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SENATE

RURAL AND REGIONAL AFFAIRS AND TRANSPORT REFERENCES COMMITTEE

Reference: Australia's future oil supply and alternative transport fuels

FRIDAY, 12 MAY 2006

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SENATE

RURAL AND REGIONAL AFFAIRS AND TRANSPORT REFERENCES COMMITTEE

Friday, 12 May 2006

Members: Senator Siewert *(Chair)*, Senator Heffernan *(Deputy Chair)*, Senators McEwen, Nash, O'Brien and Sterle

Participating members: Senators Abetz, Adams, Allison, Bartlett, Bernardi, Boswell, Brandis, Bob Brown, George Campbell, Carr, Chapman, Colbeck, Coonan, Crossin, Eggleston, Chris Evans, Faulkner, Ferguson, Ferris, Fielding, Hutchins, Joyce, Ludwig, Lightfoot, Lundy, Ian Macdonald, Sandy Macdonald, Mason, McGauran, McLucas, Milne, Murray, Nettle, Payne, Polley, Robert Ray, Santoro, Stephens, Trood, Watson and Webber

Senators in attendance: Senators Chapman, Heffernan, Milne, Nash, O'Brien, Siewert and Stephens

Terms of reference for the inquiry:

To inquire into and report on:

Australia's future oil supply and alternative transport fuels, with particular reference to:

a. projections of oil production and demand in Australia and globally and the implications for availability and pricing of transport fuels in Australia;

b. potential of new sources of oil and alternative transport fuels to meet a significant share of Australia's fuel demands, taking into account technological developments and environmental and economic costs;

c. flow-on economic and social impacts in Australia from continuing rises in the price of transport fuel and potential reductions in oil supply; and

d. options for reducing Australia's transport fuel demands.

WITNESSES

Committee met at 9.04 am

CHAIR (Senator Siewert)—I declare open this meeting of the Senate Rural and Regional Affairs and Transport References Committee. This is our second hearing. The Senate has referred to the committee the matter of Australia's future oil supply and alternative transport fuels, with particular reference to—and I will summarise these points—projections of oil production and demand in Australia and globally and the implications for availability and pricing of transport fuels in Australia; the potential of new sources of oil and alternative transport fuels; flow-on economic and social impacts in Australia from continuing rises in the price of transport fuel and potential reductions in oil supply; and options for reducing Australia's transport fuel demands. The committee is now due to report on 19 October—the Senate extended our time to report yesterday.

These are public proceedings, although the committee may agree to a request to have evidence heard in camera or may determine that certain evidence should be heard in camera. I remind all witnesses that in giving evidence to the committee they are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to a committee. If a witness objects to answering a question, the witness should state the grounds upon which the objection is taken and the committee will determine whether it will insist on an answer, having regard to the grounds which are claimed. If the committee determines to insist on an answer, a witness may request that the answer be given in camera. Such a request may, of course, also be made at any other time.

If Commonwealth or state officers are to give evidence, any claim that it would be contrary to public interest to answer a question must be made by a minister and should be accompanied by a statement setting out the basis for the claim. For Commonwealth or state officers the Senate has resolved that an officer of a department of the Commonwealth or a state shall not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions asked of the officer to superior officers or to a minister. This resolution prohibits any questions asking for opinions on matters of policy and does not preclude questions asking for explanations of policies or factual questions about when and how policies are adopted.

[9.07 am]

FISHER, Dr Brian Stanley, Executive Director, Australian Bureau of Agricultural and Resource Economics

LOVE, Mr Graham, Manager, Energy Projections and Analysis Section, Australian Bureau of Agricultural and Resource Economics

PENM, Dr Jammie, Senior Analyst, Australian Bureau of Agricultural and Resource Economics

SCHNEIDER, Ms Karen, Acting Deputy Executive Director, Australian Bureau of Agricultural and Resource Economics

FOSTER, Dr Clinton Bruce, Chief, Petroleum and Marine Division, Geoscience Australia

Le POIDEVIN, Mr Stephen Robert, Senior Reservoir Engineer, Geoscience Australia

WRIGHT, Mr Denis James Davern, Chief Petroleum Engineer, Geoscience Australia

CHAIR—Welcome. Would you like to make an opening statement?

Dr Foster—I will introduce Geoscience Australia and our roles in petroleum. Geoscience Australia is a prescribed agency within the Department of Industry, Tourism and Resources. It is a national geoscience and spatial information agency and our activities cover three broad areas—onshore, offshore and spatial information—within three divisions: Minerals, Geospatial and Earth Monitoring, and my own division, Petroleum and Marine.

The division's marine and coastal activities provide data for technical information, advice, research and maritime boundary definition under the UN Law of the Sea, regional marine planning and environmental management. With respect to petroleum, the division includes amongst its many activities the production of the annual publication *Oil and gas resources of Australia*, which is a national inventory of the upstream Australian petroleum industry. It is available free of charge on our website. It includes resource estimates of crude oil, condensate, LPG and natural gas, coal bed methane as well as forecasts of future production and estimates of undiscovered resources. Geoscience Australia also produces estimates of resources of brown and black coal and shale oil, which are published in a web based publication known as *Australia's identified mineral resources* and these estimates are relevant to the production of alternative fuels from these minerals.

The division also provides technical advice to the government on the administration of the Petroleum (Submerged Lands) Act, and this is in respect of the release of exploration acreage, the award of exploration permits, the grant of production and pipeline licences and the award of retention leases. It also provides advice on matters relating to carbon capture and storage, and it is a major geoscience contributor to the Cooperative Research Centre for Greenhouse Gas Technologies, or CO2CRC. Through geoscientific studies in my division, including the

acquisition of new data which arises from a four-year program commenced in May 2003, the division provides precompetitive information to industry about petroleum prospectivity of selected offshore sedimentary basins of Australia. These studies underpin the annual acreage release areas within the Australian government's marine jurisdiction.

With your permission, Chair, I would like to table some overhead transparencies that relate to our submission and briefly refer to them. They further demonstrate what I have said in relation to petroleum.

CHAIR—So, instead of looking at an overhead presentation, we are looking at the paper version?

Dr Foster—Yes.

CHAIR—Okay.

Dr Foster—They are conveniently labelled on the upper right, so you can see which one I am referring to. I direct your attention to the first one: Australia's sedimentary basins and exploration and development wells. Fewer than 9,000 petroleum exploration and development wells have been drilled in Australia to date. By world standards this is quite low. The wells are indicated by red dots, and they are mostly grouped in the few petroleum provinces. You would be aware, of course, of the Gippsland Basin province and the Carnarvon Basin, and last week offshore oil has started to be produced from the Perth Basin in Western Australia. Despite the highly localised drilling in some of these areas, potential does also exist in these well discovered areas. But, as you can see, many of the offshore areas remain largely underexplored, and they are the areas in grey. Priority areas in offshore frontier basins in which Geoscience Australia is conducting its current four-year program are shown in the following overhead, No. 2, and they will be discussed a little later.

It is perhaps useful to have a look at overhead 2, which shows crude oil volumes. The first major crude oil province discovered in Australia was in the Gippsland Basin, in offshore Victoria. This region has provided 66 per cent of the total Australian crude oil production and still contributed 23 per cent of crude oil production in 2004. The Gippsland Basin, however, has been overtaken as a major crude oil production region by the Carnarvon Basin, which contributed about 56 per cent of total production in 2004. Other major crude oil production areas are the Bonaparte Basin to the north, with 15 per cent, and the Cooper and Eromanga basins onshore in southern Australia and Queensland, which account for four per cent of production. You can see the millions of barrels produced in the lighter green and the millions of barrels remaining. The areas in blue are the priority areas where research is being undertaken by Geoscience Australia.

Turning to overhead 3, we look at the condensate volumes by basin. Australia produces liquid fuel in the form of condensate from gas reservoirs. Condensate is an oil like liquid that separates from gas during production. So you have to start producing gas to get access to the condensate. Currently this provides about 25 per cent of the total liquid fuel production, and the major producing area is in the Carnarvon Basin in Western Australia, which accounts for about 77 per cent of production. The Gippsland Basin would account for approximately 17 per cent.

We point out that there are also giant undeveloped condensate-bearing gas discoveries in the Browse Basin. That is indicated on the overhead. Production is planned within the next decade. In 2004 Australia produced 150 million barrels of crude oil and 50 million barrels of condensate. The current demand has been estimated by ABARE to be about 270 million barrels.

If we turn to overhead 4, we can look at crude oil volumes and numbers of discoveries by year. This overhead shows in green the total number of discoveries of crude oil over time. You can see that we have made about 450 discoveries over time. The total volume of crude oil discovered each year is shown in orange. You can see that there were some excellent years around 1967 or 1968 in the Gippsland Basin and, indeed, large discoveries in the Barrow sub-basin.

From this overhead you can see that the total volume of discovered oil has declined significantly after the Gippsland Basin in the late 1960s and early 1970s. Improvements in pre-drill resolution and the advent of 3D seismic assisted in some better discovery rates in the 1990s. There were, of course, as I mentioned earlier, a number of giant gas discoveries outside the Gippsland Basin from the 1970s onwards. They have an impact on the condensate levels.

If we look at overhead 5, Crude Oil and Condensate Production Rate, we can see that Australia's historical crude oil production has been maintained at rates of above 350,000 barrels a day since 1973. Gas production has also increased with the sale of LNG. You can see that condensate production rates of above 100,000 barrels a day have been in place since 1996. You can see a number of high points in production—for example, in 1985 and 2000—which are marked by blue dots. In 2000 there was a production of 732,000 barrels a day from the Laminaria field when the Laminaria field came on board—that is, the Coralina-Laminaria field. A new high point should be repeated in 2007, with production from the Carnarvon Basin coming onstream.

Overhead 6 shows crude oil reserve changes through time. We can see that the contributions of the more recent discoveries, while very useful, have only served to slow rather than reverse the overall decline in remaining reserves. In the darker green area you can see that the contribution of seven major fields has not been matched by the production from 185 other fields. You can look at the projected decline curve from the Gippsland and Barrow basins there.

It is evident that a new petroleum province like the Gippsland Basin is required to be found if we are to reverse this trend. The job of my division is to provide that pre-competitive data in underexplored offshore basins of Australia to attract investment so as to help find that new province. I have included in overhead 7 a summary, which I thought you might find useful, of oil resources and possible future additions to resources. I do not intend to read through those, but they are available as a summary of our agency's work.

Turning to overhead 8, I would like to look at the major petroleum basins and areas of interest. Australia has a number of potentially prospective petroleum basins and areas currently under assessment. The key producing areas are shown in green and the frontier areas being studied by the division are shown in yellow. I refer to the areas of the Bremer Basin, the Naturaliste Basin at the corner of south-west Western Australia, the Yampi and Ashmore Shelf area, the Arafura Sea off the Northern Territory, and the Capel, Faust, Gower and Fairway basins 800 kilometres east of Brisbane.

To date, six acreage areas have been released for uptake. The Bremer Basin was studied by Geoscience Australia in 2004-05 and released for application for permitting in 2005. Applications closed 20 April 2006 and we await the results of that competitive work bidding program for people to investigate this completely new area. For the Arafura Basin, four areas were released last week at the Australian Petroleum Production and Exploration Association meeting and those areas will close in a year's time. Again, they will be open for work bidding programs.

The other areas that you see—the Yampi and Ashmore Shelf areas—have had little exploration and in June this year a marine survey will take place to look for indications of hydrocarbon on the seabed and the information will be put into a package of information for industry. The Capel, Faust and Gower basins area will undergo seismic acquisition programs late this year or next year.

If we turn to overhead 9, we can see the forecasted crude oil plus condensate production rate—and this is important—from known basins. Looking forward, Australia's crude oil and condensate production rate is expected to reach another production high point in 2007-08 in the P10 scenario. P10 means that there is 10 per cent probability of exceeding that point. This overhead shows the decline under three scenarios. The P10 scenario, as I mentioned, has a 10 per cent probability of production exceeding that rate and should be seen as the most optimistic case. P50 has a 50 per cent probability of occurrence and is the most likely case and the P90 case has a 90 per cent probability of occurrence and represents the most conservative case.

The three curves include estimates of production from currently producing fields, fields likely to enter production and estimates of production for fields likely to be discovered and brought into production within the time frame of the forecast, which is about 15 years. The estimates of production from as yet undiscovered fields are generated by a detailed analysis of the geology and current trends in drilling patterns and discoveries, and so we do not anticipate production from new petroleum provinces because we do not have a drilling history. Other additions to the production rate can come from better than anticipated field performance or reserves growth. This too has not been included in the estimates but it should be noted that the scope for reserves growth is greatest in large fields early in their production life.

Finally, I would like to turn to the last slide, showing Australia in the world context in terms of the alternative fuels mentioned in our submission. This overhead simply shows Australia's share of world resources and production in crude oil, gas, black and brown coal. Gas and black and brown coal may be used in the future to produce the substitute fuels that we list. Geoscience Australia of course is not an expert in this; we simply list them.

CHAIR—I propose we hear from ABARE and then we open up to questions.

Dr Fisher—I will introduce my team. I have with me Ms Karen Schneider, my deputy director. For the purposes of today Karen is the leader. We also have with us Graham Love and Jammie Penm. Karen will make our introductory statement.

Ms Schneider—In the submission that we provided to the committee, we took the approach of summarising some of the key results from five pieces of work that we have done on the issues of relevance to the committee. It is work that we have done over the past 12 to 18 months. The

reports we have provided include the *Energy outlook to 2011*, which we released in the March quarter this year in our journal *Australian Commodities,* and the long-term projections for Australian energy production to 2030, which we released last year in October. We included our report on the viability of biofuels production, which was a report commissioned by the Prime Minister's task force on biofuels. It was made available last year in September. We have also provided two reports that we have done on energy security in the APEC region. They were commissioned by the APEC Energy Working Group and were also released last year, in June and October. We provided those five documents as attachments to our submission. All of them are publicly available from our website with the exception of the biofuels report, which is included as an appendix in the biofuels task force report and is available publicly on the website of PM&C.

I will very briefly summarise some of the key points from those reports that are related to your subjects of interest. On future oil supply, demand and prices, we note in the submission that Australian domestic consumption of oil and refined petroleum products is likely to grow more strongly than domestic production of oil over the long term, and that means that Australia's self-sufficiency in petroleum products could fall. It is currently at around 70 per cent and, by 2030, we are forecasting it might be down to around 50 per cent. We also note in the submission that world oil prices are currently relatively high in nominal terms but still lower in real terms than they were during the oil price shock of the late seventies and early eighties.

We also note some of the analysis that we have done in ABARE and also by other agencies internationally, including the International Energy Agency and the United States Energy Information Administration, which suggests that adjustments to global oil demand and supply in response to the current higher oil prices could result in some easing in those high oil prices over the medium term. Barring unexpected disruptions to physical supply, Australian consumers can continue to have access to domestic and imported oil at prevailing world prices.

On the subject of new sources of oil and alternative transport fuels, we note in the submission that, although much of Australia's oil production is currently sourced from mature oil and gas provinces, more than half of the offshore basins that shows signs of petroleum potential remain unexplored. That is an issue that GA has addressed and that is their area of expertise. We note the current high oil prices could stimulate additional exploration, which would eventually result in additional new production in Australia. Apart from that continued development of offshore resources, we refer to other technologies—for example, gas to liquids technologies—that offer another avenue of producing liquid fuels in Australia. Technologies also exist for producing liquid fuels from coal and from gas. Some countries have either begun construction of coal to liquids plants or are devoting resources to studying the commercialisation of these technologies.

In Australia the main alternative fuel is LPG. That currently supplies around six per cent of our transport fuel requirements. Other alternative fuels, such as compressed natural gas and biofuels, contribute only around one per cent of total transport supplies. In the research we undertook for the biofuels task force, our conclusions were that the production of biofuels, such as ethanol and biodiesel, should be commercially viable at present under current policy settings, given current world prices for oil.

We have not done any specific detailed research on the subject of economic and social impacts on Australia from rising oil prices but, as part of one of our commissions from the APEC energy

working group last year, we were asked to examine the consequences of energy supply disruptions, and the higher fuel prices that could result from those disruptions, on APEC economies generally. The main message from that analysis was that supply disruptions could result in some reduction in potential economic growth in the oil importing countries in APEC, but, on the other hand, would boost economic growth in the oil exporting APEC economies. We used an economic model to look at that situation and we showed that the impact on Australia's economic growth would be much smaller than other economies within APEC that are more highly dependent on oil imports. It also showed that the adverse effects of any oil price rise on Australia's economy could be much less if we assume that other energy prices, such as of coal and gas, also rose so that Australia's benefit from exporting coal and gas would offset some of the impacts of the higher oil price cost.

We have not specifically examined the options for reducing Australia's transport fuel demands. Again, in the research we undertook for APEC, we explored one hypothetical scenario in which we assumed that between now and 2015—over the next 10 years—20 per cent of all new vehicles sold in APEC would be hybrid vehicles. We assumed that those were 40 per cent more fuel efficient than new non-hybrid vehicles. We made the assumption that that would occur because of the impetus coming from high oil prices. We assumed that world oil prices would reach $85 a barrel in 2006 and would stay there over the period to 2015. Those are purely hypothetical assumptions. They bear no relationship to our forecasts. It was just to examine a particular scenario. That showed that, compared with a situation where there was no increase in those hybrid vehicles, the total consumption of oil in the transport sector grew by about 0.5 per cent a year. That was about two percentage points less than in what we would call our reference case where none of those circumstances were occurring. That is, again, a very hypothetical simulation, but it does indicate the significant potential to reduce the demand for transport fuel through the application of new fuel efficient technologies in the vehicle sector. That is a brief summary of the points made in our submission, so I will leave it there for the moment.

Senator HEFFERNAN—Can I begin by asking someone to explain to the committee the various categories of energies supplied—crude oil, condensate, LPG and natural gas. Give the committee an idea of what we are talking about. Some may not be aware of the break up and differences in how you store them and how you transport them.

Mr Wright—Crude oil is basically the stabilised liquid that comes out of an oil well. When oil is produced from a reservoir, it has gas in solution and LPG in solution. When it comes to the surface under great pressure the gas and the LPG separate off and can be separately recovered. Crude oil is very similar to a heavy fuel oil. Condensate is recovered from a gas well by dropping its pressure. It is a clear, transparent liquid. It has properties similar to crude oil but is not as suitable for use for refining for transport. It is not quite as good a substitute for crude oil and that has relevance because Australia is producing more and more condensate.

LPG, as you all know, is the stuff in barbecue cylinders. That is also significant. There is a total of about two billion barrels of LPG. LPG has slightly lower calorific values, so it will not give you the same energy output as a barrel of crude oil but, nevertheless, it is comparable to crude oil in calorific value. It is low but that is still a lot of resources. Most LPG comes from gas fields. Quite a bit comes from oil fields but probably 90 per cent comes from gas fields.

Finally, natural gas consists of methane and ethane and that is the lighter fraction than LPG. That can either be liquefied and sent overseas to markets that do not have gas or just compressed in its normal form and sent through the pipeline network to domestic markets. Gas has the transportation issue to get it to where the markets are, whereas things like oil are relatively compact and can be readily transported and can give a lot of energy for a small volume of transported fuel.

Senator HEFFERNAN—Does ABARE agree with Geoscience on when we will reach the crossover point between production and demand? Have we come over the top of the hill yet? ABARE figures indicate that we may have topped and we are on the way down the other side. Is there any conflict of ideas or are you firmly of the view that we have or have not reached the peak?

Dr Fisher—I do not think there is any conflict of ideas here, but there is the potential for misinterpretation of the way we deal with our forecasts. I think Dr Foster indicated his forecasts in overhead slide No. 9. First of all, we have a set of probabilities there and then they are based on known production from current fields and current drilling patterns. When we are looking at attempting to make forecasts, we also make some judgments on the basis of what oil prices might be, depending on the extent of exploration in the new basins that Dr Foster was talking about. On the basis of historical production and discoveries, we try to make some projections about what might be there. This is a projection based on our presumption about what future oil prices will be. If we were to see oil prices at $20, which would be at the low end of everybody's expectation over the next 20 years, then we would see much less exploration and therefore fewer discoveries than we might if oil prices were to persist at $70 a barrel, which ABARE would not be projecting either. It would seem to us that $70 would be on the upper end and, say, $20 to $25 would be on the lower end and then we would have to make a judgment about where we might see oil prices going in real terms over the longer term.

Senator HEFFERNAN—For the long-term sustainability of our energy and petroleum supplies does that say that, while ever the price stays high, we will be able to make it last longer because there will be more money put into alternative Prius type cars? Is there some good in the fact that high oil pricing drives other exploration savings?

Dr Fisher—You might be aware of the saying from an old Arkansas agricultural economist: 'If the price of eggs is high enough, even the roosters will start to lay.' On the supply side, clearly high oil prices encourage lots of activity in the exploration sector and drive new technology. My colleagues from Geoscience Australia can talk about the sorts of technologies that have been introduced in recent years—for example, horizontal drilling, enhanced oil recovery—a whole raft of technologies that we did not see 25 years ago. That has expanded reserves quite substantially. If people were to believe that these prices would be sustained then not only would we see massive extra exploration and capital spending in the oil industry; we would also have an enormous incentive to introduce non-conventional oil and other sources of liquid fuels.

For example, at the moment current reserves of crude oil in Saudi Arabia are something of the order of 260 billion barrels, but in Canada we have about the same number of barrels—270 billion—of oil sands. Those oil sands are economic at around $US30 and there is a lot of activity going on now in Canada to explore that supply and bring it into production. And in Venezuela

we have about 270 billion barrels of heavy oil. So, at the sorts of prices we are talking about today, we have enormous extra potential. If you were to move beyond oil, you could probably liquefy coal at $US40 a barrel, and there is quite a bit of coal around.

If your long-term expectation is that oil prices will be sustained at very high levels then you bring in all this extra supply. The reason you do not see that extra supply rushing in today is that effectively people are not convinced that oil prices are going to stay at these levels. If for the sake of the current argument we set aside government policy—that is, if we leave government policy settings as they are in the world today and do not try to anticipate what might happen, for example, on climate change—then basically in the long term you could say that there is a backstop technology, to use the eco-jargon, at about $40 a barrel. That will come from the liquefaction of coal and the production of syncrude from coal. That would lead me to suggest that, if you are looking at long-term real prices of oil over the next 50 years, anybody who calls a price above $40 is not taking account of the bringing into place of the liquefaction of coal. That might be a legitimate call, but that would have to depend on government policy settings changing as a consequence, for example, of greenhouse policy.

Senator HEFFERNAN—The other crossover that I am interested in is the crossover in our balance of payments. I am talking about domestic supply versus importation and the impact of that on the balance of payments—for instance, more use of our gas fields domestically rather than as an export. Have you blokes done much work on that? As a worn-out wool classer and welder, I have often wondered why we are exporting gas to China and Japan and other places at a pretty cheap price per litre. If they can use it over there, why can't we use more of it here? What would that do to the depletion of the field?

Dr Fisher—I guess that comes down to a judgment about what you are best to do with your products. We are a net energy exporter by a long measure.

Senator HEFFERNAN—We are indeed.

Dr Fisher—Particularly when you take into account our uranium exports, we are a huge net energy exporter. Basically, in Australia we have more of this stuff than you can poke a stick at. We have vastly more than we can use over the next several thousand years. So the notion that we should hold it back here and not export it does not make much economic sense to me. It reminds me a little bit of our earlier policies with respect to iron ore, when we were concerned that there might be a small shortage of this product and so we thought we should keep it from North Asia in case we were to run out and need to use it domestically.

Senator HEFFERNAN—In terms of the balance of payments, are you saying that, because we are net exporters of brown coal and other things, whatever the energy price we will always be balancing it off against our exports?

