exciting question is which role the biosphere has played in methane production in the history of the earth, and what kind of influence rising global temperatures and carbon dioxide concentration have on the production of methane from plants. Answers to these questions are important for understanding the feedback mechanism between climate change and greenhouse gas production."

Regarding Greenhouse the question arises: Do forestry and agricultural land use practices sequester CO2 in sufficient amounts to offset soil organic carbon loss, soil degradation and also methane production from plants? (What is the result, in these terms, of the production of land-based crops, including forestry and the crops used for the production of biofuels, now and into the future?)

Although currently forestry and crops, including those for biofuels, are considered to be sinks for CO2, should a comprehensive audit of the relationship between CO2 sequestration and the production of methane by plants be undertaken?

The cost of transport fuels is also of major concern to operators. The Australian Long Distance Owners and Drivers Association claims that 6,000 sub-contractors in Australia have gone broke since April, 2005, attributable to rising fuel costs. (What are the implications for logging contractors, for example?)

"Hybrid" vehicles (internal combustion/battery-electric) are of interest to manufacturers and governments. Bio-diesel/diesel/hydrogen and hydrogen fuel cell research at the School of Engineering, University of Tasmania, has national transport implications. Hydrogen fuel-cells (the fuel-cell chemically converts hydrogen to electricity) have the potential to replace the internal-combustion engines, with improved performance, fuel economy, range and emissions. Water is the by-product.

Also, on 27th January, 2006 it was reported in "The Times" that "Foresight,".....the (UK) Government's science think tank consulted 300 transport experts when drawing up its vision of how travel will have changed by 2005. Its report concludes that the growing demand for greater personal mobility is unsustainable and based on false assumptions".

"Foresight also calls for debate on the more radical option of giving each individual a carbon allowance which would apply to all their activities, not just travel."

"Steven Ladyman. The UK's Transport Minister, is chairing a group that will assess progress towards resolving the issues raised by the report. "We have two choices," he said, "we can stumble into the future in the hope it turns out right, or we can try to shape it".

These are also Australia's two choices,

Yours sincerely,



John C Evans