Dr Fisher—Absolutely. The best thing Australia can do is to export the things we have a comparative advantage in and import those things that we do not have a comparative advantage in. One of the things driving the increases in our terms of trade at the moment is that we have been exporting commodities and importing cheap manufactured goods and machine tools from countries like China. That has been a fantastic advantage for Australia over the last 10 years.

Senator HEFFERNAN—So, unlike Sweden, we do not need a future strategy for nil oil use in 20 years time?

Dr Fisher—I think that goes to the heart of a whole lot of other policies. From the point of view of whether we have energy available in Australia, we have vast reserves of energy. Generally, they are substitutable. Obviously, it costs you something in the short term to substitute, as it is not simple to directly change our transport fleet quickly, but over the longer term all of those technologies are available. For example, it is not inconceivable that we will see a huge electric vehicle fleet in Australia, and around the world more generally, in 2050. It is much more likely that we will see a huge electric vehicle fleet in 2050 than we will see a huge hydrogen fuel cell vehicle fleet in 2050. We can generate electricity from a range of fuels and that would give us much more flexibility with our fuel mix than if we were to stick to a petroleum based transport system, for example.

Senator HEFFERNAN—Take modern tractors. I have just bought another tractor. It has double the horsepower of the one that it replaced and it uses less fuel.

Senator STEPHENS—I have a question for Dr Foster as to point 2.2.1 on page 20 of his submission on the potential of new sources of oil to meet demand. Dr Foster, you have some discussion about the introduction of the 150 per cent uplift under the petroleum resources rent tax. First of all, are you aware of any applications for exploration in those designated frontier areas?

Dr Foster—As you would be aware, the program came into being in 2004. Half the designated frontier areas on offer were taken up. This program goes to 2008.

Senator STEPHENS—You also made some comments in your submission about the Bayu Undan and Greater Sunrise fields. Are those two areas part of the frontier areas?

Dr Foster—No, they are not part of the frontier areas.

Senator O'BRIEN—Perhaps you could give us a little more information on the coal liquefaction processes in terms of the energy exchange. Your submission touches upon the relatively high amount of energy that is required to convert coal to oil. I have heard Dr Fisher talking about an effective cost competitiveness at, I presume, $US40 a barrel for oil.

Mr Wright—CSIRO address that in more detail. They will be following us in this session. They have made a very comprehensive comparison of various fuels. The only comment that we would make from our point of view is that coal to oil has been commercial in South Africa during the period of the oil embargo. With the increase in the price of oil, that has been referred to, with a lot of people being interested in the technology that Sasol, the South African synthetic oil company, have with a view to exploiting their expertise in other areas of the world. CSIRO can address that better than we can.

Senator O'BRIEN—Obviously, there is no real prospect of lifting refining capacity in Australia. Dr Fisher, is that a risk for this nation in terms of the capacity to control fuel prices outside this country or are there sufficient competitive sources of fuel for us to be able to rely upon an international market not generating excessive profits for the holders of those resources?

Dr Fisher—Most things that happen in commodity markets in Australia are driven by what is happening in international markets, so those prices cascade back into Australia subject to what is happening with the exchange rate. So the short answer is that we are subject to that market and there is very little we can do to change that. In the short term, it seems to me that there are a number of components to what has been going on in the oil industry at the moment with respect to oil prices. There is certainly a lot of pressure on the demand side, and suppliers have been caught a bit short, frankly, in terms of their expectations of the increase in demand for several energy commodities. I do not think most major suppliers saw this big peak in prices coming and, effectively, none of them have been ready. As a consequence of that, we had used up what excess capacity there was and we have now bumped up against a bunch of constraints, and prices have increased quite substantially.

In addition to that, built into current prices there is effectively a risk premium. You only need to make day-to-day observations about what might be happening in the Middle East, Nigeria or Venezuela. A couple of weeks ago the Bolivian government nationalised their gas industry, and they have announced that similar things will be happening with their oil industry in six months time. All of those sorts of issues add extra uncertainty into the marketplace, so we have a great deal of concern in international energy markets at the moment about risk. Once you bump up against a supply constraint you do not have to take much capacity out of the system to cause prices to spike above the current 73-odd dollars. So I think we are subject to that. There is really not very much that any government can do to isolate itself from that.

I would not wish to comment on government policy, of course, because it is not my role, but in a sense those sorts of interventions are fraught with difficulty in the long term because you take away the incentive. Potentially, if you try and protect consumers from these prices then on the supply side you take away the incentive to do something about the constraints, and on the demand side you take away the incentive to substitute away and moderate consumption. So, while there might be some social reasons, intervening like that is probably bad policy in the long term.

Senator HEFFERNAN—So you think there is no world cartel?

Dr Fisher—Well, there is a group of countries who attempt to—

Senator HEFFERNAN—What I am saying there is this: the banana job in Australia is a tiny little example. If you try to buy a banana, it is very expensive, but at least you can eat an apple. But with oil there is the potential to manipulate the world market. That is why I wondered about our domestic gas supply and why we do not use more of that.

Dr Fisher—In the final analysis, of course, there is this group of countries who attempt to set quotas and extract some sort of rent from the market. Obviously, when oil is in tight supply it is a great time for cartels, because they work very effectively when there is a nice supply constraint. They do not work very effectively when there is plenty of oil around. Similarly, if this particular group were to attempt to continue to hold oil at $70 then they would be sowing the seeds of their own destruction, basically, because they would encourage an enormous potential amount of supply in from other sources, such as coal to liquids. That technology is actually on the shelf. If the expectation were out there, as I said before, that we were going to see it persist at $70 then there would be a lot of rent to be had. If my earlier estimate is correct, at $40 that is $33

per barrel that you get as rent for the producers of coal to liquids. So anybody who has a cartel that encourages their substitute suppliers in so that they destroy themselves is not quite looking forward to maximising their own returns, frankly.

Senator O'BRIEN—What of the anecdotal evidence of the continuing growth in demand in the most populous nations, India and China, as they develop? How should we understand the impact of their economic growth and the expansion of their motor vehicle fleets and other energy uses in the context of Australia's need and the international price of the commodity? Is that going to have any substantial effect?

Dr Fisher—This century—if I might be so bold as to make some 100-year projections—

Senator HEFFERNAN—We will not be here to see the outcome, so go for your life!

Senator O'BRIEN—Someone else will hold you to account.

Dr Fisher—Deputy Chair, I have probably noted before at this committee, in another guise, that I feel much more comfortable with 100-year projections than I do with quarterly ones, for that very reason. If you look at the fundamental underlying economic growth that we are likely to see in China and India over the next 50 years, it is pretty incredible really. We have just seen China go through a point where industrial production has really started to expand like crazy.

I will give you some idea about the competitiveness of China. If you take the example of the United States and the UK in about 1900, effectively when the US took over from the UK as the world manufacturing leader, the US was of the order of 1.3 to 1.6 times more competitive than the UK. Today, China is about 30 times more competitive than the United States in the sorts of products that you are now able to buy at Bunnings—for example, power tools, hand drills and all those sorts of things that everybody would like to have in their shed and on their farm. That sort of competitiveness suggests to me that we are going to see a massive move in China in terms of both domestic demand and their penetration into world markets.

That means that there is the potential for the Chinese to demand enormous amounts of resources over time—subject, of course, to the world being able to absorb those products. If there is no demand out there then there is no point in the Chinese manufacturing these products unless they can grow their own domestic market. So, as part of this process, we have to assume that the Chinese will do all the necessary reforms to grow their own domestic market. In the final analysis they cannot rely on everybody else on the planet to buy the things that they will be able to produce over the next 50 years. At the current projected capacity they exceed the world's appetite for consumption, so there has to be some sort of balance in this process. My colleague Jammie Penm can talk to you in more detail about all the macroeconomics associated with that, if you would like him to give you some of those details.

One of the things that drives an economy forward, apart from the economic reform that you have to do and the setting up of all of those economic institutions, is your supply of labour. To work out how much labour you are going to have, demographers create what are called demographic Christmas trees. You might be familiar with these things. They are a projection of the number of people by gender and age group. In a developing country they typically have a very triangular shape, and that is why they are called a demographic Christmas tree. In other

words, there are very high birthrates in developing countries, so there are lots of kids and, because the medical and health systems are not so good, life expectancy is not nearly as high as it is in developed countries. People tend to die much earlier, so there are much fewer older people compared to young people and you have this sort of pattern in the demography.

One of the things that drive an economy forward is the number of workers. So, when you see an economy move from that sort of shape to one where there is a bulge from age 15 to age 55, it means you have an enormous number of people coming through into the working population. When you look at the demographic projection for China in 2000, you see that sort of pattern. In 2030, that pattern will be formed in India. Twenty years ago the Christmas tree was a classic demographic Christmas tree in India; by 2030 the pattern in India will be the shape that we saw in China in the year 2000. The proposition I would leave you with is that right behind China comes India with a huge economy, a huge number of workers, huge demand and huge potential to be very competitive—so the Asia-Pacific basin is the place to be over the next hundred years.

On the other side of the Pacific we have the United States. The United States is a developed economy, and normally we would expect to see a severe ageing problem in economies like the US. The classic example is Japan. If you look at the Christmas tree for Japan, basically with an ageing population we have a demographic coffin. When you do the projections, the graphic stands straight up because there are as many old people as there are young people. Then you have an inverted Christmas tree in an economy with a very ageing population like Japan and, by about 2009, the Japanese population will start to decline. Birthrates have gone well below replacement so, effectively, the population starts to age radically. You get people moving out of the workforce, huge age dependency and a huge problem. In the United States, which is a developed country—

CHAIR—I think this answer is going on a little long. There are a lot of people and more questions that people want to ask.

Dr Fisher—I will wind up. I am sorry.

Senator HEFFERNAN—We think we should have given you two or three hours, because this is all pretty interesting. It is just that we have a time limit.

Dr Fisher—Let me quickly finish. I apologise—

Senator HEFFERNAN—Tell me the shape of Australia's—

CHAIR—No, we can do that later.

Senator O'BRIEN—I would like this answer finished before we ask another one. If the chair is going to curtail the answers to my questions, then I would like the answer concluded.

Dr Fisher—The United States, principally because of Latin immigration, has quite a high birthrate, quite a high immigration rate and a characteristic pattern a bit like China. They do not have a severe ageing problem, even by 2030, so the United States has the potential to drive the other side of the Pacific basin. Basically, the bottom line here is that we are going to see enormous demand for our resources over a long period of time. I am not saying that we are

going to see copper prices sustained at the ridiculous levels they are at today, because that is probably a bit out of control, and you will bring in massive increases in supply at these sorts of prices. But we do have inherent in the Pacific basin very significant demand over a long period of time.

Senator MILNE—I am interested in the optimism that is coming from ABARE about the potential global supply of oil. Dr Fisher, given what you have just said about a projected increase in demand from India and China, not to mention an increase in demand across the planet, is it your assumption that, at a price, oil exploration will simply lead to a sufficient global supply to meet this escalating demand?

Dr Fisher—My propositions are that there is a whole range of substitutes for these products in the longer term and that there is a vast amount of fossil fuel energy in reserves. That is substitutable at different prices. As I said previously, you can do coal to liquids for, say, $40. As a consequence of that, you tend to place a cap on these things. So it does not matter in the long term if we run out of oil. I am not making a policy statement here now about the sorts of fuels we should be using; all I am saying is that there will be an enormous ongoing increase in the demand for energy services. Those energy services will be met by a range of fuels. Whether it is oil, coal, gas or nuclear is dependent upon the final prices.

Senator MILNE—You cannot bring yourself to use the word 'renewable'.

Dr Fisher—I am happy to use the word 'renewable'—hydro, thorium.

Senator MILNE—No, it is just that it reflects a manner of thinking that you should cite all of the fossil fuel and nuclear options, but 'renewable' does not come to mind. What I put to you is this: let us put aside the substitutes because we agree that there are substitutes to fossil fuels and we should be moving to them quickly. I go back to the oil scenario. Isn't it the case that what you have been putting to us this morning is that we ought to not be too worried about oil and projections for supply, because at a price it will be viable to go out there and explore, and when you explore you will find sufficient oil to meet demand? Isn't that what I have heard you say this morning in relation to oil? Let us forget the others.

Dr Fisher—No. What I have said this morning is, yes, at a price you will go out and explore for oil and you will find extra oil. Once those oil reserves start to run out at some point—and my colleagues here are in a far better place than I am to say when that might be—then we will see substitution.

Senator MILNE—What is ABARE's position on peak oil?

Dr Fisher—I do not really have a position on peak oil. Presumably, these things have a physical limit. We will not reach the physical limit, in the sense that prices will rise, the substitutes will come in and it will not be worth getting the last drop of oil. The planet will end before we use the last drop of oil, because the economics will work.

Senator MILNE—You are quite right—the economics will work. Haven't we got to the point already? In the North Sea, for example, they spent $8 billion in exploration and they got $4

billion in return. So haven't we already reached the point where exploration costs are far outweighing returns?

Dr Fisher—That is something that I cannot answer. That would be a question for oil companies. But I do observe that there are private oil companies out there exploring today, so their expectation must be that they will make a return, because they are private companies and they make those private judgments. They have shareholders to report to.

Senator MILNE—They absolutely do. They also have government pockets to dig into, and the subsidies to oil exploration are well known. In fact, they are cited in the figures here. So it is intervention in the markets from governments that makes oil exploration viable in times when oil prices are not high. But I would like to ask Geoscience: what is your view on peak oil, globally and in that context?

Dr Foster—I am afraid I cannot offer a view, because to consider peak oil—and I am aware of the current literature on this—makes an assumption that you do in fact understand the full range of what is available, whether or not the figures from Saudi Arabia are correct. Some people claim they are not. I simply do not know the answer to that question.

Senator MILNE—So what do you pin hopes on? Do you recognise that we ought to make a quick transition away from oil and into substitute and alternative fuels, or do you pin your hopes on finding more oil?

Dr Foster—I think there is a policy element wrapped in that. I am delivering a program. From my perspective, my position is to deliver a program to look for underexplored basins in line with current policy.

Senator MILNE—Okay. Given that there are newly explored basins, what are the, let's say, optimistic and pessimistic ranges of this program that you are administering in searching these new basins, relative to the point at which Australia will start importing large amounts of oil?

Dr Foster—Again, I cannot give you that answer. Let me take an example—the Bremer Basin, near Esperance. No-one had ever seen a rock from that basin. We had absolutely no idea what was there. Our job is to actually look and assess those areas to see if there is anything. Now, if there is nothing then we put that information on the table. Our job is to get the underpinning geoscientific information so that people can make a decision on that basis. But, simply put, we just have no data at all from some of these areas. We may have an indication that there is of course a basin there. We can estimate the thickness of sediment that may be there but we do not know the type of sediment in some of these areas. We do not know if there are organic-rich rocks et cetera. So that is what is happening here. We go and have a look at these completely underexplored basins and put the information about them out there. Companies will make that decision to say yes or no. But the underlying geoscientific information is not lost. That is just one aspect of using geoscientific information—for resource assessment. There are many other aspects that we can use it for. So there is no loss of information.

Senator MILNE—Are you saying, 'We recognise they're prospective, and that's all we can say about it at this point'?

Dr Foster—We strive forward to look at the uncertainties. One of the first questions is: 'Is there a working petroleum system there?' But I might add, in the context of my division, that the actual geoscientific work in the marine world is used equally for proxies for biodiversity. So again there is no loss of information; we are just exploring to see where we are.

Senator MILNE—Can I come back to you, Dr Fisher, in relation to ABARE's oil price forecasts. Would it be fair to say that they have been wrong? They undershoot by a significant amount and have done so for quite a long time but particularly since 2002. Would it be fair to say that your prediction of oil prices has underestimated them to a substantial level and that is basically impacting on government decisions about investment in roads, rail and so on? How do you account for the fact that ABARE keeps on suggesting that the oil price will gently recede from its current value, when that is so far removed from the reality?

Dr Fisher—There is no doubt that I have made the occasional mistake with my oil price forecasts and quite a few other forecasts, frankly. Unfortunately, I will probably make future mistakes as well. However, basically what we do is that we look at what is happening in the world today and then we make a judgment, particularly when we are doing long-term projections, about what the underlying fundamentals are in the full suite of energy markets.

As I said in answer to previous questions, we have a view about what the long-term backstop technologies are in the energy sector, with respect to fossil fuels. As a consequence of that, that gives us some indication of what we might see as long-term real sustainable oil prices. Those numbers are of the order of $35 to $40 a barrel, on current technologies. So, basically, given that our paradigm is an economic one and that we make projections on the basis of what we believe are the long-term demand-supply fundamentals, we would always in long-term projections have a situation where real prices come back to that $35 to $40 a barrel. If we are starting at $70 and we are projecting out for the next 10 to 15 years, unless we believe that there are fundamental reasons why lots of oil will stay out of production over the next five to 10 years, by definition we would project that those prices would move back to that long-term backstop level.

The difficulty, of course, is that—and it does not really matter whether we are making projections about oil prices or banana prices—there are all sorts of uncertainties out there in the world, like hurricanes, for example, that have recently had an impact on both oil and banana prices. We assume, when we are making these projections, that we have effectively normal events. We do not try to anticipate wars in the Middle East or hurricanes et cetera. As a consequence of that, we will make mistakes.

Senator MILNE—Dr Fisher, why don't you factor in climate change? Earlier you said that you put climate change aside in relation to policy settings. You have just said that you do not factor in climate change as a risk, but you have talked about extreme weather events. Every climate scientist will tell you that with climate change you will get extreme weather events. When ABARE forecasts its oil price, what is its risk calculation on the basis of climate change?

Dr Fisher—Basically, in the case of, say, my five-year projections, I do not believe that I am in a position using the current science to make any judgment about whether or not there are going to be more hurricanes. And I am not be in a position to know where they might fall—whether they fall over an oil-producing basin or whether or not we have more in the Gulf of Mexico. Until the science and the forecasters upon which I rely can do that much more

effectively, I will have to continue to make assumptions that I will see basically normal weather patterns.

Over the longer term, if ABARE is making projections about climate policy, for example, it is not the case that we do not take account of these things. We do do scenarios where we account for different potential policies and, of course, the projections that we make in that case—in the policy cases that we talk about with respect to climate change—do take account of these other policies. What we are talking about here, when we are talking about climate change, is what we would call our reference case. So this is a case where we take current settings and we assume that they will stay the way they are today out into the future, and then we do a projection.

Senator MILNE—So to clarify, you see climate change as an unproven notion at this point and therefore you do not factor it in as a matter of course?

Dr Fisher—No, I am sorry, I did not say that. What I said was at this stage if I go, for example, to ask my colleagues in the met bureau to give me projections about what is going to be happening with the weather 12 or 18 months out, I cannot get that. They are not in a position to do that. Therefore I am in no position to factor those short-term scientific judgments into my forecasting. As soon as the experts can do that then we will factor those in, and obviously every other decision-maker will do so as well.

Senator MILNE—Finally, at what oil price do you think alternatives such as gas to liquids, oil sands or shale oil et cetera will become viable if CO_2 emission costs are internalised?

Dr Fisher—That is a very good question. I will answer the question, first of all, in terms of what we know today about the prices without penalties. Oil sands are about $US30 a barrel. Coal to liquids are about $US40 a barrel and shale oil is about $US70 to $US95 a barrel, so shale oil is a long way out of the money at this stage. What happens once you have a carbon penalty depends on the technology you have available and the level of the carbon penalty that is imposed. For example, if there is a carbon penalty imposed, for arguments sake, of the order of $US40 a tonne of carbon dioxide, then that would make carbon sequestration and storage probably viable and, as a consequence of that, you could continue to exploit fossil fuels and bury the carbon. But whether that technology is going to be there and at what point it is going to be viable, is in a sense an open question and that is something that we have been exploring in our other work to do with the Asia-Pacific partnership and the technologies available for mitigating climate change.

Senator NASH—Dr Fisher, earlier you said that we have more energy in Australia that we can use in the next thousand years. Can you clarify for me which forms of energy you were talking about?

Dr Fisher—I am talking about all forms of energy in that case, including uranium. If you do the conversion of uranium into barrels of oil, which is tonnes of oil equivalent, then we have enormous reserves. I am not suggesting for a moment that we are about to go and exploit that other than what we are currently during with respect to exports. But in terms of the amount of energy that we have available—and as I was reminded previously there are also renewable resources potentially available depending on the technology we have—we are a very strong net energy country and a net energy exporter.

Senator NASH—I am interested in the nature of oil as a finite resource, and I know that there is a lot of talk about possible finds. Hypothetically, in Australia in terms of our oil reserves, if no more was found in Australia how long would what we have last?

Dr Fisher—That sounds like a calculation for my colleagues on my left—

Senator NASH—I am happy for anyone to answer. That is fine.

Dr Fisher—to tell us the reserves. Then it is a fairly simple calculation to do the division.

Mr Wright—If you just look at crude oil and condensate, because essentially they are close enough to being the same commodity, the supply of total economic demonstrated resources—which is what we think can be commercially produced in the foreseeable short-term future—is about 14 years. If you just take crude oil economic demonstrated resources, there is about seven years of supply. Adding in the condensate doubles the number of years. It is a kind of artificial answer because the number of years supply you have left depends on your production and, as production declines and reserves decline, the number of years production left stays the same. It is probably more relevant to ask: 'How does consumption compare with the number of years production left?' That will get down to probably about 10 years of crude oil and condensate economic demonstrated resources. That is why we are importing a lot of oil.

The other point to make of course is that the rate of production will decline quite dramatically but the rate of production of sales of gas will increase and, along with that, condensate production will increase. That is really driven by how big the gas market is, both here and overseas, because, as the gas is produced, the condensate is separated out from it. That condensate cannot be produced at a higher rate; it depends on the gas being produced along with it—that is, with the exception that you can do a thing called gas recycling where you can slightly increase the condensate production. Basically, oil is the thing you can produce fastest in the short term. Condensate is tied to the gas market. But the total economic demonstrated resources of gas at current production rates would last about 65 years.

Senator NASH—I am aware that gas would last longer. It is not a very long figure for oil. How confident are you that there are more reserves in Australia? It might have been Dr Foster who mentioned earlier that we need another Gippsland Basin. From the devil's advocate point of view, what if it isn't there?

Dr Foster—I guess we cannot answer that question until we have looked. I would like to return to a comment that I made about the Bremer Basin—and I will come back to your question—just to make sure that I have this absolutely clear for everybody. When I remarked that no rock had been taken from this area, we did put in a dredging program and dredged up rocks to show that there were source rocks to produce hydrocarbons available, and we did other work. As I said, that area was released last year for acreage uptake and the bidding closed on 20 April.

My profession as a geologist would tell me that we would not actually give up until we have made sure that we have looked very carefully. There are very good reasons that we should suspect in a global sense to have basins formed and have in them organic matter to produce oil. I cast my mind back to when I was a primary school student and remember being told that there

was no oil in Australia because the continent was too old. It is obviously pre the Gippsland Basin and pre the 1964 Moonie oilfields, but I will not go too far back.

Senator NASH—On that—and I understand what you are saying—regardless of what length of time it is, there is a point at which we will use all the oil. I come back to the earlier point that somebody made about renewable fuels and how alternatives, including renewable fuels and the other things, will kick in obviously when we are getting closer to the point where we are running out. As scientists, is it your view that more should be done to have all those things happening concurrently as opposed to a view of wait until we run out and then let market forces determine the advent of all these other things?

Dr Foster—That is really a policy question you are asking me. I return to the fact that, under Geoscience Australia and the position that I am working on, we are currently charged with the view of looking to open up these underexplored areas.

Senator NASH—That is a fair point. I have one last question, which is on renewable fuels. I note that you talked about the production of biofuels in your submission and that it is currently viable at present but expected trends in world oil prices and changes to domestic fuel taxation arrangements to reduce the commercial viability. When you were looking at that and calculating it—we look at the price per barrel now and it obviously makes renewable fuels look quite good—at what dollar price per barrel, coming back down, did you assume that renewable fuels would no longer be viable? I assume you have done that in terms of being able to make that statement.

Mr Love—In this sort of question there is a very useful diagram in the Biofuels Taskforce report. It is figure 6 on page 113 of the report. Reading from that particular diagram, it shows you the cost of production for biofuels. It also shows you different levels of world oil prices and different levels of exchange rates. You can read from that diagram what level of oil price you need to produce biofuels viably. To give one example from that particular diagram, for ethanol at an exchange rate of 75c, you should be able to produce that viably at a West Texas intermediate oil price of around $55 a barrel. At different exchange rates you might be able to do it for a lower oil price.

Senator NASH—In terms of research, which comes under your capacity, has any research been done that you know of in biofuel production processes that would lessen the cost of production for biofuels? I know there is a range of things—it is probably a broad question—but is any research being done on that?

Mr Love—Certainly, as we get more experienced with the technology of producing biofuels, the cost of production should come down. It is a fact that the feedstock cost constitutes quite a large proportion of the cost of production. If you were a biofuels producer then you would always have to keep a very close eye on your feedstock costs. You could economise on your labour, capital and so on but, at the end of the day, if you could not get that feedstock at the right price then it would not be viable to produce.

CHAIR—I have a number of questions. One of them follows up on questions that Senator Nash asked. That is on the issue of whether we wait for the market to decide things or whether we actively intervene. I have been doing some research on the internet and I have a found a

paper by a chap called Chris Skrebowski from the UK Energy Institute. He makes a number of points, and one of those is about when peak oil will kick in. He reckons it will kick in at about 2009. He presents a whole lot of figures that support that. One of the points he makes is that one barrel of oil, in a field when you find it, produces a flow that we can use of 250,000 barrels. In other words, a quarter of a field that you find is actually peak flow. He goes on to say that in 2004 the total world discovery was 7 billion barrels and in 2004 the demand for growth was 2.9 mega-million barrels. He says that this needs a production of 13 billion barrels of new reserves. In other words, there is a shortfall between production demand growth and what we are finding. There are a number of other figures that he gives that are easily found on the internet. There is also a report called the Hirsch report, which I presume you know about it, by the US Department of Energy. Is anybody aware that Australia has commissioned any such research looking at the potential impact of peak oil and whether peak oil is a reality?

Dr Fisher—Nobody has asked ABARE to do such work.

CHAIR—Has ABARE looked at any of the work that has been done internationally on that?

Dr Fisher—Yes, we look at that literature as part of our energy and climate projections work. Our view is basically that all of this material is out there, and every agent and investor in the marketplace has access to that information. Decisions will be taken by those investors and consumers on the basis of that information, and as a consequence of that the market will deal with this.

CHAIR—One of the findings of the Hirsch report was that mitigation efforts will require substantial time.

Dr Fisher—Sorry, mitigation—

CHAIR—Mitigation efforts: in other words, efforts to find alternatives to oil. I have printed the summary of the report. In it he says:

Waiting until world oil production peaks before taking crash program action leaves the world with a significant liquid fuel deficit for more than two decades.

My reading of that interpretation is that waiting until the market prevails will not work because at the moment there is insufficient capacity for alternatives. If oil is going to peak sooner rather than later, the world is going to be left in liquid fuel deficit for at least two decades.

Dr Fisher—First of all, I cannot comment on whether governments should be doing stuff. However, if I were asked to provide advice to a government about this, my advice would be that all of this information is available. Governments do not make investments in these things, other than in cases where there are national oil companies—and typically our experience with national oil companies is that they are grossly inefficient, so private markets do a better job of this. That is point 1. Point 2 is that the technology is available on the shelf, for example, to liquefy coal. If we were to have a major deficit in oil supply compared with consumption by, say, 2010, the question would be whether the investment in those alternatives would take place fast enough to meet the gap. Then the policy question becomes: should governments be in the business of going out and making investments in other technologies that are available, in an attempt to supply

those liquid fuels? If I were asked, my answer would be that, frankly, governments have a role in providing the framework in which private agents might make those judgments, but it should not be governments themselves doing that investment.

CHAIR—Is not the government facilitating exploration for oil? It has made new policy announcements very recently on that. There is international research showing that, no matter how much you look, the oil that we need is not going to be there. You may say this is a policy question, but if this information were given to you and you were asked by government where we should be investing, would it not be wise to be helping other industries to meet the shortfall?

Dr Fisher—Before I could answer that question, I think I would need to see exactly the way it was formulated and the policy context in which I was answering that question. Part of the question goes to the heart of current policy and it is not my business to be talking on behalf of the Department of Industry, Tourism and Resources. But I would again go back to my previous answer.

CHAIR—I have got a technical question. You were saying before that it is $40 per tonne for CO_2. How much does that convert to, for a barrel? We are talking in tonnes and barrels.

Dr Fisher—I was talking about the price of carbon, which is $40 a tonne. Imagine a situation where we have somewhere in the world a climate policy that says we are going to have a carbon tax. A carbon tax of $40 a tonne of CO_2 would be sufficient to make, at current estimates, carbon capture and storage a viable technology. But that does not relate to a barrel of oil from overseas.

CHAIR—No. But, if you were then producing a barrel from coal to liquids, would that equate to a barrel of product? What would it add to the cost of a barrel of oil or what is produced?

Dr Fisher—I would have to take that on notice.

CHAIR—Okay. It is important for us to know how much that would add to the cost of production of oil.

Senator O'BRIEN—CSIRO might be able to give you that.

CHAIR—Yes, we will perhaps ask CSIRO.

Senator HEFFERNAN—Does ABARE figure the impact of the currencies of the Indian and Chinese economies on the global power of the US dollar? What impact of playing around with the currency valuations of China and India will all of this revolve around? Is there any currency factor in all of this?

Dr Fisher—Yes. I would not want to make a projection here today about when the renminbi will become the reserve currency of the world.

Senator HEFFERNAN—I do not want you to do that. If you do it, make it a 100-year one!

Dr Fisher—By definition there are adjustments in our modelling to take account of the changing dominance and importance of these emerging countries. When we are doing

projections out to 2050 or 2100, it is absolutely clear that the Chinese will become a very important economy and people will want to own the Chinese currency.

Senator MILNE—I want to return to the issue of carbon capture and storage—geosequestration. You keep talking about it as if it is proven technology or there is a high probability that it will be proven and successful. Can you tell me where in the world it works and whether it is practical for Australian application, given where our current coal mines and energy facilities are?

Dr Fisher—My scientific experts are here to assist. Recently the Intergovernmental Panel on Climate Change produced a special report on this topic.

Senator MILNE—I am aware of that.

Dr Fisher—There are fields that are working mostly with respect to enhanced oil recovery but there is also an experimental field. I will let my colleagues talk about that.

Mr Wright—The process of injecting CO_2 into underground reservoirs has been going on for about 40 or 50 years in various oil fields around the world. All that demonstrates is that you can put CO_2 underground, keep it there for a finite time and do some things with it. There are a few projects that are trialling CO_2 injection. The most well known ones are the Sleipner field in the North Sea, where they injected for three years in a trial project to remove CO_2. There is a big project going on in Weyburn in Canada using CO_2 from, I believe, a coal fired power station in the United States. It is proposed that CO_2 will be injected from the Gorgon field into a reservoir in Barrow Island, but that has not happened yet. They are very small potatoes in the world context of the amount of the CO_2 that is being emitted.

There are really two questions here. One is about capturing CO_2 and the other is about storing it. The storage process is in a way the most simple because the reservoirs into which it is put are reasonably well understood in terms of their capacity. The real issue is that CO_2 comes in various forms. CO_2 from gas fields is already separated out as part of the process of producing natural gas, so at the point of transfer that is available to put into an underground field. CO_2 in power stations is mixed with about 80 per cent nitrogen. That is not readily available and there is a large energy cost in separating that out. So, in a way, the CO2CRC, which Geoscience Australia is involved with, covers both aspects: the capture process, which is a chemical engineering problem, and the underground storage. It is really the capture that has not been done on a large scale worldwide, because people have not been interested in getting flue gases and putting them underground.

There is CO_2 production for commercial reasons—pure CO_2 fields like the Caroline field in the Otway basin. But, again, that is in a different cost category. They are very special fields that can be used effectively for food-grade CO_2 uses. So a variety of technology is available, but basically there is a question about whether you can store CO_2 underground safely for long periods and there is a very separate question about whether you can separate it from flue gas. There are about 500 million tonnes of emissions of CO_2 from Australia annually and probably only 10 per cent of that comes from gas fields and readily useable sources. So there is a huge energy industry there and the technology really has to be proven that it is economically and technically capable of doing it.

Senator MILNE—I have a last question for ABARE. I note that the US Energy Information Administration is predicting a long-term rise in real oil prices—an increase of about 50 per cent over the 2003 level by 2030. That is considerably different from ABARE's prediction. You are suggesting that oil prices are going to recede from their current value and be considerably less than the US Energy Information Administration is predicting. Can you tell me what is wrong with their assessment? Are they wrong?

Dr Fisher—The short answer to that is that we are talking about different base years. What I have been talking about this morning is what is happening to real oil prices against current prices of $73 versus what was happening in 2003. It might be useful to the committee if I were to share with you a chart that we have prepared, which basically shows crude oil prices in 2006 dollars from 1970 up to the current day. That will give you some idea about what has been happening to the price of oil, adjusted for inflation. One of the problems that we have in this whole debate is that each morning, when we get up and listen to various radio stations, we hear statements that the price of oil has just reached another historic high. Frankly, that is not true. The price of oil may have reached some high in terms of nominal value, but it has not reached a historic high recently in terms of real values, as the chart that I am happy to table will show. It will not be until we get close to $US95 a barrel that we get real prices that are anywhere close to what they were back in the second oil price shock in around the late seventies.

CHAIR—I have a final question and then we will have to wind up because I realise that we are late. Have you given the government a range of scenarios for possible petrol prices? You have your prediction, which is that they will go down. Have you given the government a range of options of what happens if petrol prices go higher?

Dr Fisher—The government has not asked me for long-term petrol price scenarios.

CHAIR—So there is no modelling that you are aware of on the impact of long-term petrol prices, if oil prices remain high, on the different sectors of the Australian economy?

Dr Fisher—In our opening statement Karen Schneider mentioned the work that we have done on APEC. That is the only work of this nature that we have done in recent times.

CHAIR—As we have run out of time, I thank you very much for your attendance. I am sorry that we have gone over time but we had quite a lot of questions for you.

[10.52 am]

BROCKWAY, Dr David John, Chief, Division of Energy Technology, Commonwealth Scientific and Industrial Research Organisation

CHAIR—Welcome. I do not know if you were here earlier when I read out my lengthy opening statement but I will not go through it again as I know you know what the terms of reference of the committee are. I remind you that these are public proceedings, although the committee may agree to a request to have evidence heard in camera or may determine that certain evidence should be heard in camera. I remind you that giving evidence to the committee is protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to a committee. As you are a Commonwealth officer, I remind you that the Senate has resolved that an officer of a department of the Commonwealth or a state shall not be asked to give opinions on matters of policy and shall be given reasonable opportunity to refer questions asked of the officer to senior officers or the minister. This resolution prohibits only questions asking for opinions on matters of policy and does not preclude questions asking for explanations of policies or factual questions about when and how policies were adopted. I invite you to make an opening statement.

Dr Brockway—I am pleased to be here today to appear before the committee. My colleagues Dr Ronalds and Dr Griffiths of the Division of Petroleum Resources gave evidence to the first hearing of the committee in Perth. They focused mainly on issues around oil and gas exploration and extraction, and gas-to-liquid technologies. I understand I am not here to answer questions on those. I understand I have been asked to answer questions relating to CSIRO's overall research portfolio in the energy domain with an emphasis on the issues of renewables and distributed energy that arose at previous hearings of the committee.

By way of introduction, CSIRO is undertaking an ongoing process of focusing its research on areas where it can make a significant impact and be internationally competitive. That is a science investment process that some of you will have heard about. In the energy domain, CSIRO's appropriation investment spans a broad portfolio of areas designed to address Australia's needs, both current and future, and looking for opportunities for the future. There are a number of ways in which we can categorise our energy research portfolio. They are: gas, coal and petroleum exploration and extraction—which is pretty much what you addressed in Perth—low emissions coal technologies, renewables, energy storage, energy management and distributed energy. There are a number of other areas, including non-greenhouse gas emissions.

CSIRO's total appropriation investment in those areas is about $58 million this year. It is budgeted to be about $63 million next year. In addition to that, CSIRO in fact has a significant appropriation investment in climate modelling and adaptation to climate change, and that is of the order of $20 million. So you can see that there is a very substantial investment across CSIRO. About 11 of the 18 or 19 divisions are involved in energy research in one form or another. The two principal ones are the Division of Energy Technology, of which I am chief, and the Division of Petroleum Resources, of which Bev Ronalds is the chief. You heard from her in Perth.

Comparing CSIRO's appropriation investment in renewables to that in clean coal technologies, we see that the overall investments are quite similar, which is something that is not often recognised. This excludes appropriation investment in resource extraction for coal, gas and petroleum. It also excludes that investment in climate that I spoke about, which is another $20 million.

I will list the areas of CSIRO's current renewables focus. There is solar thermal reforming of natural gas to syngas, which is a way of embedding about 26 per cent additional energy in the syngas and shifting that—a process called shifting—to hydrogen and separating that from CO_2. We have established in Newcastle the National Solar Energy Centre, which is a major new investment, to do this. I have some photographs of it here, if you want to look at them. We are also focusing on solar organic Rankine cycle power generation, which is a way of using solar energy to generate electricity. That is also complemented by waste heat ORC—organic rankine cycle.

We have a program in fuel cells, which of course are related to the use of hydrogen. We have a very important program in large-scale energy storage devices for renewables—something that is not often recognised. One of the key challenges for utilising wind power is to take out the fluctuations, to take out that intermittency. We have a significant program in that and we are hoping to expand that substantially in future. Complementing that, we have wind site profiling and wind forecasting for power. Again, it is to do with the fluctuations and how the national electricity market might have to operate if there is a large proportion of wind and solar power.

We are involved in organic photovoltaics and dye-sensitised solar cells research, pretty much as part of a national program. There are some world-leading people in Australia, including those in CSIRO, in that area. We are involved in energy storage devices for hybrid electric vehicles, again aimed at reducing greenhouse gas emissions. That is focused on various battery types and supercapacitors. We are involved in the evaluation of aspects of biofuels production and utilisation. At the moment we have a scoping study on alternative transport fuels, to determine whether we can make a significant impact in that area with increased investment.

I am not sure how relevant it is to this committee but CSIRO are also involved in research into distributed energy and energy management, and that is to do with local energy management within a building such as this. CSIRO are involved in agent networks for distributed generation, where we might have a whole series of distributed sources, some of which could be renewables, of course. We are involved in modelling and simulation of distributed energy. That is a brief description of the range of the portfolio of projects. A number are undertaken within my division but, as I said before, 11 of the 19 divisions do in some way or other impact on energy research. I will not be able to describe all of them in any detail, but some I can.

CHAIR—We heard before from ABARE about coal-to-liquids. They were saying basically that it was right there and ready to go—it was just a matter of price. Is that a correct understanding of where we are up to with the development of coal-to-liquids?

Dr Brockway—That is correct. There are several technology routes that we could take. One route is direct coal liquefaction. The coal is heated under pressure with a solvent, usually a recycled solvent, and the coal is converted to a liquid. That liquid is tapped off and it can be refined in the normal way. That technology is well known. There was in fact a major program in

Victoria in that area in the eighties and early nineties, starting in the State Electricity Commission of Victoria and going on to a major program that was funded by the National Energy Research Development and Demonstration Program.

That eventually led to a massive investment by the Japanese government through MITI—a billion-dollar demonstration plant in the Latrobe Valley to liquefy Victorian brown coal. That was proven. The Japanese since then have developed the same technology for black coal. There are two issues. One issue is the matter of cost. Certainly at the $50-a-barrel price, that technology could be viable. The problem for any company wishing to make a decision in that area is whether it will remain over $50 a barrel. Even at $45 a barrel, it is probably viable. The other challenge for it, of course, is that it is greenhouse gas intensive, so—

CHAIR—That was my next question.

Dr Brockway—if there is a cost to carbon in the future, that would impact substantially on the cost profile. I am not able to answer questions on what the impact would be. That is just one of the technology routes. Let me talk about other technology routes and then I will come back to that one. The other principal technology route in terms of coal is coal gasification. We can gasify coal with steam and oxygen and produce syngas, which is a mixture of carbon monoxide and hydrogen, and then put that through a gas-to-liquids process. I think you would have heard some of that in Perth. The gas-to-liquids process is a way of converting the gas to liquid products. You can do the same sort of thing with natural gas, which is I think what you would have heard of in Perth.

CHAIR—Yes, we did.

Dr Brockway—You can take the natural gas and reform it so that you produce syngas in exactly the same way and then convert that in exactly the same manner to a liquid product. Those are the various routes that you can take. We recognise that one of the things that does need to be studied is the relative greenhouse gas emissions from those two technologies. It is true to say that, while we have a reasonable understanding of the greenhouse gas emissions that might result from a coal gasification and syngas-GTL route, we do not have the same understanding—or at least I do not have the same understanding—of the direct liquefaction route. The reason for that is that the work finished in Australia in the early nineties. Some of us were in fact involved in it 20 years ago, but that was a long time ago and things have changed since then. One of the things that CSIRO has recognised is that there is a need to do a study under Australian conditions looking at what the greenhouse gas profile might be of those comparative routes of coal liquefaction and coal gasification with gas-to-liquids. That is something we recognise and do expect to undertake in the future.

CHAIR—I asked a question of ABARE before and I think someone said to try asking CSIRO. ABARE was saying it was $40 a tonne for CO_2. Do you know how much that converts to per barrel?

Dr Brockway—No, I do not. That is a question that could have been asked of the petroleum division people, because they are the ones who are involved in the petroleum area.

CHAIR—Maybe you can take that on notice. Could you get the petroleum mob to answer that for us?

Dr Brockway—Okay, we will take that on notice.

Senator O'BRIEN—Did you hear the evidence of the earlier witnesses, Dr Brockway?

Dr Brockway—I heard a little bit of it but not very much.

Senator O'BRIEN—I think, in essence, Dr Fisher was saying that peak oil is not the issue because of the alternative technologies—for example, liquefaction of coal—which, if oil is running out, will replace oil as a fuel for some time. Whilst he did not address the greenhouse gas issue, I am taking from your evidence that that is a much bigger issue.

Dr Brockway—It is a matter of cost and the greenhouse gas issue. Australia benefits enormously from having very low cost energy. It is one of our international competitive advantages. We do have, of course, the highest greenhouse gas intensity per capita of any nation in the world. So there are those two competing factors. I would agree that there is no shortage of energy, in principle. It is a matter of the technology, the cost and the greenhouse gas emissions. And of course greenhouse gas emissions get back to what the ultimate cost will be and what we as a society decide we have to do about that issue.

Senator O'BRIEN—Would you agree that if we were certain that the price of crude oil was going to stay at $70 there would be investment automatically, private or public, in producing alternative fuels pretty quickly?

Dr Brockway—There certainly would be, because a number of technologies could become commercially viable. But the issue for investors is always: will the price remain that high? At any time, the Middle East could drop it down a long way. I am not able to comment further than that.

Senator O'BRIEN—Yes, it is a market-prediction thing. We have heard evidence about the probability, according to some witnesses, that we will run out of affordable oil sometime in the relatively near future. That is an important question that this inquiry needs to consider. You say that the Middle East producers can drop the price pretty quickly. No-one is predicting that. The futures markets are not predicting that. I do not think the futures markets are suggesting the sort of price that Dr Fisher suggests ought to be the price of oil and that he would predict would be the long-term future price of oil. In the context of the science and the available resources, what scenario should we be looking at?

Dr Brockway—If we are talking about crude oil prices at $50 plus a barrel, a number of technologies become viable. The Biofuels Taskforce came to the conclusion that a number of new ethanol projects, for instance, could be viable if the price was expected to remain above $47 a barrel, which it clearly is at the moment. In terms of ethanol or total biofuels, Australia only has capacity for around 70 megalitres at the moment. We produce only about 30, I think. The intent, of course, is to go to 350 megalitres by 2010. That may be possible; certainly the technology is there. Again, it is all a matter of cost.

Senator O'BRIEN—And a market.

Dr Brockway—And the market.

Senator O'BRIEN—That is the problem at the moment, isn't it?

Dr Brockway—In that particular case, it is not just the market. At least, it is not just the cost—it is the market in that there is a lot of community resistance to it. That is an issue that needs to be addressed, although I do note that some companies are doing that now.

Senator O'BRIEN—In terms of the production of ethanol, what are the relative greenhouse issues with the production and use of ethanol as a fuel replacement?

Dr Brockway—Ethanol, being a biofuel and coming from crops, is considered to have, essentially, zero greenhouse gas emissions or very low greenhouse gas emissions. That is because the crops are considered to take it up. I am not sure I can say much more about that. The actual impact of, say, E10—on the petrol market and with the reduction in greenhouse gas emissions that will be produced under the expected scenario, even with 350 megalitres—is not expected to be large. Three hundred and fifty megalitres is about only one per cent of our total petroleum, so, while it will make an important contribution to reducing greenhouse gas emissions, it will not be enormous by any means.

Senator O'BRIEN—All sorts of products, including woody weeds could be used to produce ethanol, as I understand it?

Dr Brockway—That is an interesting one. At the moment, all of the production involves fermentation and distillation. There are some industrial processes, but essentially we are talking about biofuels and distillation of waste starch et cetera. That is the main source in Australia at present. I heard part of one answer previously that related to the cost of the feedstock for it. That is a challenging issue. The Biofuels Task Force was giving evidence that if large amounts of crops or grain, for instance, are used for biofuels then that could impact on the availability of grain or the cost of grain for feedstocks and other purposes, so there is a balance to be struck there.

The key point is that new technologies are being developed at the moment to do with enzymatic hydrolysis of lignocellulose to break the lignocellulose down so that it can then be fermented. If we assume that that waste has little value and that it could be used for biofuels then there could be a significant reduction in the cost of biofuels or ethanol in the future. But that technology is still in the research and development phase. Whether it actually translates into a cost reduction at the end of the day or whether it simply makes available a lot more feedstock for the process is yet to be determined.

Senator O'BRIEN—Some people have proposed that if that were an available solution, some of the areas currently growing sugar unproductively might produce a lot more quick-growing woody weed type species for that sort of production. I guess that is another question. Other evidence we have had suggested that, were we to produce vehicles designed for higher ethanol mixes, that would not be a problem; it is just that we do not produce them now and that, in some

parts of the world, particularly in Brazil, much higher mixes are used to operate motor vehicle fleets without a problem. Is that true?

Dr Brockway—Yes. You can operate vehicles with 85 per cent ethanol, but they do require special engine components because, obviously, ethanol has different properties to petrol. So the way it attacks seals within an engine and the corrosion potential et cetera needs to be addressed, but it is technically possible and it is done.

Senator O'BRIEN—That is right. Is it a high cost?

Senator MILNE—It is done in Australia, isn't it, and exported to Brazil?

Dr Brockway—I think you are right, Senator, as I understand it. South Australia still produces those vehicles for the Brazilian market.

Senator O'BRIEN—Mr Bellino, as I recall.

Senator NASH—Exactly. It gets worse, doesn't it?

Senator O'BRIEN—I was aware that we were exporting a vehicle to Brazil which had been modified. It is not a cost issue in that sense. What about the transportation? Presumably Brazil has coped with any evaporation or absorption of water issues in their supply chain?

Dr Brockway—That is a particular problem in that ethanol is hydroscopic, so it will take up water. The problem with something like E10 is you have to prevent that happening, and that can be done. All it requires is better housekeeping. If I recall correctly, the Biofuels Task Force recommended that Australia investigate what sort of additional costs that might entail, but it is simply a matter of keeping that water out and keeping a good turnover. It is important to ensure that that housekeeping, however, is very good if you are using ethanol, and that is certainly true.

Senator O'BRIEN—As to hydrogen as an alternative fuel source, I understand that there are considerable difficulties with maintaining a safe storage and accident emission regime with hydrogen.

Dr Brockway—There are particular issues with hydrogen. I do not know that you would say they are particularly bad. In fact, there can be good aspects to it—hydrogen being so light, if there is a slight leak it will disperse very rapidly.

Senator O'BRIEN—Except under a bridge or something.

Dr Brockway—Of course, in an enclosed environment it is dangerous, but then so is any build-up of any hydrocarbon. The biggest problem is the low bulk density of hydrogen. How can we improve that? CSIRO has research under way that will be supported through the CSIRO program of collaboration with universities looking at how to store hydrogen and try to get a greater bulk density. In terms of an energy density per mass it is quite high but in terms of bulk density per volume it is quite low. One can, of course, compress it or one can cool it and liquefy it but the best way of getting a greater density into a certain volume at the moment, as we understand at least, is through metal hydrides. There is research going on in that area in Australia

and worldwide. That is a key part of the problem: what can you put in a petrol tank or a large tanker and how can you transport it around the country?

But the biggest problem with all of these—let us say with the hydrogen economy—is that we have at the moment an economy based around petroleum. We have a wide distribution network. We have some 8,000 petrol stations in Australia. You would need an equivalent number of hydrogen filling stations or use of those filling stations. There is a very big cost. The cost of hydrogen per se—the generation and production of hydrogen—is high at the moment. But that is the sort of area we are working in. The National Solar Energy Centre that CSIRO has invested millions in in Newcastle uses a process of thermal energy through the sun—trapping the solar energy in the syngas and then shifting that to hydrogen so we end up with hydrogen that has solar energy embedded in it, if you like. It is a way of producing hydrogen from natural gas.

Senator O'BRIEN—The issue of electric vehicles has been touched on in our evidence, and clearly there are vehicles now in production in Europe with relatively short ranges but which are economically viable. What work is CSIRO doing on that?

Dr Brockway—CSIRO has work going on in fuel cells, which is one of the key areas for providing power to electric vehicles. CSIRO also has work going on at the moment with one of the car manufacturers in developing a hybrid petrol/electric vehicle. In the driving cycle you need a lot of power—energy delivered quickly—in the acceleration process. That cannot be delivered quickly from a battery. CSIRO, and in fact my own division, has a significant program developing devices called 'super capacitors'. These are devices that can deliver energy very quickly, so they allow for acceleration. You then need an energy storage device that can deliver the energy more slowly during the cruise part of the cycle, and that is where fuel cells and batteries come into it.

We are developing both fuel cells and lithium metal batteries for some of those sorts of purposes. Lithium metal batteries have applications in small devices as well. We are in the process of developing a technology which we are calling an 'ultra battery', which is a combination of both super capacitors and a lead acid battery. That, we believe, is very important because that one device, without external electronic management, can deliver power—energy very quickly as you need it for acceleration—take in the power during regenerative braking very quickly, which a battery cannot do, and then it can operate as a battery for the cruise cycle. We are having that technology developed. We have licensed that to a company where we have had prototypes made already. This year we are expecting to be testing those under road conditions in a vehicle.

As an aside, the ultra battery is also the principal technology for taking the fluctuations out of power from wind and solar. You would be aware that generally speaking a very important part of an electricity grid is the stability of the power. The problem with wind is the fluctuations in that power. If the wind gets above a certain velocity they need to shut down the turbines immediately and that causes major spikes, which is a big problem potentially for South Australia in the future where they have plans for many more wind farms than the grid can safely accommodate in terms of energy stability. The ultra battery, developed for large-scale purposes can be, we believe, a solution to that. If a wind turbine farm needs to be shut down, the ultra battery will allow time for that energy to be delivered from other sources, probably intermediate load gas turbines or

what have you. We believe that technology is particularly important for renewables applications in the future.

Senator NASH—I am interested in the biofuels aspect of this. I note in your submission that you talk about biofuels. You say a plan for increasing ethanol production beyond the 350 megalitres could have some benefits. Does CSIRO have a view about what types of things should be contained in the formulation of any plan?

Dr Brockway—No. That is a policy area; we do not have a view on what drivers the government might put in place to achieve certain things.

Senator NASH—You are supportive of the idea of a plan being beneficial if they are going to increase the target.

Dr Brockway—I am saying that a plan would be necessary if we want to try to achieve a greater impact from or amount of biofuels. The plan might be quite simple. If it is believed that crude oil prices are going to remain above $50 a barrel you may not need very much of a plan.

Senator NASH—I believe the United States is going to use around 15 billion litres of ethanol this year. Are there any scientific reasons why the United States should be so focused on ethanol and there should be such a significant use of ethanol in the United States as compared with Australia?

Dr Brockway—The main reason is to do with political decisions to do with regional and rural support. The Biofuels Taskforce did look at this matter and came to the conclusion that, almost universally, the reason for biofuel support around the world is principally to do with rural and regional support. That was one of the conclusions of the Biofuels Taskforce. I cannot comment on American politics, but it may be that they are supporting their rural industry. Corn is a particular feedstock for ethanol and they have a very large corn industry, of course.

Senator HEFFERNAN—And downstream impact. We are talking about ethanol: I will declare an interest. I not only drive a tractor—so I should declare an interest in that—but I am the only politician in Australia who pays Manildra money. I have cattle on a commercial arrangement on agistment there. I have paid a lot—in six figures—over the years on agistment.

Senator NASH—I am sure that there would be quite a lot of farmers who sell their grain to Manildra.

Senator HEFFERNAN—But the money is going the other way with me. But downstream—

Senator NASH—Perhaps I could finish my questions, and then we could come to Senator Heffernan.

Senator HEFFERNAN—Righto.

Senator NASH—Thanks. We were talking earlier about cars running on E85 and cars being produced to do that. Just from a scientific basis, is it possible to modify existing engines for E85 or do they have to be specifically built?

Dr Brockway—I do not think it is possible to practically modify them. Certainly you could take an engine apart and change all of the seals in it, but I am not able to comment further than that. It may be that special alloys are required in parts of the engine. I do not know that.

Senator NASH—On biodiesel and the heavy vehicle industry—and again this is a technical question—is it a simple technical change to enable trucks that currently run on diesel to use biodiesel, or would they need some kind of engine modification for that?

Dr Brockway—As I understand it, they can use small blends of biodiesel. I believe some vehicles can run almost exclusively on biodiesel. Again, it is outside my area of expertise.

Senator NASH—I will ask the trucking industry this afternoon. Thank you very much.

Senator HEFFERNAN—An important part of the economics of ethanol out of grain—whether it is corn or wheat or whatever—is its downstream use. When looking at America, I have often wondered about the net impact of converting food to energy in terms of the overall use of this product. It seems to me that, if you are going to have a commercial ethanol plant in rural Australia, in a lot of areas you would have an associated downstream use of the by-product, whether it is a 5,000-cow dairy or a feedlot or something. Has the CSIRO figured the economics of ethanol production? Is the downstream use of the by-product part of the economics?

Dr Brockway—The Biofuels Task Force was given evidence that, if grains were used extensively, the price of grain for feedlot would in all likelihood increase. So there is that sort of impact. To the best of my knowledge, CSIRO has not looked at waste products after ethanol production.

Senator HEFFERNAN—You mean in terms of market and demand. Given that we are at a 40-year low for the price of wheat, it would be a pity if some terrible aberration in the market raised the price of wheat for the growers! That would be just a shocking thing to think about. Bugger the feedlots. Is it going to change the nature of a feedlot from being a user of primary grain to being a user of a by-product of grain? That could be the offset there for the feedlot industry. It would also be a shame to see the price of sugar rise. I do not go with the argument at all that worries about the cost of the primary grain. The dearer it is, the better, as far as I am concerned.

Dr Brockway—Those sorts of issues can be looked at by CSIRO. I believe the Division of Sustainable Ecosystems has looked at some of those issues, but I am not totally familiar with them.

Senator HEFFERNAN—Would you be able to provide the committee with any literature on the—

Dr Brockway—On the value of—

Senator HEFFERNAN—There is obviously an argument out there from parts of the industry—and we will be hearing from some of them today, I presume; and I have my own view, given that the fuel companies are all so friendly to us—that, if you let this ethanol thing out of the bag, the soil will fall off the planet. That is their attitude in Australia, whereas it is a

completely different attitude in America. If there is no energy deficiency in converting food into fuel and then back into a food chain through a feedlot or a downstream process, I would like to know whether there is literature around that supports that as an efficient use of the original use of the grain.

Dr Brockway—There was a study that the CSIRO did for a company looking at the total efficiency rather than the cost, if I recall correctly. It was considering the value of the waste products to assist the future production of the feedstock for ethanol production. That was done on a commercial basis, so the company would have to release that information. It did show that a substantial reduction in greenhouse gas emissions was possible. Most of the studies have shown that the actual reduction in greenhouse gas emissions from using ethanol, if you look at the total life cycle, is in the range of one to four per cent. The CSIRO study for this particular company showed that because of the integration of the way that they were operating the plant, using some of the waste for energy production and some of the waste for farming input, the greenhouse gas intensity did reduce by something of the order of between eight and 11 per cent. With new projects where there is that total integration, the greenhouse gas footprint could be reduced significantly for ethanol in terms of a full life cycle. But that was for a new plant, and whether that was commercially viable I am not sure because I do not know where it stands in terms of construction.

Senator HEFFERNAN—The market will sort that out.

Senator MILNE—Dr Brockway, having listened this morning to ABARE and Geoscience Australia and listening to what you have been saying, it seems to me that the problem that we have is that all technologies are regarded as equal in terms of the research effort addressing the ongoing demand for transport fuels. My question to you is this: in relation to prioritising those, would having a price on carbon make it easier for research institutions such as yours to start anticipating what technologies are actually going to be feasible? What I am putting to you is that everybody says, 'Putting climate change aside and internalising CO_2 costs, this would be viable and that would be viable.' Would it assist to have a price on carbon?

Dr Brockway—Our research portfolio is not based on setting a price on carbon. What we are doing is saying that we need to develop technologies to reduce the greenhouse gas emissions from our existing type technologies and we need to develop new technologies that have much lower greenhouse gas emissions. We are not saying that there does need to be a price on carbon per se. What we are saying is that we are developing technologies that will achieve that objective. But in all cases we need to bear in mind that, whatever we do with energy, if we are going to reduce greenhouse gas emissions that will come at a cost. Our research is aimed at reducing that cost.

Digressing for a second, we are establishing a program to look at removing greenhouse gas emissions from existing power stations. Whatever we do, that will come at a cost, so at the end of the day it is a community decision as to whether or not there is a cost as to carbon. Reducing or changing any technology nearly always comes at a cost. What we are trying to do is reduce that cost increment as much as we can. In these technology development areas, we talk about learning curves. These are well known if you look at photovoltaics, wind power and even fossil fuel generation. You always get with time a reduction in cost and it plateaus at some stage. That comes about through doing the research and development of technologies, learning how to

operate them, implementing the technologies over time and getting more and more of them so you get larger scales. CSIRO's research program is aimed at assisting with that learning curve and reducing the cost. Very few of these technologies are entirely new. In most cases it is a matter of improving the technologies to reduce the cost.

Senator MILNE—What I was getting at there is that a lot of stake has been put on the capacity with coal to liquids. There is a lot of energy embedded in doing that. If you compare it with electrifying with solar, at the moment, without a price on carbon, it is hard to say where you would better put your research effort. Is that not the case?

Dr Brockway—We have decided that we need to invest across all of that spectrum. That is why we are actually going from fossil fuel type generation, and reducing the greenhouse gas emissions from that, right through to things like organic photovoltaics, which we believe will ultimately produce electricity with very little greenhouse gas emission. Of course there will be some greenhouse gas associated with manufacturing them, but ultimately that could even come from renewables—but we are talking a long time out. We believe it is necessary to have that broad portfolio of research programs, because that is what Australia will benefit from. We are not in the business of predicting what will be picked up or when, but clearly we believe that the ones we are focusing on are those where it is important. This is in fact coming out of the science investment process. It is not just to do with energy; it is across the whole of CSIRO. We are trying to say, 'We can't be in all areas, but we need to be in those areas where we think that the greatest impact can be achieved for Australia.'

Senator MILNE—On coal to liquids, if we think about New South Wales for a moment, obviously you have a lot of coal. Are there any suitable reservoirs in New South Wales where you are going to sequester the gases?

Dr Brockway—You are right. The accepted wisdom to date is that there are not any big reservoirs there. Over the last decade a study has been trying to identify the large reservoirs in Australia. There are five or six of those, including the depleted Gippsland Basin and the Denison trough in Queensland in New South Wales, but there are none of that sort that are available in New South Wales. However, CSIRO has recognised—and this is what is going on in my division—is that there is potential to sequester CO_2 into deep unmineable coal seams and adjacent strata. CSIRO has been doing research in the Division of Energy and Technology for three or four years now, looking at the sequestration potential of deep unmineable coal seams and the adjacent strata. Much to our surprise, we actually found that the CO_2 sequestration capacity of some of the coals we looked that is about twice what we had expected. CO_2 is taken up by coal. So we have recognised from that is that there might be the potential for sequestration—not in massive reservoirs of where we can take all of Australia's CO_2 for the next thousand years, but sequestration sites that might be near to either existing power stations or future coal-to-liquids plants. Relatively near to those, there might be the opportunity to sequester into what we would refer to as niche sites: a site that is not massive but big enough to take all of the CO_2 emissions for that particular plant, whether it is a power station or coal-to-liquids plant.

The simple fact is that we recognise that there is the potential there, but we do not know whether they exist at the moment. In fact, we are talking to industry at the moment about a program of work to do an evaluation of that and then possibly a sequestration demonstration. We are talking about coal and adjacent strata which is at least 800 metres and possibly a kilometre

down, because we need to keep the CO_2 in a supercritical state. There is very little information: most of the coalmines are only interested in the first 400 or 500 metres and they do not go down a kilometre in their drilling. The first thing we need to do is look at what the potential is, based on existing information, do a model based on various sites and say, 'What do we know about the coal down a kilometre? Will it be suitable?' We then need to do more drilling, more modelling and then at the end of the day the sequestration demonstration. We do not know, but there may in fact be that potential in New South Wales. It is something we are looking at the moment.

Senator MILNE—I wanted to explore demand-side management initiatives that you are working on, but we do not have very much time. Is there anything you want to highlight in that regard?

Dr Brockway—Yes. There are two things that we are doing. Firstly, we are looking at small intelligent wireless devices that talk to one another. You could have a number of wireless devices around a house or a building as big as this, but mainly around a house, where they talk to one another and they control the systems within the house. That will substantially reduce the time at which the energy is demanded. The simplest example is that you do not need your washing machine going at times when there is high usage of power; you could in fact have it switching on after hours. So that sort of technology exists now, but it is pretty crude. What we are doing is developing sophisticated wireless devices that will talk to one another. That is one part of it, and that is with a local energy management system.

Secondly, a related problem is how we manage, let's say, 1,000 distributed generation sources, all with different energy profiles, because some would be solar, some might be wind or you might have gas microturbines. If they are all impacting on a grid, how do you manage all of them and how do they talk to the grid? So we are developing protocols and codes to look at how we might manage a large number of devices like that. In fact both of those sorts of things are study programs right at this moment at the Newcastle CSIRO Energy Centre. In my division we have these little motes, these little wireless control systems, around some of the laboratories, talking to each other and monitoring conditions and so on. We also have two gas microturbines, we have solar cells, we have power coming in from the grid and we will be reinstalling our wind turbines over the next couple of months. So we will be applying the knowledge we have developed from modelling to the actual situation at Newcastle. In fact, the Newcastle energy centre is designed so that, certainly for part of the year, input power from the grid can be zero.

Senator MILNE—Just how far away do you think these clever devices that would suit the residential environment are from being commercially applicable?

Dr Brockway—They are probably four or five years away from being technically feasible. Commercial feasibility is another interesting aspect—

Senator MILNE—So they will be technically feasible in five years and then it is about when you can get the money.

Dr Brockway—Yes. One of the biggest problems for Australia—I suppose it is a problem and an advantage—is that because of our very low cost of energy the potential for introducing technologies to reduce the usage of energy is less here than it is in Europe, where power prices are substantially higher.

Senator MILNE—Yes. Thank you.

CHAIR—We are out of time. Thank you very much, Dr Brockway. I think probably all of us had more questions, but we will have to wrap it up.

Dr Brockway—Thank you.

Proceedings suspended from 11.43 am to 11.55 am

KASPURA, Mr Andre, Policy Analyst, Engineers Australia

CHAIR—Welcome. I apologise for our lateness; we have been spending some time with our other witnesses! Sorry about that. I am required to do a bit of a spiel, but I will cut it very short. You already know what the terms of reference for the committee's inquiry are, but there are just a few things that I need to remind you of. These proceedings are public. The committee may agree to a request to have evidence heard in camera and it may determine that certain evidence should be given in camera. I remind you that, in giving evidence to the committee, you are protected by parliamentary privilege. It is unlawful for anybody to threaten or disadvantage a witness on account of evidence given to a committee, and such action may be taken by the Senate as a contempt of parliament. It is also a contempt to give false or misleading evidence to a committee. If you object to answering a question, you may state your grounds and the committee will determine whether we think it is still appropriate to insist on an answer. If the committee determines to insist on an answer, a witness may then request to give that evidence in camera. Do you have an opening statement?

Mr Kaspura—Just a few brief comments. Engineers Australia are very much concerned with movements towards sustainable development. Certainly, while we did not directly address that in the submission that we put forward, that is the overriding background to our interest. As part of that interest, the summary of our position would be that we would like to see much greater emphasis on a risk management approach to fuel management in Australia. The reasons for this are very simple. Oil prices have risen and they remain high, despite what all the pundits said before last Christmas, when everyone was arguing that the rises were temporary and that they would come down. But now we are seeing various world authorities recognising that the oil market fundamentals have changed and what we in fact have is evidence of structural phenomena in that market. As the IMF recognised and as we pointed out in our submission, what is different about the current rise in oil prices compared to peaks in the past is that long-dated oil futures are very high—and when we talk about long-dated oil futures we are talking six-plus years out. They remain high, around the $US65 mark, and they show no signs of backing off.

Against this background we have a current policy where all of the agencies responsible for these matters in Australia are predicting that our high dependency on oil is going to continue. From our perspective, we believe the risk is not so much to supply—running short of oil, although that inevitably will happen; we think that the main issue is the impact of the price of oil on the Australian economy and the flow-on effects that will come from that. Our feeling is that the current policy does not adequately address these issues and is reflective of circumstances that are no longer relevant to this country—circumstances in which supply was bountiful, we had clear-cut security of supply and we had cheap prices.

Gippsland, as your previous witness pointed out, is largely depleted. Gippsland was where much of the oil that was the source of Australian production and the root of the policy of oil energy security was based. Gippsland peaked in 1986. Even though there have been a number of oil discoveries in Australia, notably in the North West Shelf area, this has only stalled the overall peak for Australia for a few years. The significance of this is that Australia's reliance on imported oil is growing.

For many years we were both a net exporter of energy and a net exporter of oil. The Carnarvon oil was in fact not used predominantly for local production as Gippsland was; it was used predominantly for export. But around 2001 the situation reversed. In 2000-01 we still had a net surplus on our balance of payments, in 2004-05 prices, of $4.27 billion. But by 2004-05, we had a net deficit of $8.13 billion, which is a $12.4 billion turnaround in a matter of a few years.

All of the projections that the official agencies are coming up with are suggesting that the volume of imported oil is going to rise. So not only is the Australian economy going to be susceptible to high oil prices and the possibility of those rising but also we are going to be subject to the vagaries of exchange rates. As the proportion of our imported oil is higher, any movement in the exchange rate that is significantly downwards is just going to increase the Australian dollar price of oil quite dramatically.

We are pushing very hard for a risk management approach. In any kind of risk management approach, there are two things that could happen. If you move too early, you end up paying up-front more money for mitigation type policies than you really need to. But you have to balance the risk of doing that against what might happen if you move too late, which is that adjustment becomes more radical, more disruptive and probably overall more expensive.

We think that there are options at the moment that are relatively consistent with the government's policy on land transport fuels. Firstly, we think that prices can be kept manageable. We also think that there are options available that will assist us in our security of supply. We are pushing the notion of mitigation through conservation, more fuel-efficient vehicles, more efficient fuels, encouragement of hybrid vehicles, encouragement of public transport and a shift from road to rail on long haulage transport.

We also think that another mitigation option is directly compatible with the old policy of security of access to our fuel—that is, we can more effectively use our existing resources. I noticed that in my paper I inadvertently emphasised LPG. I should have emphasised both LPG and natural gas. I could leave with you a small article from the internet which shows that the Honda motor car company in California has released a version of the Honda Civic, a very common car, which runs on compressed natural gas.

More importantly, it is a methodology that overcomes the current argument against using this kind of approach. The argument is that we do not have the infrastructure in place to utilise that resource. The service stations do not have compressed natural gas. I am aware of only one, in Liverpool, and that is largely because the Liverpool City Council has a policy of using natural gas for half of its fleet. This facility is a small device which it looks a little bit like a gas water heater that sits on the wall and is plumbed into the home natural gas source—the same source that you use to heat your water, cook your food and so on. Every house becomes a servo and it overcomes the infrastructure.

These are options available for Australia in an area where Australia does have a comparative advantage in resources. We are earning considerable export income from these resources. That resource is potentially also available for us to use at home. The bio options are also available. I know that government policy has a variety of tentacles out, encouraging various fuels, but we believe that, as part of a more comprehensive risk management strategy, some of this could be strengthened.

In summary, Engineers Australia is quite concerned at the potential price impacts on the Australian economy. Certainly, peak oil is an issue, but most commentators get diverted unnecessarily by the precision relating to the timing of peak oil. That does not really matter. It is give or take a few years. Supply is not going to run out anyway; it is going to continue well after the peak. There is reason to believe that the position adopted by the Australian government is probably more pessimistic than it needs to be. The real issue that needs to be picked up is: how do we deal with the price effects that come from oil? These price effects are all-pervasive. We see evidence of people's concern in all walks of life at the present time.

Senator O'BRIEN—Could we have a copy of that document?

Mr Kaspura—Yes. I brought it along for you. Were you referring to the Honda Civic article?

Senator O'BRIEN—Yes. It would be good if we could have that and get it copied.

Mr Kaspura—It is readily accessible on the web, but I brought it because I thought it might be of some interest. There are Australian technologies. Natural gas is fundamentally different from LPG. It is mainly methane. But the broad principles of engine modification are very similar. It is not a technology that is particularly difficult. It is more about acceptance of that style of fuel by users.

Senator NASH—In your submission you note that the transport sector will be badly affected because of its high dependence on oil. I think that is probably a fairly sensible comment to make. What do you see as the best alternatives? If the transport sector is going to change its fuel mix, what do you see as the most appropriate alternatives?

Mr Kaspura—Oil will still be available. Oil will be and should still continue to be used in transport. But the issue is changing the mix so as to optimise the overall cost to the country of transport. At the present time we have an absence of competitive neutrality between road and rail through the infrastructure access pricing regime. If oil prices rise, it is going to entrench the current modal distribution of transport and the price effects are likely to be more severe than if we had competitive neutrality and there was scope for some adjustment between modal options.

Having more rail combined with having smaller trucks from rail heads to distribution points will probably be less expensive all over than having the current great reliance on road. Of course, there will always be some routes for which rail is not an option. If you look at much of the rural hinterland in New South Wales, you will see that many of the rail lines have fallen into disuse and it would cost an arm and a leg to resurrect them. You will always need to use trucks in that instance. This is where options like alternative fuels offer a chance for mitigation. Compressed natural gas and LPG are options available for heavy vehicles, just as they are for ordinary cars. It really requires a broad spread of mitigation options, not reliance on one basic fuel source, which the present policy relies on.

Senator NASH—I noticed that you were addressing biofuels and talking about feed stocks, I think using sugar. Did you take that into account? Did you look at biofuels? Earlier, Senator O'Brien quite rightly raised future potential feed stocks for biofuels. Did you look at it only in the context of current feed stocks or did you look at it in the context of what may come online and what difference that would make?

Mr Kaspura—I think the truth is that we did not look at that question very deeply at all. We just looked at it in the broad rather than in the more detailed sense that your question implies. As an organisation we will be looking at that some more. At the present time we have a committee of our governing council called the Sustainability Committee, which is reviewing all of our sustainability policies, including our sustainable transport policy, and biofuels is an element of that. But that is probably out of kilter with the timetable for your committee.

Senator NASH—I have one last question. One of the comments you make is:

- there will probably be a conflict between metropolitan and rural/regional demands for oil in Australia, when there is less of it available and demand for both continues to rise ...

Can you expand on what you mean by 'conflict'? What types of things have you taken into account in making that statement?

Mr Kaspura—It will be the price issue. As I indicated a moment ago, with some routes, principally rural routes, the only option is current motor vehicle type transport. In cities, the demand will be much more for mass transit arrangements—public transport—and economising on the fuel that you are using. Essentially, the conflict is that there will be a need for different types of policies in different circumstances rather than a conflict between people for dwindling oil.

Senator NASH—Thank you.

Senator MILNE—I note that you said that the best place or the most likely place for behavioural change is in the cities.

Mr Kaspura—Yes.

Senator MILNE—The transport emissions are very significant in terms of Australia's greenhouse gases, plus we have congested cities and poor air quality. You talk about public transport. Can you outline how you think we would best address that transition away from building more flyovers, tunnels and so on and actually moving to a much better public transport option?

Mr Kaspura—We have not gone into that in the detail necessary for a decent answer to your question. The adjustment is going to start with people confronting a larger fuel portion in their budget. You are seeing that reflected in the commentary from various motorists organisations and other lobby groups. At this stage we have had a fairly moderate increase in the price of oil. If the projections of what some pundits are suggesting, which is $US100 a barrel, works out, I would suggest that the impacts are going to be rather nasty and people will, of necessity, have to confront this issue.

People are already making decisions of that nature. When they are buying cars, they are deciding to buy a medium sized car as opposed to a large car. There is now extensive marketing of diesel vehicles in Australia. Those vehicles have 30 per cent better fuel economy on average, so you get more mileage for your dollar. People are adjusting and people do take public transport into their decisions anyway. In Sydney many people already use public transport and many more would if the transport system were more efficient. When you face a one-hour journey from your

office to your home, that is a significant cost in itself. But if you roll up to the station and the train does not turn up, that is a real problem. I know from personal experience, having worked in Sydney and used the train system for nine years, that that is an occurrence more frequent than most people would be comfortable with. It is a real pain when it happens, I can tell you. You can organise your life around more time sitting on a train—you can do work on it, you can read and do all those sorts of things on it—but there is not a lot that you can do when it does not turn up, and that is the problem that is confronting more and more people in large metropolitans area like Sydney. That is the problem on which work has to start. I gather the New South Wales railways people are focusing attention on this to get greater reliability into their service and then develop things from there.

Senator MILNE—In your submission you more or less concede that the market has not worked in terms of driving the changes that are required towards fuel efficiency and in relation to rail versus road efforts. Do you think it is time that Australia had a mandatory vehicle efficiency and fuel efficiency standard? Do you think it is time that we had an energy efficiency target?

Mr Kaspura—I am not, and Engineers Australia are not, very supportive of microtargets in these sorts of areas, because they have a habit of losing relevance and then becoming an impediment as opposed to an assistance. Engineers Australia recently put a submission into the Productivity Commission's inquiry into infrastructure access pricing. The view that we took in that submission was that we need to move to competitive neutrality, that we need to price externalities in two steps and that we need to do that comprehensively across all issues of public policy. In energy this has fairly wide ramifications for both stationary energy and transport energy, and none of these are particularly palatable. They all imply costs from mitigation options and those costs vary depending on the degree of emission abatement that you are aiming at. In this particular submission we did not really raise the issue of emission abatement from transport, although clearly that is very important. What we were looking at predominantly was the price effects coming from the main fuel product itself and how they were going to impact on things. If we are concerned about emission abatement, we are going to end up adding to the costs that may come from oil itself.

As I said in the submission, an option is to hold off. There is an awful lot of circling the wagons going on—and this is not just in Australia; this is in most of the Western economies—where policy makers can see that action is needed but do not want to be the first one to break ranks, because their country's comparative advantage will be impacted and it may be impacted needlessly if these constraints turn out to be temporary in nature or if there is some other technological breakthrough which helps prices along.

On the other hand, as we have tried to say, there are options available—a broad sweep of things—which are not terribly inconsistent with the government's current stance on transport, petroleum and energy sources. Developing some of these further, more rapidly than is the case at the moment, would put us in a better position to cope with adjustment. It is a case of being able to cope with the adjustment when it occurs and as it occurs. The risk of early action is of course that you end up paying an awful lot of money upfront, sooner than you need to. But that has to be balanced against waiting. The cost of waiting is that you are going to end up paying an awful lot of money anyway and the adjustment will be much nastier than it would be in other circumstances.

Senator HEFFERNAN—Have Engineers Australia tried to work out what real savings there could be? To give a little example, when you turn on the tap to brush your teeth, do you let the water run?

Mr Kaspura—Yes.

Senator HEFFERNAN—What about when you are at the lights with the car engine idling, or that sort of thing, where there is absolutely no production from the engine running—have you worked out the impact of all of that?

Mr Kaspura—Not that I am aware of. I am sure someone has done it, but we have not actually gathered that information from our members. I will endeavour to find out if someone has done that and get back to the committee.

Senator HEFFERNAN—There is pretty good technology now in our new tractor technology. It is a modern tractor which has a computer control on the fuel, which is something to behold compared to the old tractor where you just pulled the throttle and away she went, and she stayed at full bore and blew out black smoke. So surely long-term consideration of where we are at and what we are going to need should include—

Mr Kaspura—Yes. This is actually part of what we are suggesting should be in the mitigation strategy—that is, conservation techniques both to make existing vehicles perform better and to put pressure on manufacturers to produce even more efficient machines. Hybrid technology is then an extension of that. But it is certainly true that a modern engine will work more efficiently with the computer chip driving the injections than the old carburettor approach, which was pretty hit and miss.

Senator HEFFERNAN—Not as good as the Malvern Star pushbike, of course!

Mr Kaspura—That is true. I am getting a bit long in the tooth to be pushing one of them around Canberra!

Senator MILNE—A lot has been said this morning about coal to liquids as the next big transport solution. We do not have to worry too much, according to some evidence we have had, because we can go to coal to liquids. From your submission, you do not regard this as a very viable option for Australia's transport fleet. Would you like to go into that some more?

Mr Kaspura—I am not sure that we necessarily addressed it in quite those terms but I think the general position the organisation would take is that there are a wide variety of options and each of those options will assume relevance as the price of oil rises. At the present time, we are coming from an era during which oil has been quite cheap and the history of alternatives to oil is that their commercial scope has been limited by the price of oil. The technology for converting solids to liquids is expensive, and that is the key issue.

The interest, of course, in that sort of technology emanates from making use of our present infrastructure. This is why I brought you that little article on the Honda Civic: it is not necessarily the case that we are constrained by existing infrastructure. We need to think outside the square. In Canberra, I would not hesitate to guess that 90 per cent of houses have natural gas

running past them down the street and probably half the houses have natural gas connected. It is a very small step from that to home fuelling, as the Honda Civic example illustrates.

I guess really what I am saying in a longwinded way is: let us look at the easy options first. We are going to eventually need to deal with the hard options. All of the technologists and researchers are telling us that there are a lot of unresolved questions and they need time. Let us give them the time. Let us pick the easy options like natural gas. It is an inexpensive fuel. It is consistent with the government's policy on keeping fuel prices manageable. We have abundant supplies in Australia, so it is consistent with the policy of security of access. It is not that hard.

As to the other options, like conserving fuel, using hybrids and shifting to diesels, look at the comparison between Europe and Australia in the use of diesel vehicles. The demand is so high that virtually no diesel vehicles get to Australia because they are snapped up in Europe virtually as soon as they come off the manufacturer's floor. It is a very simple relationship. The cost of fuel in Europe is a damned sight more than it is here and people are reacting. Australians will react in a similar manner. I think there is something to be learned from this. Part of that lesson is that adjusting in short, small steps is a damned sight less disruptive than adjusting in big chunks. The big chunks will always be expensive and disruptive and they will always cause a lot of difficulties.

Senator O'BRIEN—In terms of compressed natural gas, there is one vehicle manufactured already, but presumably you could convert existing vehicles?

Mr Kaspura—You could convert existing vehicles. That was one particular example that appealed, because not only was the vehicle able to take the gas but it was associated with the experiment of home refuelling. I understand there are other brands of car in Australia that you can buy off the showroom floor as dual-fuel vehicles—LPG and petrol. There is a different type of modification needed for compressed natural gas, but it is of the same degree of technical complexity as the LPG. It is not that hard.

Senator O'BRIEN—I suppose the question that Treasury will ask is how they collect the revenue from fuel if it is put into the vehicle in the way that you suggest is possible.

Mr Kaspura—I guess that is right. But these are issues that need to be confronted if you want to in fact use that kind of fuel. I guess one of the difficulties that we are drawing attention to is that no-one is talking about it. Those policies are not being thought through. An option that is pretty viable is going through to the keeper. We would be happier if that issue were talked about and resolved so that the option could be brought into play. With regard to that article that I provided, that vehicle was released in 2004. At that time it was something of an experiment. That was a couple of years ago now. I bet it has proceeded beyond that.

Senator O'BRIEN—I recall an article in one of the Australian papers about the same subject—home refuelling—suggesting that the cost would be minimal compared to the current cost of fuel.

Mr Kaspura—The main issue with compressed natural gas is that the process of actually compressing it is reasonably energy intensive. If you want to do it quickly in the sort of time span that you would want to occupy at a servo, a lot of energy will be needed to compress it. But

the advantage of this home fuelling is that you can use a lower pump capacity to do it overnight. You have slow, steady refuelling overnight so that the actual energy cost is kept within reasonable bounds. There are flow-on implications because the energy you would be using is stationary energy, and if you are talking about greenhouse abatement then you have another set of consequences. You have to be concerned about the interactions.

CHAIR—I have one last follow-up question on infrastructure. You were talking about infrastructure earlier. How would you rejig government investment in infrastructure?

Mr Kaspura—We put out a press release on budget night welcoming what was happening. For a long time—six years—we have issued infrastructure report cards. They are essentially judgmental, based on information about the state of infrastructure for its current and future use. Road and rail infrastructure have both received a bit of a caning over the years so, accordingly, when we saw that being addressed we said, 'This is pretty good.' There is an imbalance between road and rail, but there is also an argument about the capacity of rail operators to quickly absorb large allocations. The evidence is that there is growing efficiency in the main-line track infrastructure from existing policies, and the allocations that were provided will help that along considerably.

That is not the end of the story; a lot more needs to be done. Principally, it concerns the transfer between modes. Stuff that is carried on trains eventually has to ship to its ultimate destination by trucks. It is at those railheads where there are still complications and room for improvement, and we have been saying this in our infrastructure report card process. A lot is happening. The big concern we have is that if it is all happening too quickly at present, when there is a skill shortage in engineers, it may not happen properly.

Senator HEFFERNAN—I have one final question and it is what I would describe as a 'drop dead' question. If the world's last oil and gas supplies were in the Antarctic, would you go after them?

Mr Kaspura—We do not have a view on that as an organisation; we have not confronted that.

Senator HEFFERNAN—I am so pleased that the Antarctic is not in this material that we have been given today.

Mr Kaspura—It is of a similar nature to the issue in stationary energy, where many people have asked the organisation why we do not have a policy on nuclear. The questions are of a similar nature. The organisation has resolved that, on those sorts of questions, we are not going to come up with a definitive policy. We are going to investigate the arguments for and against on a factual basis and we will promulgate that information as a way of assisting policy makers.

Senator HEFFERNAN—You have done well.

Senator NASH—Very briefly, there is home fuelling of these natural gas cars, which is very interesting. Are there any potential safety issues, though, with home fuelling?

Mr Kaspura—They are very similar to the use of gas generally. The same basic concerns are there for your cooker and hot water system at home. You have to ensure that the system's

integrity is intact, that you have not got any gas leaks around the place and that you do not inadvertently shove a shovel through the gas main, because they are not a huge distance underground. Other than those concerns, as far as I could tell from this Honda example, there were no particular problems. Where there is a filling implement in a home situation, there would be a risk of children getting at them and fiddling, which they are wont to do, and so you may need to govern access in some way. But, in terms of the gas, the technology is fairly well proven. People have been handling natural gas for a long time.

CHAIR—That is interesting. Thank you.

[12.35 pm]

MOORE, Mr Peter Byron, Executive Director, International Association of Public Transport (Australia/New Zealand)

CHAIR—Welcome to the committee hearing. I will not go through the terms of reference again. I remind you that these proceedings are public and that the committee may agree to a request to hear evidence in camera. We would then determine whether we should actually hear the evidence in camera. Giving evidence before the committee is protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee and such evidence may be treated as a contempt of the Senate. It is also a contempt to give false or misleading evidence to the committee. I invite you to make an opening statement.

Mr Moore—Rather than focusing on the technology issues, our submission focused more on the options for reducing fuel demand. Our organisation is an advocate for increased utilisation of alternatives to the private motor car. We are an organisation that has been around for about 130 years, based in Europe. There are not too many arguments that we have not seen before. We have been involved with submissions, particularly in Europe, with regard to this question. Europe, like Australia, is facing the same sorts of issues.

At the start of the 21st century, Australia, like much of the developed world, finds itself at, we believe, a critical decision point. For half a century, our cities have followed a growth pattern that has been possible only because of readily available and affordable motorised transport. Most of us now live a considerable distance from where we work, shop or socialise, but we still manage to get around in reasonable time.

I will quote from a brochure that we have just put out. In fact, it primarily deals with this committee's report. The brochure is called *Energy Crisis? Climate Change?—Breathe Easy*. I have some copies that you might like to look at afterwards. The brochure states:

Without this mobility, our cities would have been quite different—more like the older—

European cities—

... compact suburbs close to our city centres.

They would be healthier places to live and perhaps we would not suffer the problems of dispersed cities with issues about road tolls and health problems. You have seen some of the issues with obesity in children being quoted in the media in the last few days. The brochure continues:

Many of us thought this low-rise expansion could go on indefinitely, but it is now clear we were wrong and that we will have to re-engineer our cities over the next few decades.

Firstly, it's now clear that the age of low-cost energy is coming to an end and that, over the next 10 to 20 years, many of us will not be able to afford to drive the distances that we presently cover.

Secondly—

we believe—

the jury is no longer out on climate change. Unconstrained use of carbon-based fuels is a major contributor to global warming and, for this reason alone, we must moderate our use of oil and coal.

I am sure the question about the energy outlook has been addressed many times over the last two days, and I will not go into any detail on that. One of the interesting issues stated in the brochure is:

Half of the oil that ever existed has now been consumed in less than 100 years

I get very worried when I see oil companies starting to talk about oil depletion. I again quote from the brochure:

All fossil energy sources are finite ... in fact, at current rates of consumption, the remaining lives of our oil and gas reserves can probably be measured in decades and their decline will have far-reaching economic effects. For instance, as our own oil fields are exhausted, we will become dependent on imports with significantly increased exposure to price rises through increased demand, currency fluctuations, and the ever-present risk of supply disruptions ...

Undoubtedly, we are seeing evidence of that already.

Oil and gas supplies won't just dry up overnight; they will tail off over several decades and the associated price rises will make alternative fuels more attractive ...

There is no doubt that there is no magic bullet in any of this. We believe that 50 ideas are required to encompass this current debate. The brochure continues:

Even if our oil, gas and coal reserves were limitless, we would still have to confront the need to limit their use. This is because the atmosphere can no longer absorb the products of their combustion. If we don't find a way to prevent the release of greenhouse gases, or move to alternative non-greenhouse energy sources our climate will be—

as has been suggested—

destroyed forever.

Where do we go from here?

Clearly we can't go on living as we do, given the twin challenges of fossil fuel depletion and climate change. But, if we are to achieve a sustainable environment, profound changes will be needed—

particularly in our cities. I am sure that much of the current debate before the committee is about what is happening in our cities around Australia. Given that 90 per cent of our population live in the urban centres, it is a crucial debate.

Let us consider some of the changes that might be necessary. As an organisation, we are focused not so much on technology—what car might or might not work or what fuel might or might not work—but more on other ideas that might be appropriate. We suggest that it is time to start planning for a better balanced portfolio of travel options. The combination of private cars and public transport systems needs to be optimised. We need to identify and reserve future transit corridors. We need to set firm agendas for that development and establish budgets, not only for transport infrastructure but also for the operation of them. We must take steps to preserve existing corridors, for both heavy and light rail and bus ways—and to set clear goals for their development.

You have probably heard the term 'transit oriented development'; we call it 'transit integrated development'. Again, we believe that there is no magic bullet for any of this current debate. There is the ever-present issue of where the money comes from to supply all these changes—and that is always a justifiable concern—and the strategies that may be necessary to extend the use of public transport over the next few decades. We should not overlook the funds that are already invested in transport, which are at present mode specific. We cannot continue to separate funds in this way. When we look at the federal budgets over the last 20 or 30 years, it seems that they start off with roads funding and whatever is left goes into what we term 'transit integrated development'. The pie is going to have to be cut up differently.

We believe that, in future, public funding must be put into one pool and allocated between transit and roads according to need as demonstrated by cost-benefit analysis. It is now clear that there is a place for road congestion charging. I am sure that most of you have heard about the cordon charge in the UK. In fact, in the UK, the Mayor of London, Ken Livingstone, has just bought 100 new buses with money from last year's fund. We believe that the London CBD cordon charge has been an outstanding success. The city of Manchester and cities in Europe such as Stockholm are seriously looking at it.

Sooner or later we have to come to a point in Australia where we recognise the value of alternatives to the private motor car. I am a little perplexed about the way in which we price transport in Australia. We price electricity and water in terms of what we consume, but we do not do that for public transport and the private motor car. We believe that the basic behavioural change will occur when people have a feel for 'the behaviour I choose to take, I pay for'—in other words, I pay for what I use.

These days we all know the situation where we pull up at the petrol pump and put in the $80 or $100 worth of fuel. But, if included in that cost were the registration charge, insurance charge, road pricing charge or whatever, our behaviour might be a little different. For example, the new transport secretary in the UK is about to introduce road pricing there. Perhaps it is time for us to look at some of those policies for Australia.

Currently, we have some pretty silly ones. I am sure you have seen some of the media releases from Minister Watkins, Minister Batchelor and others about the fringe benefits tax. We have this ridiculous situation where people who are able to take advantage of fringe benefits tax

advantages are driving their cars a little further so that they can reduce their tax. This is absolutely nonsense policy. We are funding the Greenhouse Office to the tune of many millions of dollars to change this behaviour, yet we have a taxation policy which says that, if you drive further, you pay less tax. The message that sends to me as an individual is that people are being encouraged to have a motorcar and to use it more. This is absolute nonsense policy, and we make no bones about it.

Our plan for the future—and I am sure you are going to get a lot of these over the next few weeks—is firstly to improve city design by limiting further low-density sprawl and encourage more compact urban layouts that can be supported by transit systems. Secondly, we need to clearly set out the costs of alternative travel options, including the costs of congestion, energy, air pollution and health, and then get the pricing right. In other words, you pay for what you use. If I choose to have a certain behaviour with my travel then I pay for it. We accept this with water, electricity and many other things. With transport, for some reason unknown to our organisation, we do not seem to be heading down that path.

We need to reserve new corridors for transit and protect existing corridors. In no place is this more important than in Sydney, Melbourne or Brisbane. We must allow for the provision of quality, high-frequency services that maintain mobility within defined energy and greenhouse budgets and provide what we term 'quality alternatives' to the private automobile. Particularly with public transport, we focus on what the minimum is. I heard a little bit of previous debate about what option we should take with public transport. Our suggestion is that, if you give people a quality alternative, they will use it. If you give people a transport choice, they will use it. Our secretary-general, when he comes here from Europe and I take him to our cities, says: 'We've missed the train. Where do we catch the bus? Where do we catch the tram? What choice do I have?' The usual answer is, 'Well, we have not got one—we either wait for the train or use our car or a taxi.' That is the issue we believe we face in Australia.

We do not believe there is any magic solution to the problems we have currently. We believe there are many issues that need to be addressed and many things that need to be implemented. But our strong suggestion is: let us get some of these policy things such as fringe benefits tax right, for goodness sake. Our people in Europe have been continually perplexed for the past 10 years that I am aware of by this particular policy issue.

Senator MILNE—I would like to explore the congestion tax ramifications. We read about how successful it has been. London, of course, has a very efficient tube system. Was there an adequate public transport capacity in place so that people had the option to make that shift? I am asking this in this context: if we did this in Sydney next week—if we introduced a congestion tax—would the public transport system be adequate for people to make the shift?

Mr Moore—Absolutely not. It is running at capacity now. If you look at Melbourne, with the fuel problems we are having currently, patronage has gone up some 30 per cent. The trains are packed. They are at 120 per cent of capacity every morning and afternoon. Sydney is worse. We see problems in Sydney with running trains on time. We do not have an alternative. To introduce a cordon charge into Sydney at the moment to encourage people onto public transport would not be a pleasant experience. There are many reasons for that. We have had no real investment in public transport in any of our major cities, I suggest, since the Second World War. We have had some airport rail links built, but real metro systems have not even been thought about. We have

never had the debate in Sydney, for example, about a metro system for Sydney. We argue about the light rail or the bus down George Street, but what would be the solution perhaps in 30 years?

In the UK and in London in particular—and I am sure that many of you have experienced the tube—the tube is an interesting experience in the morning. If you had another option which was perhaps slightly more pleasant, such as the bus, you would take it. People in the UK are doing that. I saw a figure last week showing that patronage had gone up 12 per cent on buses in London in the last 12 months.

As to the secret to cordon charging, we had a world congress in London in 2001, when Livingstone was about to introduce the cordon charge. There were two factors involved in the way it came about. Firstly, he was putting his whole future on the line if it did not work. He said to us, 'If this doesn't work, in three months time I will not be here.' Also, he said, 'Every pound I collect from that cordon charge I will use to buy a bus with.' Every year he has, and he has publicised and benchmarked it. The community has accepted it. We believe there is an opportunity here in Australia to perhaps have a cordon charge in Sydney or Melbourne in a certain area and then use the money to buy alternatives to create that quality option.

Senator MILNE—That is the point I wanted to get to. I absolutely appreciate the success of it overseas, but to introduce it for Sydney right now, for example, would create chaos for the reasons you have outlined. Have you looked at the options—say, for Sydney—for introducing it, with equity considerations as well, to certain parts of the city? What would you suggest? From what you are saying, we clearly need a major investment in public transport to get ready for it and we need to have the introduction of it when we have the capacity. It is unlikely that we will get that in one go. Have you modelled a phase-in in that context?

Mr Moore—Indeed we have. A number of studies have been done for the City of Sydney Council, for example. I have suggested to somebody that I never want to see another study on what could happen in Sydney with cordon pricing. We do not really need it. It has been done, and I can supply you with many examples of that. The secret to making it work in Sydney is to at some point eliminate cars from the city. If we put a light rail system down George Street it would not work, in the same way that the buses do not work at the moment, because it would be hindered by traffic. If we introduced a cordon charge at the same time, with perhaps restrictions on cars moving in and out of the city, it would work. But, again, the key point is to sell it to the community. We need to say, 'Every dollar we collect will build an alternative, whether it is light rail or bus lanes or whatever.' That is the hard bit. I believe that with many of these things the technology is easy. The behaviour, the policy and the leadership are the difficult bits.

Senator MILNE—One other point I would like to take up with you is the issue of urban planning. Again, Europe has some advantage because in many ways the area of the city is defined due to high population density and small physical areas, unlike in Australia where the assumption is that we can just keep on growing cities as far as they can go. Are there any European or other overseas comparable examples, from your networks, of where a city has basically said: 'Right, that's it. We're drawing a line around here and we're not expanding it any further; then we're going to backfill with our transport systems'? Where can we look for that sort of model? I am aware of what Perth has done. I was really impressed by what is going on there, compared with anywhere else in the country. Are there any good overseas examples we could look to, regarding this urban design issue?

Mr Moore—Canada is a good one. Toronto started 30 years ago with this issue—and that is how long it takes; there is no question about it. One would suggest that they have lost impetus in the last little while. But the urban planning issues they addressed 30 years ago are worth looking at. They are applicable to Sydney, Melbourne or Brisbane. It is an issue that in certain parts of the United States, for example, has been addressed very well. Portland is a great example again. I am sure you have heard about that.

It would take Sydney 30 to 50 years to get to a point where we could take advantage of some of those strategies. The corridors are there in many respects—Parramatta Road and some of the rail corridors that have been set aside and are being set aside. We absolutely have to get that right today. If we do not, we really will not have a solution if we try to address these issues in 10 years time. I suggest that the time to start is now. I am sure that you have heard many people say that. We are not in crisis mode at the moment, unless something diabolical happens with fuel or whatever. Behaviour would change very quickly and our systems could not cope, particularly our public transport systems. But there is the opportunity to start today with policies that support changes to urban planning. Those sorts of issues are absolutely essential.

Senator NASH—I have something to note, then a very quick question. Something that has been raised again, as it was in the last hearing, is the negative impact of the increase in oil prices falling disproportionately on the outer regions of metropolitan areas and the lower socioeconomic groupings. It is important that the committee note that that was raised at the last hearing and has been raised again. Mr Moore, in your submission, with regard to public transport, you point out:

Every poll conducted on this issue in the last five years shows the public favor more investment in public transport and less in road funding.

Can you tell me who was polled, what was the percentage of people—metro versus rural and regional—and what the results were?

Mr Moore—Sure. The Warren Centre in Sydney has done a lot of work in this area. Western Australia has conducted a lot of polls. We have done an international poll in this area. I have yet to see an attitudinal study that does not suggest that people are extremely interested in alternatives to the private motor car. The poll in Sydney was very interesting. The question was asked, 'What is your biggest problem about living in Sydney at the moment?' This was the Warren Centre poll in 2003. The response from some 72 per cent people was: 'Traffic. Transport. I can't move.'

I rang my daughter this morning. She lives in Ashfield in inner Sydney and she has a work placement out at Mount Druitt next week. She said: 'Dad, I can't get there. The trains are there but they are so unreliable I can't guarantee getting myself to work on time.' She had a car, in which she had a big accident on Parramatta Road a few weeks ago. Those are the implications of living in Sydney at the moment.

Senator NASH—I understand that completely, but it was a broad statement. I just wondered if that included regional polling or it was purely metro polling. I have a suspicion that regional people would say they want more in road funding as opposed to public transport. Do you have any figures you could supply to the committee that might give us a more definitive idea?

Mr Moore—We sure do.

Senator NASH—That would be good.

Mr Moore—The line between outer metropolitan, and regional and country is becoming somewhat blurred. I am a little frightened about what might happen in our major cities if fuel went to $100 a barrel. For residents of Western Sydney who have two, three, four or five cars and no option except to use the car to get to work, it is a little frightening.

Senator O'BRIEN—I guess it goes without saying that you are a critic of the federal government's AusLink program because it excludes people transport.

Mr Moore—We are quite open in our criticism. We felt that AusLink was an opportunity lost. I have been quoted in many media outlets over the past couple of years suggesting that that opportunity could be brought back again, but it is not being taken advantage of. I believe that this will perhaps become a higher profile issue if fuel goes to the levels it is predicted to, particularly in outer metropolitan areas.

Senator O'BRIEN—Yes. That is another question. One of the debates we have been having is about the replacement of oil with other fuels, which may ultimately cap the price and mitigate the investment in public transport. I asked in relation to compressed natural gas vehicles, which you could refuel at home, how you would collect the tax in that circumstance. That would be a pretty attractive option for those people in Western Sydney, I imagine.

Mr Moore—Indeed it would. In answer to how to collect the tax, you could collect it at the wellhead, in the same way you do with oil.

Senator O'BRIEN—Except that that fuel is used for other purposes as well.

Mr Moore—That is right. There is a little bit of tinkering that needs to go on there. It is a difficult question. I think the issue at the moment, and I am sure you will hear a lot about it, is about technological solutions. Perhaps they are appropriate in certain areas, but we lack focus on policy, behavioural and other possible solutions. For example, I come back again to the FBT question: if you gave people a small financial incentive to use an alternative, would they use it? That was introduced in Canada and the US some years ago. The suggestion, particularly from Canada, is that that one policy results in a three to five per cent modal shift to public transport.

It would at least level the playing field. We are not suggesting there is a black-and-white solution where we take the tax off cars and give it all to public transport; there are a lot of variations in between. But we could publicise it widely so that people would feel they were getting an advantage by using other forms of public transport. Send them the message, 'If you choose to exhibit this behaviour, there is a financial incentive in it for you.' I believe we need to move away from purely thinking about whether they are gas, petrol or diesel cars. That is all fine; they will be appropriate in certain areas. We are neglecting these other possibilities.

CHAIR—Getting back to the equity issue and the outer metropolitan areas. You made the statement, 'You use it, you pay for it,' or words to that effect. While I do not disagree in theory, of course that would have a greater impact on those that have less capacity to pay. How would

you suggest we deal with that, particularly as a lot of our cities—other than Perth, where we have a rail system that goes to some of our outer metropolitan areas—do not have good public transport systems yet.

Mr Moore—Indeed. There are some social equity issues there that obviously need to be addressed. Some rebates if one lived outside a certain area might be appropriate. It is important when we introduce such a policy as that that we do not send the wrong message—that we are encouraging you to perhaps live in outer metropolitan areas without other forms of public transport. There is no doubt one could not just say, 'If you choose to live in Mount Druitt, you have a certain level of income and you own a petrol driven car, you are going to be penalised.' That certainly needs to be addressed. I believe there are social equity issues there that, if gasoline did go to $100 a litre, it would be necessary to address almost overnight because people would have no other option.

CHAIR—We heard evidence in Perth—I think it was from the Association for the Study of Peak Oil—about the rationing of petrol and the idea that you could get an allocation of petrol and, once you had used that, you would pay a lot more for more petrol. ASPO said that you could do it at the petrol pump with a card—everyone would have a card and would rack it up on their card. Have you thought of things like that? It did sound like it could be a fairly rational policy approach if we had to come to look at it. They were saying that, if you lived in the outer metropolitan area and you had a lower income, your ration may be higher because you do not have access to a good public transport system.

Mr Moore—I can remember some 25 years ago developing a fuel-rationing plan for Australia. Those plans are available. It could be done. Variations include that you are entitled to more fuel if you live a certain distance out or whatever. That could happen quite quickly. I think we got to the point of almost printing the ration cards. That was in the days of a shortage of oil rather than high prices. That sort of thing could certainly be a possibility. There are many great ideas out there about what is possible. Our overriding aim is that in current times, with fuel reasonably plentiful albeit pricey, if you choose to travel using a private motor car with one person in it you should pay for it—it is visible to you, so you feel it. At the moment you do not feel it. When I pull up to a petrol pump and put $60 worth of petrol in my car, it is hard, but I do not really feel it after I have left the petrol station. That is the issue. We have it with water and electricity. If I choose to turn the tap on, I pay for it; if I choose to put the heater on for eight hours instead of seven, I pay the extra amount. But if I choose to drive, I do not really feel it.

Senator MILNE—Is there a modelled relationship between oil prices and public transport? Is there a straight line relationship between how, as the price of oil goes up, so too does public transport patronage?

Mr Moore—That is an interesting question. I asked the same question. No, there is not modelling for that. There are elasticity models for fare increases and public transport. The old rule of thumb was that, if fare prices went up three per cent, patronage dropped off by a certain amount. The model about if fuel prices go up by a certain amount patronage goes up is being done. Our anecdotal evidence, particularly from Melbourne, suggests that in the last 12 months patronage in the peak has gone up 30 per cent. I suspect Sydney is even higher. I suspect Brisbane is slightly lower than Melbourne. There is no doubt that people are voting with their

feet. If there is an alternative and they can get to work on time, they will use it, irrespective of whether or not it is uncomfortable.

Senator MILNE—Just as far as this committee's report goes, are you collating any of that material in the next three months or so in relation to Melbourne and Sydney?

Mr Moore—We are, yes. We will certainly send that to you.

Senator MILNE—Good—I was going to ask if you would be prepared to table it with the committee when you had collated it. Thank you.

CHAIR—I understand that you were going to table your pamphlets.

Mr Moore—Yes. Some 12 months work has gone into that from what we call our policy committee here in Australia on our view about where some of these policy areas should be addressed and how they can be addressed. I will leave some copies with you today.

CHAIR—That would be much appreciated.

Mr Moore—It is available on the web on www.uitp.com. Some of our best minds have addressed the issue of where they see the future of decreasing fuel, increasing price, increasing demand for public transport and what needs to happen now. I suggest that it is one of the best pieces of work that we have done in the last 10 years.

CHAIR—As there are no further questions, I thank you for appearing.

Proceedings suspended from 1.04 pm to 2.04 pm

ROBERTS, Mr Kevin, Vice-President, Australian Lot Feeders Association

CHAIR—Welcome. You would know the terms of reference so I am not going to go over them. I remind you that these are public proceedings, although the committee may agree to a request to have evidence heard in camera or may determine that certain evidence should be heard in camera. You may request that your evidence be heard in camera and we will discuss that request. I remind you that witnesses giving evidence to the committee are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to a committee. I invite you to make an opening statement.

Mr Roberts—Thank you, Chair. By way of introduction, I am the Vice-President of the Australian Lot Feeders Association. I am also a director of a family lot-feeding business in Queensland. I think the ethanol debate is probably the biggest threat to my industry since the last chemical residue crisis that we had in the late nineties. The Australian Lot Feeders Association would like to put forward a paper prepared by the Centre for International Economics. It supports the paper that was put in by the Livestock Feed Grain Users Group. It goes without saying that many and varied studies in recent times by independent authorities have clearly shown that there is a threat, particularly to intensive livestock industries and their viability. I attended the ethanol conference in Brisbane this week and I found it interesting that, although almost every speaker at that conference called for a mandate, the United States keynote speaker and the Brazilian keynote speaker said that unless ethanol were mandated it would not be viable, which supports very clearly the studies that we have conducted and the studies that were conducted by the likes of ABARE and the CSIRO.

The things that I am best equipped to be able to describe are the differences between the way agriculture in Australia operates and how giants such as the United States and Brazil operate. Our industry—and I am familiar with the lot-feeding industry although I have had some experience in the pig industry—is export focused. It is export based; it is export priced. Even though there is a very strong demand, particularly through supermarkets, for grain-fed beef in Australia, the price is ultimately set by the export market. When we are considering the benefits or disadvantages of ethanol, it is very important to note the impact that it can have on a small nation. Although we in Australian agriculture often think we are a big noise, on the world scene we are a very small noise.

My memory of the drought in 2002 concerns grain prices. Sorghum went to $320 a tonne and wheat went to $355 a tonne but, by the simple importation of grain to the seaboard by the chicken industry, the price of grain fell by $85 a tonne virtually overnight. I raise this to demonstrate the volatility of the grain market in this country. This country is not awash with grain, although at times people would have you believe that we have giant surpluses.

In recent times, as we are all aware, the climate seems to have changed. I am still resisting giving into climate change at this stage, but in fact, in a sense, in the middle of the nineties—1994 through to 1996—there was a shocking drought on the eastern seaboard of Australia. In

2002 we did not seem to have a physical grain shortage, but, just because the market stalled, we saw grain prices go to a limit that we have never seen before.

We were able to survive in the export market because the United States, too, had difficulties in 2002. We have enjoyed in the last couple of years a holiday, as I would put it, because the United States have not been in our premium market, Japan. For them it is a very sad dilemma, but for us it has been something of a magnificent holiday. We should not let the way our cattle industry has buoyed, with the United States out of that market, run away with how our market is travelling. With those comments, I will be happy to answer questions or put forward any other comments as required.

Senator HEFFERNAN—Did you bring a mattress?

Mr Roberts—No, but I am pretty used to—

Senator HEFFERNAN—Because I am about to back-slam you and I thought it would be a softer landing!

Mr Roberts—Thanks very much!

Senator HEFFERNAN—What proportion of the feedlot industry is owned by vertical integration with a multinational connection?

Mr Roberts—There is about a million head of capacity in Australia. The majors, which I believe you are referring to, including AMH and other—

Senator HEFFERNAN—And Rockdale and whoever.

Mr Roberts—Yes. I would say that it is probably in the order of—

Senator HEFFERNAN—three-quarters.

Mr Roberts—No, I do not think it would be that high, as yet. I may stand to be corrected, but I think it would be less than 50 per cent of today's capacity.

Senator HEFFERNAN—I agree with you on what happened when it went to 320 bucks, and Hunter Grain brought that wheat in and put import parity into the equation. The flaw in your argument is import parity; you are not talking about import parity.

Mr Roberts—I am talking about all markets—

Senator HEFFERNAN—You could bring wheat in now from the Argentine, which is a lot cheaper than ours, if we let you.

Mr Roberts—We cannot, in fact. The feedlot industry cannot import grain because of the up-country, and we support that.

Senator HEFFERNAN—I know that. But the price is more likely to be controlled by what is happening at the Chicago exchange than what is happening to our ethanol industry here.

Mr Roberts—I do not believe so, because what you would have is an induced drought.

Senator HEFFERNAN—Let us just go through it then.

Mr Roberts—Okay.

Senator HEFFERNAN—World grain supply reserves are at a low position. Do you agree with that?

Mr Roberts—Yes, I would.

Senator HEFFERNAN—And our grain prices are at a 15-year low and, historically, are among the lowest they have been in the last 40 years. You expect us to accept an argument from you that you want to operate in a continuous market with those conditions. As you said, it is export oriented. You want the profits to be borne by your side up rather than our grain side down. With our fuel and our tractors everything is doubled or trebled, and with fertiliser we have a world cartel to deal with. The lot feeders have a flawed argument to come in here and say, 'We don't want this to happen because we don't want Australia's wheat growers to get the best price they can get in what the market will bear.'

Mr Roberts—No. That is not the argument at all. The fact of the matter is that we operate on a world market—

Senator HEFFERNAN—You do, I know.

Mr Roberts—that is, our produce, whether it is owned by the multinationals, as you call them, or not. But the fact of the matter is that there are other people within the cattle industry. What needs to be very clearly understood is that in the lot-feeding sector there could well be a casualty, particularly if mandating were to take place.

Senator HEFFERNAN—That's bullshit.

Mr Roberts—But, more particularly, the cattle industry will be the big loser.

Senator HEFFERNAN—No, sorry. You are not allowing for vertical integration. Take our dairy industry—which is one of the most inefficient users of irrigated water, I have to say. I think the landscape is going to change dramatically because attached to most ethanol plants is a downstream industry, whether it is a feedlot or a huge dairy of 5,000 cows. Are you taking that into consideration? The feedlot industry is a by-product of an ethanol industry.

Mr Roberts—I know the point very well.

Senator HEFFERNAN—Sure you might have to change the location, but what the hell—why wouldn't you go with it?

Mr Roberts—I understand the use of the by-product very well. In the lot-feeding industry, the maximum that we would be able to use is 20 per cent of our ration. In the dairy industry they would be able to use more. The dried distillers' grains may be able to be used by the pig industry at up to something like 50 per cent of their ration. But I can assure you—and I repeat—that if our particular sector is not viable then indeed we will pass that on to the broader cattle industry.

Senator HEFFERNAN—You will pass it backwards instead of forwards; that is what you will do.

Mr Roberts—We have no ability to pass it forward.

Senator HEFFERNAN—With great respect, the people who own these things—and I will not name the companies—get an unfair tariff advantage in going into some other countries through vertical integration. You will pass it back, for sure. We are talking about market power here—consolidated lot feeding and consolidated retailing. Everyone wants the sucker to be at the back of the fence; I say the sucker ought to be at the front of the fence.

Mr Roberts—We are quite happy to let the market forces be the determiner of the marketplace. We do not have the ability to determine our end price. It is determined by the marketplace. I have been in agriculture for quite a long time and I have seen agriculture be the pawn in many a debate.

Senator HEFFERNAN—But, with great respect, the argument you are using is that, regarding the price of water, which is now tradable, you want to put some sort of a floor in the market—or a ceiling on the market. That would be as silly as saying, 'If you can make better use of water through growing grapes or hoochie-coochie or whatever, and you can pay $1,000 a megalitre where somebody else can only pay $200 a megalitre, then the bloke who is paying $200 ought to be retained in the market, not the bloke who can pay $1,000.' It is just interfering with the market.

Mr Roberts—I think interfering with the market is underpinning one sector against another. Regarding the ethanol industry, for instance, we have accepted that until 2011 there will be a rebate on the excise. We accept that—and the fact that there is a call on the mandating of ethanol. If ethanol is not able to compete viably on today's market without support, then I do not understand it at all.

Senator HEFFERNAN—I agree that, as with the tax incentives for the forest industry or whatever, you have to have some equity in the market in terms of subsidies. I agree with you on that. You cannot have some open-ended subsidy for the ethanol industry that puts all the cattle guys out of business. As for the argument that I have heard many times—that somehow grain is going to get too dear—I was over in South Australia the other day talking to people from two or three of the major wool studs; I will not name them. I said to one, 'You've had some famous sheep.' He said, 'We don't have any sheep any more. We grow wheat. There's more money in wheat.' That is how the market works. If there is no money in feedlots and cattle, people will do something else. Cheerio for the wheat growers, for God's sake.

Mr Roberts—That is fine, but it is my responsibility to point out to you—

Senator HEFFERNAN—I appreciate that.

Mr Roberts—that our industry could be a casualty, but with it will be a lot of cattle producers in this country. It is true that there are those vertically integrated companies that Senator Heffernan talks about, but they buy Australian cattle from Australian cattlemen.

Senator HEFFERNAN—And do a wonderful job with them, too, I might say.

Mr Roberts—Yes. But I think it is important that that is clearly understood.

Senator HEFFERNAN—But, with great respect to all those people, if Cargills, for example, can see a global advantage, as they could when we had the meat export review, they will take it. When we divided up the 378,000 tonnes of quota into America, where there was a contingency quota attached to the market as well, it was discovered that, for global purposes, that contingency quota could be used somewhere else in the globe in a particular corporation's better interest, to the detriment of that corporation's operations here. That is how these guys work. I say: let the market sort that out. We are being murdered by a fertiliser cartel. No-one wants to talk about it, and we are expected to cop that. We are expected to cop fuel prices and all the other increases, and you say, 'We have to stay down there.' I say, 'We don't.'

Mr Roberts—I did not say that we need to stay down there. I am pleased to correct that. I said that the market forces should be the thing that determines the price of all commodities, not some support to one side of an industry as opposed to another. That is what I want you to clearly hear. We believe what Senator Heffernan is saying: the market forces should be the determiner of price, not some support, as has been the case. If you mandate 10 per cent ethanol in this country you would need 12 million tonnes of grain, as estimated by CIE and others. If you take 12 million tonnes from the eastern seaboard, where over 85 per cent of the feedlot industry—

Senator HEFFERNAN—Are you allowing for the sugar? We might double or treble the sugar market.

Mr Roberts—It makes a lot of sense to be making ethanol out of sugar—

Senator HEFFERNAN—Or bush trees? You are saying it will all come out of grain. I would be saying that if I were you, too.

CHAIR—Let Mr Roberts answer.

Mr Roberts—If you have a look at the proposed ethanol plants in Australia, most of the proposals—one billion litres are being proposed—are based on grain based ethanol, not sugar. That is our argument and that is why we think it would be foolish to continue to have support, whether it be after 2011 or whether it be through a mandate.

Senator HEFFERNAN—Which says to me there will have to be a lot of feedlots attached to that billion—I know the proportion.

Mr Roberts—I wish to remind you that only 20 per cent of our feed can come from the ethanol by-product. What a feedlot is about is building muscle, and it needs protein and energy.

Senator HEFFERNAN—But what you are not allowing for is that you will be holding the cards, if that is the case. You will be able to get your base product—the 20 per cent—for sixpence if what you say is true, and that will offset the increase in the grain price, because it is supply and demand. If there is an excess of the downstream product, you will get it much cheaper because you can just say, 'Sorry, old bud,' like the grape growers are now copping it. They are the bunnies. That will more than offset the price of your grain. I entirely disagree with your argument, but I think it is terrific that you are putting it.

Mr Roberts—I know that our research shows differently to that. I pointed out 2002 and I did that very specifically. There was not a physical shortage of grain on the eastern seaboard of Australia but, because of the way grain is marketed in Australia, the price was able to walk to a height that I have never seen in my entire life, and I have been farming for some 36 years. That was a false market. We would effectively create a false market—at least one every three years—because very notable climatologists are telling us that we can expect a drought in this country every one in three years. That frightens the hell out of me; it really does.

Senator HEFFERNAN—I can remember that we stored wheat and got 320 bucks a tonne for it and then, as I say, my good friend brought in that one load and dropped it to 260 or 270 bucks overnight. The market will compensate. You can bring wheat in as long as it is cooked.

Mr Roberts—Only to the seaboard.

Senator HEFFERNAN—You can bring it in. You do not want us to apply import parity to you, but you can apply import parity. In other words, your argument is a false argument, in my view, because you could import and you could add that to the downstream product of an ethanol plant. I think you are having a good go but—

Mr Roberts—Senator, I have been having a good go for 20-odd years.

Senator HEFFERNAN—But nobody has been having a good go back at you.

Mr Roberts—That is not true. You are not the first one to have a go at me about this argument. The facts of the matter are—

Senator HEFFERNAN—So what stops you from importing? Why isn't the price the determinant of what Chicago says and the import parity issue? Why isn't that the determinant?

Mr Roberts—Because we cannot import grain up-country in Australia.

Senator HEFFERNAN—No, but other people can, which takes them out of the local market.

Mr Roberts—Yes, as was the case—

Senator HEFFERNAN—So if you are getting a proportion of your feed stock from downstream—and it may not be a giveaway—

Mr Roberts—It would be a giveaway.

Senator HEFFERNAN—I mean, if there were an excess, it would be cheap.

Mr Roberts—That is possible, but at this point that is not how the numbers run, and we have studied this very closely.

Senator HEFFERNAN—Anyhow, I think you have done really well.

CHAIR—So you have done some work on factoring in that 20 per cent of the feed stock is wasted for ethanol? Have you done some figures on that?

Mr Roberts—Yes, we have.

Senator HEFFERNAN—How did you price it?

Mr Roberts—We priced it on indications from the ethanol producers, at the price that they have indicated. At the price that they have indicated, we would not even want to buy it, to be frank. We have priced it against other products, such as silage. We have tried to be completely realistic about this. It is really not the price of that product that will determine it. It will be the false shortages created by the 80 per cent of our grain requirements in our rations.

Senator NASH—I am having a little trouble getting my head around the premise that you are putting forward, but I will persist. What you are saying is that there should not be any government assistance to an industry if the result will artificially change a market?

Mr Roberts—Yes, that is a good start.

Senator NASH—Excellent. You have also said that you will let market forces be the determinant. So you are saying that government should not really be involved in any way, in terms of assistance to industry?

Mr Roberts—In continuing to support a particular industry while there are other industries out there without similar support.

Senator NASH—Could you tell me—and these questions require simple yes or no answers—whether the pork industry has had any assistance from government over the last 10 years?

Mr Roberts—The pork industry could have. I am not familiar with it.

Senator NASH—In your position, you are not familiar with whether or not it has?

Mr Roberts—I would not know to what extent the pork industry has received support. I am in the beef industry, not in the pork industry.

Senator NASH—But you are here as a representative of the Lot Feeders Association, which represents the pork, chicken and dairy industries. I would have thought that you would have a reasonable knowledge of their industries.

Mr Roberts—I have some knowledge, but I do not know to what extent they have been supported.

Senator NASH—All right.

Senator HEFFERNAN—The answer is yes.

Senator NASH—Thank you, Senator Heffernan. I will be all right. What about the beef industry over the last 10 years, if that is your area of interest? Have you received any assistance from the federal government?

Mr Roberts—I would have to say that, if you are referring to—

Senator NASH—I am talking about the premise of government assistance to industries, so is the answer yes or no?

Mr Roberts—I guess the answer would be yes.

Senator NASH—Are you aware of whether there has been any assistance to the chicken industry?

Mr Roberts—I am not aware.

Senator NASH—Could you take on notice the questions about the chicken industry and the pork industry, as they are part of your organisation, and come back to us with the answers?

Mr Roberts—Yes.

Senator NASH—What about the dairy industry?

Mr Roberts—The dairy industry certainly has.

Senator NASH—So what you are saying is that the ethanol industry should not receive any assistance from government, even though all those other industries have received assistance from government. The premise that you are putting forward, in terms of the ethanol argument, is that government should not assist industry.

Mr Roberts—Senator Nash, I think you are trying to put the argument that these industries have had assistance. The ethanol industry is already receiving a very substantial leg-up, and we believe—

Senator NASH—I understand that, but you are saying, 'Let market forces be the determiner; government should not be involved in the ethanol industry,' when the industries that you represent have received assistance from the federal government—and quite rightly, I might say, in probably all instances. So to me it seems irrational that you can say, 'These industries should be able to get help from the federal government, but the ethanol industry should not.' I am having a bit of trouble seeing how you arrived at that conclusion.

Mr Roberts—I am quite happy for the ethanol industry to receive its benefits until 2011. You do not see any mandating of beef, chicken, pork or any of those things. If any industry needs support to help it through a time of crisis, I have no problem with the federal government supporting it at that time—for example, the sugar industry. There have been lots of industries that have been supported through times of crisis. In agriculture, I support that. However, with ongoing support—and this is the real point—it ought to be market forces that are driving the industry. If the industries that I represent here today need ongoing support forever then I think that we need to have a very close look at that.

Senator NASH—I do not think anybody for a second is saying that we should be assisting any industry in an open-ended way. But there might be some that say that those in the grain industry suffering from historical lows in grain prices need assistance and, therefore, by association, assistance to the ethanol industry would help the grain industry as an agricultural industry. But I just want to get to this issue of a mandate. Your premise, and correct me if I am wrong, is that if a mandate were introduced it would take a certain amount of grain out of the market that you buy from. Is that correct?

Mr Roberts—That is correct.

Senator NASH—Right. So how much grain do the lot feeders use per annum at the moment?

Mr Roberts—About 2½ million tonnes of grain, and collectively the Livestock Feed Grain Users Group use around 10 million tonnes.

Senator NASH—And I gather you have done quite a bit of work on the effect that the mandate would have.

Mr Roberts—Yes, we have.

Senator NASH—Have you done it at different percentage levels? I would imagine that, if you are talking about half a per cent, 10 per cent, 20 per cent or 30 per cent, the volumetric impact that that would have on your rationale would be substantially different.

Mr Roberts—It would make a difference.

Senator NASH—Have you related that back to the potential difference in price?

Mr Roberts—We see that the price changes, and we can support our argument. As I said, in 2002 there was no physical shortage of grain on the eastern seaboard; however, the price walked beyond true market forces, we believe. It continued on because—

Senator HEFFERNAN—That was a little con job, though; it was sorted out by one load of imported wheat.

Mr Roberts—It was a pretty big load, Senator; it was 300,000 tonnes, to my recollection.

Senator HEFFERNAN—I am familiar with it. I dealt with it.

Mr Roberts—It is a pretty substantial load of grain.

Senator NASH—But what you are basically arguing is a supply and demand issue, isn't it?

Mr Roberts—Correct.

Senator NASH—You are saying that if the supply comes out then your costs will increase.

Mr Roberts—Yes.

Senator NASH—Could you supply for the committee—I appreciate that you would not have it with you now—the work that you have done on those different levels of mandate and the cost impact that you related to your industry? I imagine you would have done them for a whole lot of different levels, because they would all be different.

Mr Roberts—It was given to the Prime Minister's task force. There was a report done by CIE. We asked CIE to do work for us, and they did a very intensive study on the different levels of a mandate. That work has been done, and I would be happy for this committee to get that work.

Senator NASH—Thank you.

Senator MILNE—What level of increased cost are you already bearing as a result of what we are currently doing on ethanol?

Mr Roberts—There have been no grain based plants built anywhere in Australia to this point. One has been proposed in Dalby; for two years it has been on the drawing board. There is another one at Gunnedah. There are quite a few that are planned, but at this stage there are no plants operating. Therefore, there has not been any effect, because they are not taking grain off the market.

Senator HEFFERNAN—But wouldn't it be fair to say that, even though their ethanol plant is downstream from their flour, Manildra, which I have declared a peculiar interest in, are still in the market? They use one million tonnes a year. Is that disadvantaging you fellows?

Mr Roberts—No—

Senator HEFFERNAN—Do you want to take them out of the market too? Do you want everything to yourselves?

Mr Roberts—No, we do not want everything to ourselves at all. There is no such thing as a level playing field, but we do not want it to be uphill all of the time.

Senator HEFFERNAN—But what you want to do is put our wheat growers out of business.

Mr Roberts—No, we do not want to put anybody out of business.

Senator HEFFERNAN—Your argument is to do that.

Mr Roberts—No, sir, I do not wish to put any—

Senator HEFFERNAN—I have said many times that we have to compete with a global cartel on fuel and fertiliser.

Mr Roberts—That is correct.

Senator HEFFERNAN—If we have to operate on a global scene then so should you.

Mr Roberts—We do operate on a global scene.

Senator HEFFERNAN—Therefore, just on Senator Nash's question, we would like to see the sums that you did on the advantages and disadvantages of being on the receiving end of the by-product of an ethanol plant.

Mr Roberts—I would be happy to provide that information.

Senator HEFFERNAN—And the assumptions you made on price and supply and demand.

Mr Roberts—I would be happy to provide that information.

CHAIR—That would be appreciated.

Senator MILNE—I would like to get back to this issue that you are selling into an export market for almost all of your product.

Mr Roberts—The feedlot industry actually exports about 60 per cent of its product. About 40 per cent is domestic. The point I want to make about it, though, is that, if our export market for any reason declines, we see that there is a decline on the domestic market as well. What happens is that there is a change of direction of product out of the country. If you put it onto the domestic market then it forces the price down.

Senator MILNE—I understand that. I am asking you whether you are making the assumption or arguing that the export market cannot bear an increased price.

Mr Roberts—It is not a matter of whether or not it can bear it. The fact of the matter is that we are against countries like Brazil, Argentina and the United States. In our premium market, which is the Japanese market, as a result of the very fact that Americans were looking to get back into Japan in December, we had feedlots fall in capacity by about 50 per cent during October, November and December. There was also a fall in the cattle price. The season for cattle was quite okay. Fewer cattle were put on for sale. The fact of the matter is that, as soon as there is the threat of the Americans coming back into the Japanese market, there is a very great pressure put on our industry. So we are at the absolute mercy of the export market.

Senator HEFFERNAN—As is the poor old bugger back at the farm with his cows.

Mr Roberts—Absolutely—I have no problem with that. I understand.

Senator HEFFERNAN—Isn't the phenomenon of the 200 million cattle in Brazil a bigger threat to your industry than an ethanol industry here?

Mr Roberts—It is one of the threats. We do not necessarily see it as a bigger threat. The Australian cattle market has grown a feedlot industry which has put a substantial lift into the cattle industry of Australia. We are not directly competing with the Brazilians because they are putting their meat into a different market than our premium market.

Senator HEFFERNAN—With great respect, if not for the good work of this committee you would be definitely competing with them, because they were landing that meat that went to Wagga tip here at 40 per cent less than the local product.

Mr Roberts—Yes, I agree with—

Senator HEFFERNAN—You agree with that bit.

Mr Roberts—I agree with almost everything I have heard you say about that meat coming in and being dumped in the Wagga tip.

CHAIR—Your issue with ethanol is with the grain based ethanol. Is that correct?

Mr Roberts—That is correct. We do not have an issue with ethanol per se. I want to make that very clear. We are not equipped to be able to make a good call on whether ethanol is good for the environment or bad for the environment or anything else. We have no argument with ethanol per se, only with the use of grain based ethanol.

Senator HEFFERNAN—So it is about the level of the subsidy?

Mr Roberts—Yes, the level of the subsidy.

Senator HEFFERNAN—That is fair enough.

CHAIR—That was my first question. My second question is this. We are looking at peak oil and we are looking at the role of ethanol as an alternative fuel as it relates to peak oil. We have heard a lot of evidence that peak oil is going to hit a whole range of industries, particularly the agriculture industry. If you look at the scenario of the agriculture industry being hit very hard by peak oil, mandating ethanol is, in terms of the bigger picture, of benefit and in the public interest. That also helps your industry, the agriculture industry, because peak oil would otherwise damage it even more. Have you factored that bigger picture benefit of ethanol into your scenarios?

Mr Roberts—We think that there is a lot of debate to be had about that topic. I am not equipped to be able, in this forum this afternoon, to make much more comment on it.

Senator HEFFERNAN—We are a rude bunch of buggers, aren't we?

Mr Roberts—The other senators might want you to speak for yourself, Senator!

Senator NASH—I think he knows that. Your premise is about the impacts on your industry, including the cost impact. I am presuming that when you talk about grain you are talking predominantly about feed wheat.

Mr Roberts—No, not at all—feed grains. They are coarse grains. The feed lot industry can and does use a variety of grains. It uses sorghum, wheat, barley and some corn but not very much.

Senator NASH—I guess I am particularly asking about those ones that can lead to ethanol production and have been so used. What are lot feeders paying on average per tonne at the moment? I know that is a broad question. Just a ballpark figure will do.

Mr Roberts—It is a bit too broad but I will give you what the range is at the moment. It is $170 to $180 a tonne delivered to the Darling Downs and to Brisbane it is about $190. I know that best because I am currently trading in it.

Senator HEFFERNAN—For what?

Mr Roberts—That is for sorghum.

Senator NASH—No, I was asking in particular for those grains that relate to ethanol production.

Mr Roberts—That does. Sorghum, for instance—

Senator NASH—But not at the moment. Sorry, I was not very clear. It is in terms of the grains that are used at the moment for production in Australia.

Mr Roberts—The only producer, as Senator Heffernan points out, is Manildra, which uses wheat. But its primary use of the wheat is actually for starch removal, not for making ethanol.

Senator NASH—That is true. So what percentage of feed wheat would your industry actually use at the moment?

Mr Roberts—I think it would be somewhere in the order of 20 per to 30 per cent of the total grains that we use.

Senator NASH—Given wheat is predominantly, if not completely, used for starch removal, as I understand it—wheat being 20 per cent of the grains that you are talking about—if there were not a change and that starch production continued to be from wheat as the grain, that would really affect only 20 per cent of your feed use.

Mr Roberts—If it was only wheat that was being used, yes. But if you increase the use of wheat in ethanol production, you are then going to change the dynamics of the market for all grains.

Senator NASH—I take your point. So we are talking $170 to $180 at the moment—

Mr Roberts—That is for sorghum on the Darling Downs.

Senator HEFFERNAN—Tell us what you are paying for wheat, because I might make you an offer!

Mr Roberts—$225 a tonne today if you deliver it to my feed lot.

Senator NASH—On that note—and I take the point you made earlier that you have been doing this for many decades—what were you paying for wheat 10 years ago?

Mr Roberts—We paid $265 a tonne in 1996. I spent a lot of time here arguing about the potential to import grain to Australia because we had a very serious drought in 1994, 1995 and 1996.

Senator NASH—Indeed. So it was more than 10 years ago. I would say that that is a very good premise for assistance for the grains industry. I have one last question. In the work that you have done and you have had done, in terms again of dollars per tonne, what is the worst-case scenario increase? What I mean by that is: in the work that you have done or have had done on percentage mandates that may or may not be put on, what would be the worst-case scenario per tonne increase to your industry if a mandate were to be implemented?

Mr Roberts—In the CIE report that I have given you, they have looked at grain possibly going to $450 a tonne. I personally do not believe that will be the case. We would not pay it because we would not be there. We would be out of the market.

Senator HEFFERNAN—That is ridiculous because the pellet industry would immediately import grain. I want to come back to the cost, this $220. I might get a bit of this for me. What sort of wheat is it?

Mr Roberts—Currently we are using feed grain.

Senator HEFFERNAN—Yes, but what protein? Is it ASW or under or over?

Mr Roberts—It is under.

Senator HEFFERNAN—It is under ASW, so is it PGH2 or what grade is it?

Mr Roberts—I am not sure.

Senator HEFFERNAN—The price for that wheat today, if you are under ASW and you are under 11 per cent protein, is $150 to $155 a tonne at the farm gate. Someone is having a lend of you.

Mr Roberts—No. If you look at the transport costs in this country—

Senator HEFFERNAN—What I am saying is that that is what the price is at the farm gate.

Mr Roberts—That may well be the case, but I am telling you what I am paying for it delivered to my feed yard.

Senator HEFFERNAN—But are you buying it from Grain Corp or whatever the system is?

Mr Roberts—Grain Corp. Yes, it is coming out of storage.

Senator HEFFERNAN—Just for the clarification of the committee, it is worth to the farmer about $100 to $155 a tonne, which it was worth 20 years ago.

Mr Roberts—I think that is a very good point that you have made, that that is the price that the farmer is being paid. What the farmer is being paid and what the end user has to pay is most often a very different number. Because we are bringing wheat from Northern New South Wales, we have transport costs that are very high. This country competes with the likes of the United States. Just have a look at the transport costs—I believe this committee is looking at transport—in this country compared to other countries that we compete with on the world market. We pay very high transport costs. The wheat that is being delivered to our feed yard at the moment would have a transport cost somewhere in the order of $50 to $60 per tonne. I hear the senator's point about what the farmer is getting, but the end user—

Senator HEFFERNAN—How far are you taking it?

Mr Roberts—It is coming from Northern New South Wales.

Senator HEFFERNAN—Is that 400 or 500 Ks?

Mr Roberts—It is about 500 Ks.

Senator HEFFERNAN—That is worth only $35 a tonne.

Mr Roberts—I would like your transport company to be working for me.

Senator HEFFERNAN—It depends on the back load of course.

CHAIR—We are getting over time.

Senator NASH—On that, I would just make the point—and, you are quite correct, you do have those associated costs—that the ratio is the same over time. Your transport costs may increase by a percentage, but there is that direct ratio between cost at farm gate and cost to you. I would ascertain that they are probably fair and similar. I am now done, thank you.

Senator HEFFERNAN—For God's sake, if we accept your pure argument—and we are really grateful that you have come and put your pure argument—that bit that you are paying the 50 or 60 bucks on is going to get higher and the poor bugger that is growing it is going to get a lot less. So we are going to go out of business. You are going to go out of business anyhow.

Mr Roberts—I think we could all be out of business.

Senator HEFFERNAN—My farm as well.

Mr Roberts—My concern is that I am not the first one out.

CHAIR—I think we will finish it there. You will be pleased to know that we have the Trucking Association coming afterwards, so I am sure we will be asking them questions about transport.

Mr Roberts—I am sure I can rely on you good senators to stick it right into them as well!

CHAIR—Thank you very much for coming and presenting to us this afternoon.

Mr Roberts—Thank you very much for your time.

[2.49 pm]

KITE, Mr Leigh, Treasurer and Public Awareness Campaign Manager, ACT Peak Oil

POLLARD, Mr Alexander Gray, Convenor, Chair and Submission Editor, ACT Peak Oil

CHAIR—I welcome Mr Pollard and Mr Kite of ACT Peak Oil. I know you have been sitting down listening to me rattling off the rights and responsibilities of witnesses, so I do not need to read them to you. I think I can take it as read that you have heard them a number of times now. I invite you to make a brief opening statement.

Mr Pollard—I am the convenor of ACT Peak Oil, which is a group of Canberrans concerned about the implications of the peak of world oil production. We set up just over a year ago. We met over the internet.

CHAIR—Very dangerous!

Mr Pollard—That is how things happen these days. We met in a lounge room, formed a few email lists and started talking about the issue.

Mr Kite—I am Alex's offsider in the organisation. I act as treasurer and the public awareness campaign manager. We are basically a group consisting of the people on the street who the decisions that the government makes will affect. We are pretty independent analysts as far as political and commercial situations go. We feel we are probably going to be able to get away with saying some very interesting things today that perhaps some people in areas of government or people who are working within organisational guidelines would not be able to bring up.

Mr Pollard—It is interesting that a number of us are IT professionals. Both Leigh and I are IT professionals. We spend a lot of time on the internet and we have been reading up on these issues for a long time.

Mr Kite—Yes. Basically, the information travels that way so if you do surf the internet a lot, you just trip over things. Most of our group are fairly young. We are mostly under 30, with just a few people, like Alex's father, who are a bit older. We have been analysing most of the principles and the situation for the past couple of years. As Alex mentioned, we found other likeminded people and we said, 'We had better step up to the plate and see what we can do here.' Our strategic focus at the moment is the raising of awareness of the issue: politically, publicly and corporately.

Alex leads political engagement. He will be doing the majority of the speaking and answering the majority of the questions today. I will probably chime in when I feel I have something to add. I am leading public awareness, so the kinds of things I do are community information sessions, bumper stickers, coffee cups, t-shirts—all the usual sort of stuff that the traditional non-government organisation awareness raisers do. With that, I will pass over to Alex, who will introduce the content of our submission.

Mr Pollard—Our main message is that we think elected representatives have a responsibility to alert the public to this very big problem and to start a dialogue on the issue. We think the approach should be multipartisan. We recognise that it is a very hard message to sell, but politicians need to take the lead. We have already had a lead from John Anderson, as Deputy Prime Minister, who mentioned the issue on *Insiders*. I was watching one morning in May 2004 and Barry Cassidy was interviewing him. John Anderson mentioned that the peak of world oil production may be upon us. It just went straight past Barry Cassidy. George Bush has admitted that America is addicted to oil. Helen Clark, the Prime Minister of New Zealand, has used the phrase 'peak oil'. So awareness is growing, but Australia's elected representatives need to take a much more active role in getting the message across to the public.

This committee inquiry may be one of the few public opportunities to address this issue. This inquiry is very welcome. It is kicking off what I hope will be a very important and long-running process. But we want it to continue. We do not want it to stop here. People will look back with interest at what this committee thinks and decides, so we are at a very important juncture in history. Decisions made now will be looked back at with great interest by historians. We also need to take a risk management approach and realise that solving the problem now may be expensive, but what are the risks, what are the costs, of delaying action?

This inquiry is obviously confronted by many potential problems and options. It is a huge problem and obviously senators will sometimes be really quite confused, or quite confronted by the scale of the problem. So I think one of the overriding principles is the need to select options that give us flexibility and a fall-back position—options that can work together in different combinations to give us choices depending on what scenarios arise. We cannot hope to have definite plans; we can only hope to have options. Take electrified rail, for instance. Electrified rail uses electricity, which can come from all sorts of sources. That gives you much more flexibility than depending on liquid fuels to power your train system.

In our submission we talked about a number of very important principles. Rather than delving into the detail of a lot of issues, we thought it would be good to talk about underlying principles. Those principles include such things as energy return on energy invested. A fuel has to be actually worth producing in energy terms, in general; otherwise, you are just wasting energy in a process that does not make any energy sense. Energy quality is another issue, though. Sometimes you might want to turn coal into liquids. Even though in terms of energy return on energy invested it is a negative, you are getting a fuel of higher quality out of that process. So maybe that is worth considering. Then there are the laws of thermodynamics which state, essentially, that energy is dissipated at each step in an industrial process so that the more steps you add to a process the more energy you will lose. You can have very elaborate processes that might have tax subsidies and so forth, but will they actually have any net benefit?

There is a need for a scientific approach—a scientific approach which relies on observational evidence and does not get caught up in institutional or popular beliefs. It is basically an open-minded, fair-minded, evidence based approach to finding solutions to problems. Government will probably need to take on board a lot of scientific expertise in order to come to decisions which make sense without having to effectively outsource the solution to the marketplace, though the marketplace can be quite an effective instrument.

There are of course the limits to growth. The limits to growth are quite infamous as a study in the potential for various physical limits and constraints on our planet to prevent indefinite economic and population expansion. The key take-home message from the limits to growth—and it is often overlooked—is that, essentially, in trying to evade physical limits you often come up against other physical limits further on down the track, and they tend to pile up on top of each other. I think that is already happening, with climate change and oil peak starting to happen simultaneously. Essentially, by trying to defer problems you end up having them all happen at once. There is also the notion there of 'overshoot'. Essentially, if you are driving in the fog the last thing you do is put your foot on the accelerator, but that is what we insist on doing when we grow the economy and the population as fast as we can.

Another principle is the appropriate use of economics. Economics is a very useful instrument for understanding human behaviour and getting ends happening in the easiest possible way. There are fundamental economic principles like property rights, which are very valuable in terms of assessing what the true cost of oil should be. If you have a situation where, say, owners of oil supplies in the Middle East fear that those assets will be taken off them unlawfully—either by an angry domestic population or perhaps by an invading foreign power—then the people who fear that outcome may sell that oil at fire sale prices ahead of time so that they can gain the benefits of that asset.

Of course, economics is subordinate to ecology. You cannot have an economy without an environment, and I think we need to bear that in mind. Another principle is avoiding the tragedy of the commons—making sure that assets held in common are not squandered because people fear the asset will be used by other people first. There is a need for intergenerational equity. We need to make sure that there is enough for those yet to come. There is the need for wealth equality, not just for purely moral purposes but also because, in societies where there is a wide differential of wealth, the wealthy can tend to drive decision making and push costs onto the less well-off. In that case, that often ends up translating into things like environmental degradation. There is also the precautionary principle, which is: if you do not know about the future, do not act assuming everything will be fine.

In terms of information, which is very important for the proper functioning of a market in something crucial like oil, our submission talks about how the international energy agency figures are unreliable. According to Simmons, the author of *Twilight in the Desert*, figures by the International Energy Agency are largely based upon estimates of tanker capacity, as tankers move in and out of ports and harbour spies. Allegedly anonymous harbour spies make guesstimates about the volume of these tankers and where they are going, and this forms the basis of International Energy Agency figures. That is just completely unacceptable.

Saudi Arabia, as an example, does not allow well-by-well audits. As a result, we have very little information about how much oil it has. There were a lot of political changes to oil figures in the 1980s in the Middle East. Recently we heard, according to Sprott Asset Management, that Saudi Arabia's mature fields are now in eight per cent decline per annum. Overall, this means Saudi Arabia is declining two per cent per annum. This really means that the peak has arrived.

There is also an issue to do with information about the cause of the oil crisis and the question of whether it matters what the cause is. You can say: 'Oil prices are going up, and we do this and this to alleviate the problem. It doesn't matter whether it is terrorism, politics, wars or a physical

supply constraint.' But the reality is that it does matter that it is a physical supply constraint; there is a difference. If we do not talk about how there is a physical supply constraint then we will get tensions to do with foreign countries that have the oil and blame-shifting. In the world today, military build-ups are happening and there is a risk of international problems. We need to talk about how there are physical supply constraints. This is the root cause of a lot of the problems. This why groups in Nigeria can use emails and a few guns to put the world oil price up by dollars. We need to talk about how there is a real supply problem and, therefore, that we need a constructive approach to the problem.

Mr Kite—I will supplement what Alex is talking about. You have probably noticed that our submission is very different from all the others that you have received. We are not here to talk about planes, trains or bikes and especially grain. We are taking a step back, viewing everything thing from the big picture and applying some fundamental principles.

This is a small view of civilisations and how to run them. You can take a look at a civilisation and a complex society and say, 'If you want to have one, then you need to get across resource management, pollution and population control.' This all has to be done sustainably. You have to live within your means. Peak oil is a very complex problem. It completely balloons out and intertwines with everything, and these principles come to your attention very quickly.

Basically, it is resource control, pollution control and population control done sustainably. These kinds of things are probably going to rest on the three pillars of health, education and ethics and morals. That is a good basis upon which to run a society. You need to look at the way things are today and ask: 'How do we do things? How do we really run a society?' Our goals seem to be the making of a buck. We are not saying, 'I have to live within the means that Mother Earth provides me with.' It may sound a bit hippie, but the cold, harsh reality is that there are limits to what this planet offers and the human race is just running smack, headlong into them.

You only have to look at things like the population of the world in 1870; it was about two billion. In 1859, the first oil well was sunk by Colonel Drake over in Pennsylvania. From then on, the population graph just went zoom; it went straight through the roof. What we did was say: 'Excellent. We have all this available, cheap and abundant energy. We'll just party and we'll build lots of stuff. We'll increase the population.' That is fine. It is very good—we have achieved a lot of things. But the problem now is the amount of oil and other resources that we use: 82.5 million barrels of oil per day is what we used approximately two years ago, give or take a couple of hundred or thousand here and there. Oil provides a big slab of our total energy, 35 to 40 per cent, and that powers 90 per cent of our transport.

So there are a couple of things going on. As you are well aware, there is a liquid fuels crisis, but if you look at the bigger picture there is also a very big problem of scale. We need to ask: 'If 6.3 billion people are too many for the planet, are 20 million people too many for Australia? What was the sustainable population of Australia before we had access to that energy?'

Mr Pollard—What we are talking about is a paradigm shift, such as a shift from, say, economics to ecology and a shift from incremental changes to quite dramatic changes. There is often a lot of fear that a transition will be quite expensive, but often the transition is a lot cheaper than we expect. And we do need to remember that we need to make a transition very urgently. It is a very urgent problem we are dealing with.

We also need a paradigm shift from things like fossil fuels to renewable fuels. This has a related shift, which is basically from a supplier based profit centre, where the profit is made by the supplier of the raw materials that power our economy, to a situation where, because the inputs for renewable sources are generally essentially free—such as sunlight for solar energy, water for hydroelectricity and so forth—the profit centre lies with those who have the best technology to generate and deploy power. Obviously, that is a shift from just resource extraction industries to knowledge based industries. The ACT does not have energy resources internally apart from solar and wind, I expect, but we do have a lot of knowledge. One example of that is sliver cell technology, which offers really cost-competitive solar power, and that is now being manufactured in Adelaide, I think.

CHAIR—We want to be able to ask you some questions, so could you wind up quickly?

Mr Kite—Okay.

Senator HEFFERNAN—Can you step back and give us the message? I want to get the message.

Mr Pollard—The message is that there needs to be a proactive approach by politicians to start talking about this with the community in a really open way.

Mr Kite—Yes. It is no good hiding anymore. There are problems and it does not take long to find them. So it is time to break out of asking: 'Are we going to fix this, are we going to fix that or are we going to just let the market sort it out? How about we actually sit down as people who manage the country and say, "Right, this is what's actually going on on the ground. What kind of society can we build upon that that is going to work within our means?"' And it is going to be hard. I certainly do not envy the people that have to take us through the next 50 years. That is the message.

Senator MILNE—I would preface this by saying that the peak oil association also took quite a prominent role in the hearings we had in Perth. You may have noted their submission. We have already heard quite a bit of evidence that is similar to what you are giving now. This morning we heard from ABARE that there is really not a problem. Oil prices are going to recede slowly. They are going to be $40 a barrel into the future. Geoscience Australia assured us that we are out looking for more oil. Clearly there is more there, so we are just going to go and find it. Anyway, if we do not, we can move rapidly to liquefying coal and that is our solution. The message that politicians are getting from the peak agency that advises government is that we do not have a problem. Would you like to respond to the claims that the oil price is going to go down, that we are going to find more and that, even if we do not, we will move to liquid coal?

Mr Kite—What you need to do is ask who is giving you the expertise and what their background is. I know that I keep bringing this up, but it is an engineering and science problem as much as it is anything else, and probably more so. I know there is policy, there are people and we have a big system already in place. There are a whole heap of forces that are just going to assault you when you try to make your decisions. But you need to start at the bottom and say, 'Right, this is how much of the stuff we have.' Has anyone from ABARE or anywhere else actually come and said, 'We have precisely this amount of reserves and we think that there is not going to be any kind of problem'?

You need to be talking to the engineers and the people out there who can say, 'This is how much oil we have and this is where the energy comes from.' Other people are in their zones. I have great respect for the people who are the leaders of their respective industries in this country. But you do not talk to a cattle man about energy. You talk to an energy man about energy. That is one of the principles that we need to have. When you make your decisions as to whether there will be a problem or not, that is a good place to start.

Mr Pollard—The problem has been a lack of good information about where the oil is and how much there is, and no realistic understanding of how long it takes to turn over the infrastructure in an economy from one system of energy dependency to another. Peak oil in a sense is like an inflexion point. Prior to the peak, the price of oil generally seems to fall because there is more of it. It always seems to meet demand. Suddenly, there is less of it in a given year and it keeps falling. Therefore, peak oil is like an inflexion point. The economics profession is not used to that kind of thing. They are very much used to incremental change and not paradigm shifts or inflexion points like that. I guess there is also the problem of investment certainty in replacements for oil. If you do not know if the price is going to be high for the foreseeable future, and if government and other advice is not telling you that it is going to be high, then there is no incentive to develop alternatives. There needs to be investment in certainty in terms of the price.

Mr Kite—One thing that is very important is to keep economics in its place and separate it from the actual physical quantity debate. Oil could drop down to $40 a barrel tomorrow. That would be nice, wouldn't it? Fuel would go down and everything would be fine. The problem is that, if you keep the actual physical rate at which the oil is coming out the same, you will get a nice uniform drop-off in availability. If you reduce it, you will have more available later. But if you artificially mess with that then you can cause yourself problems. As the oil drops off the price naturally goes up because of the supply-demand thing. That is going to give you an accurate view of what is going on. If you step in and say, 'We'll subsidise it or do something so that we can get the price down, but we will keep on sucking it,' all of a sudden you are going to reach the situation where the peak has dropped at one point, world oil production is now only 50 million barrels a day and you have somehow managed to insulate yourself from that economically. That bubble is eventually going to burst.

Mr Pollard—Yes.

Mr Kite—So that is the problem. Using economics and the market to insulate a physical problem is not the way to go. That is a very important principle when you decide whether the oil peak and the energy crisis in general are going to be a problem. Just answer, 'Where is the energy going to come from?' not, 'Where is the money going to come from?' to keep things going the way they are.

Senator HEFFERNAN—That was a bloody long answer!

Mr Kite—Sorry about that; I get excited!

CHAIR—Does that mean you want to go next, Senator Heffernan?

Senator HEFFERNAN—No, that means I cannot remember what the question was!

Senator NASH—There is just one thing I would like to follow up. I think one of the suggestions you make is that there should be pay-as-you-drive car insurance and registration. How would you envisage that working?

Mr Pollard—Unfortunately, it would require a lot of cooperation between the federal government and the states, because the federal government levies fuel excise and the states manage things like car registration. I guess the idea would be that you want to have a situation where people do not pay a sunk cost once a year to use the car and then, having paid that cost, think, 'Well, I'll just use the car.' You want people to be able to leave the car in the garage and save more money by doing that.

Senator NASH—So you are talking about a per kilometre type of thing?

Mr Pollard—Yes.

Senator NASH—Would that not have a very negative impact on regional Australia though? Just given the fact that—

Mr Pollard—Yes. I think there would have to be some kind of allowance for people who drive long distances, definitely.

Senator NASH—Like some kind of weighting.

Mr Kite—That ties in directly with the issue of urban planning, though, and how we have built a nation which is based on the premise of an abundance of cheap energy. Now that it is looking as if it is not going to be there for the foreseeable future you have to do something about that.

Senator NASH—Have you done any work on the socioeconomic impact of the increasing price of oil on the outer fringes of metropolitan areas?

Mr Pollard—No, we have not, but of course there are studies being done on that. Obviously they are quite preliminary at this stage.

Senator CHAPMAN—It seems to me that you have an unduly negative view of the future. You said: 'We have to take account today. If we use all our resources then the next generation will be without resources.' If people had taken that view in the 19th century, they would have severely diminished the level of their standard of living, concerned about what might happen to people in the 20th century. And yet the people of the 20th century have had the greatest standard of living of any generation because of new technology. Aren't you ignoring the capacity of new technology to overcome the oil shortage and provide alternative energy forms? What you are saying seems a very Malthusian view.

Mr Pollard—Yes, there is a very pessimistic view that we have just basically passed through the halfway point in the fossil fuel era, where we have had this tremendous abundance of energy that has been stored up under the ground for millions of years and we have used half of it or so. I am not a technological pessimist. I think there is a great deal of potential in future technologies. One issue that I think is worth bringing up is the potential for things like nuclear fusion. Really

we are only just getting our boots on in terms of looking into that. I would like to differentiate between nuclear fusion and nuclear fission and say that 'nuclear' is often used just to mean uranium. Uranium is a problem because it is a long-lived radioactive fuel and waste, but nuclear fusion could provide clean energy in quite huge quantities. There is the huge ITER project that is being done between a number of nations, and that is costing billions of dollars.

It has come to my attention—I am an engineer by training—that there are technologies such as focus fusion, which basically involves a relatively small-scale production of energy, costing in the range of tens of millions to establish. It has no neutron production, so there is less radioactivity or no radioactivity. It has a very high conversion efficiency to electricity. The reason why it may not have been picked up is that it is only a recently researched concept. It has been researched in university laboratories in the United States and Chile. NASA has shown interest in the concept.

The problem with institutional science is that politicians have to be convinced to part with sometimes large sums of money and scientists tend to form consensus positions that this is the best way forward, and sometimes they can exclude alternatives. So I think there is a need to take a scientific approach to a lot of these problems, look at the range of options, fund things on merit and not think that the biggest project is necessarily the best. That is an example of not closing off options prematurely and that we need to use a scientific method in its truest sense.

So there are possibilities. There is a great deal of possibility in solar technology, such as the sliver cell technology from the ANU. For example, there are potentially huge financial benefits in solar power. There are guaranteed markets in China for solar power. There are mandatory minimum targets, whereas there are no such targets for uranium in China, which is an interesting situation.

Senator CHAPMAN—Given that you say we are at the halfway mark, which is possibly one of the reasons why the oil price has escalated in the way it has, that escalation in the oil price is beneficial in terms of making alternative technologies more economically viable.

Mr Pollard—Yes, this is the use of economics to achieve an efficient outcome. As long as the price signals are set correctly, theoretically, economics could determine the best way forward if all the inputs were all priced correctly, with taxes and so forth. Unfortunately, we have distortions, and we need to internalise certain externalities, such as greenhouse emissions. There are obviously some political problems with doing that at the moment. We can solve a lot of problems with economics, but one thing economics may not be able to deal with is the urgency of the problem. We have left it a bit late and, as a result, we may need to take action through government to find solutions really quite quickly.

CHAIR—We have finished our questions. Thank you very much. We very much appreciate you taking the time and making the effort to come in today.

Proceedings suspended from 3.22 pm to 3.48 pm

HOWSE, Mr Robert Neville Arthur, Research and Policy Officer, Australian Trucking Association

ST CLAIR, Mr Stuart Roy, Chief Executive, Australian Trucking Association

CHAIR—Welcome. I am sure you would have read the terms of reference so I am not going to go through them, but there are certain things that I need to let witnesses know. I remind you that these are public proceedings, although the committee may agree to a request to have evidence heard in camera or may determine that certain evidence should be heard in camera. I remind you that giving evidence to the committee is protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee and such action may be treated by the Senate as a contempt. It is also a contempt to give false or misleading evidence to a committee. You may refuse to answer a question. If you do so, the committee will determine whether it is going to insist on an answer. If we determine that we will insist on an answer, you may request that you give the answer in camera. I invite you to make an opening statement.

Mr St Clair—We appreciate the opportunity to come before today's hearing into Australia's future oil supply and alternative transport fuels. I am new behind the wheel of the Australian Trucking Association. I have been there for only a few weeks. Our submission to you was prepared by one of our good people, but that person is tied up doing other things so you will have to put up with me. Please bear with me, as there are many things that I do not know, including some things that relate to this submission, but I am sure we will be able to get through. You are aware that the Australian Trucking Association has make a submission to the committee. I have a copy of it in front of me and I am sure it has been circulated to members. I will start by reading part of the letter that was sent to the committee. It says:

Road will remain as the dominate mode of transport in Australia due to a number of reasons. Barring quicker than anticipated advancements on the 'supply side' (i.e development, commercialisation and utilisation of 'futuristic' engine and fuel technologies), it is likely that internal combustion heavy vehicle engines and the use of petroleum products will be commonplace in the 'mainstream' for an extended period of time.

Diesel prices have increased in Australia by 80%—

as this letter is dated 1 March 2006, I would hate to think what the percentage is now but it would be substantially more than that—

between 1999 to today. Indications are that prices may remain high and volatile for an indefinite period of time. ABS data indicates that the industry has had trouble 'passing on' these rising fuel costs to freight customers, to a point where the industry's profit margins have dropped well below Australian industry-wide levels. To maintain a sustainable industry, these costs will need to be passed on—intuitively, to the detriment of the Australian economy.

To offset these costs, and in the absence of radical 'supply side' measures, the ATA calls on all Governments to pursue a vigorous and sustained productivity and efficiency reform agenda for the industry to reduce Australia's demand for petroleum products; achieve improved safety and environmental outcomes; and offset current and future labour productivity problems. The agenda is large—

as we all know—

and a very high level of government commitment is needed. Recent COAG and NTC support to this agenda is a step in the right direction.

Madam Chair, I know you have two-way discussions at a committee meeting like this. We are certainly open to any questions as we go along. I will go through the paper with reference to each of the terms of reference and offer some comments on each of them. If you want to come straight in, I am happy for you to do so. Term of reference (a) refers to 'projections of oil production and demand in Australia and globally and the implications for availability and pricing of transport fuels in Australia'. The Bureau of Transport and Regional Economics estimates that the Australian freight task will increase from 375.1 billion tonne-kilometres in 2000 to about 648 billion tonne-kilometres. We know that will be roughly a doubling. It is a simple mathematical equation: if the economy is going to grow with a freight task at 3½ per cent per annum, obviously it is going to double in 20 years. That is quite significant for a country the size of ours.

We have had quite significant improvements in some productivity with the introduction of different configurations of vehicles to be able to do the freight task in this country. We saw during the early to mid eighties and then in the early nineties the introduction of what are called the B-double configurations for haulage over longer distances, which take up and build on the great success over many years in Australia of road train operations in which you have a number of multiple vehicles. The numbers of those at the big end of the scale are still relatively small—my understanding is that at present there are about 10,000 of that size and configuration in Australia—but they have certainly made a productivity difference and, significantly, we note that fuel consumption for the amount of freight carted is dramatically lower than just having simply one trailer to do the work.

We have also noted over a period of time an improvement in the fuel consumption of heavy vehicles compared to what it used to be. One of the downsides has been that as an industry, as we have embraced some of the environmental concerns that the community has and changed design rules ourselves for the introduction of Euro 4 and Euro 5 engines, as we reduce those emissions, we often lose fuel consumption. On one hand, we are improving the emissions but, on the other hand, we are starting to use more fuel. There obviously needs to be a balance between those. Generally, operators are so conscious of fuel consumption that they will do amazingly small things to their vehicles—whether it is tyre pressure, engine tuning or the right horsepower for the right job—to ensure that they get the best available fuel consumption.

On the question of new sources of oil and alternative transport fuels, you will notice in our submission in table 4 that about a third of the cost of running a modern heavy vehicle is fuel. That substantially rises, as you can imagine, with the price rising, so it is something that we need to take into account as a generalisation in the absence of more qualified results that have become independently assessed and made publicly available. The contrary anecdotal advice from operators is that the consumption of alternative fuels has led to few commercial advantages because of operable issues and generally net higher costs: energy content—something like that.

From talking to them at a recent convention of ours where we had a collection of operators from all over Australia, we know that the industry has people who are willing to embrace alternative fuels. I think the majority of operators do not really have a fixed view on it as long as

it is competitive in price, it is productive, its availability is there and it does not hurt the engines themselves. That will come down to manufacturers giving advice as to what sorts of fuels should take their place. Many trials have taken place in our industry for gas turbines. We have had gas-diesel trials. We have compressed natural gas trials being run in Western Australia—and I hope that there was some evidence put forward when you were in Perth that it is good. We have not seen the results of those tests. I am not sure whether they are completed but certainly people are willing to embrace that, particularly when you are talking about some of the longer distance road-train operations in our more remote areas.

Biodiesel is something that people are using now. There are general discussions starting to be held between operators as to the advantages or disadvantages of using it. There is a consciousness that says: 'We will embrace these things but we must not be penalised from an economic or from a productivity point of view.' That is encouraging, from our point of view. I mentioned the issue of alternative fuels. They mainly have lower energy content compared to diesel, and that is an issue. There is a graph in the submission to do with that. I mentioned gas derivatives earlier. A number of hire and reward operators have trialled LPG and CNG, as I mentioned. There is, however an absence of trial data. We are still waiting and, as such, the ATA cannot reach conclusions as to the merits or otherwise of gas deliveries as an alternative fuel at this point. The ATA understands that the Australian Greenhouse Office is about to release a compendium of the trial results in April. I have not seen them. If they have been released then that is our miss, but we are certainly looking forward to seeing them.

Flow-on economic and social impacts are continuing to rise. I do not think I need to dwell on that. The margins are so small in trucking now because of the dramatic increases of fuel costs. Most trucking operators tried to absorb them for some time. They are not able to do that any more—and neither should they, because at the moment if they do that, they will go broke. You can imagine the simple economics of a small business which uses maybe 100,000 to 150,000 litres a year. It used to be around $100,000 but the equivalent now is probably $180,000. Not only is there the difficulty of ensuring that you can cover the cost back but also the sheer difficulties of funding that through either credit limits with the fuel suppliers or simply trying to pay it. It is quite horrendous.

We understand that there is a fuel levy that many operators are putting on now. My understanding of the figure for that is around 17 per cent above what the standard rate processes are for long-distance driving. We are hoping that, while there may be a lot of larger operators putting that fuel levy on, they pass it down the line to those who are subcontractors and owner-drivers working to them. As you are aware, there are a huge number of independent operators out there—about 42,000—that compete against each other. Some of them go right down to the one-truck operation, and many of them are very good business people and do very well. But it is our role, I think, to ensure that they pass on those costs.

It is starting to bite, and it does not look like it is going to ease when you see the prices going up. Maybe that will lead to some alternative fuels coming in, which would be a good thing. We have estimated that around 92 per cent of operators in Australia have one, two, three or four heavy trucks in their fleet. That is the size of the operation, so it is a very competitive business out there.

As far as options for reducing transport fuel demands are concerned, one of the options we believe governments should look at, if they cannot control the cost of fuel, is productivity improvements to ensure that freight rates are kept under control. Those can be brought about by having a look at the configurations of vehicles, either in weight, length or height. We need to look at the road asset properly to try to get away from engineers who suggest that they build a road for no-one to drive on, because then they can keep it in a pristine condition. We believe that roads are to drive on—that is why they are built—and that they should have an effective life. They should be treated accordingly and built to take some of the loads.

We find the many anomalies between the jurisdictions and the lack of harmonisation around Australia frustrating, to say the least, because that affects productivity. In our view, if we can improve the productivity of the road freight industry, we can keep our costs to a minimum and therefore have a smaller impact on prices at the end of the day for mums and dads who are buying things off the shelves of supermarkets.

Just about everything in this country gets carried. We often hear people suggesting that we get rid of trucks. That would be really good, but we still want to go down to the shops on Sunday morning and buy our litre of milk, and we want it fresh. We still want to go and buy our bread, our cornflakes and all those things that, by necessity—whether they be white goods or other things—have to get moved. All those things need to be carried by truck, unless we want to go back to the days of walking up to the dairy with our pail to get milk—

Senator HEFFERNAN—Is this a paid advertisement?

Mr St Clair—Thank you, Senator—or unless we want to go to the bakery to get our products from there, or to the abattoirs to get our fresh meat. Otherwise it gets carried on a truck and the cost goes on.

CHAIR—You might want to think about winding up so that we have got time to ask you some questions.

Mr St Clair—That is fine, thank you. When you look at the other issues that we face generally, with the consumption of fuel the issue to us is productivity gains, and productivity gains are about harmonisation around Australia.

Senator MILNE—I did see the piece that was on television on Sunday morning about the problem with New South Wales having different requirements to Queensland and Victoria in terms of configurations, weights or something. Do you want to explain what we could do in relation to that?

Mr St Clair—There needs to be harmonisation between the jurisdictions so that there is a common level of high-mass limit, if you like; and, if that is to be set at a rate, it should be a common rate amongst all of the states. At the moment it is not. As I mentioned on that particular program, New South Wales is the one that lags behind at the moment—and Queensland to a certain extent. Victoria has embraced a higher mass limit, which means that you can have a configuration for a certain weight through South Australia to Victoria to come through to Queensland, and then it has to take some of that weight off to come through New South Wales. Eighty per cent of the freight travels through New South Wales.

Senator MILNE—What would be the implications for roads if we were to harmonise to the heavier weight—any or none?

Mr St Clair—It is up to the engineers to look at the capacity of the road. We believe the capacity of the road will more than adequately take the extra 2½ tonnes in the configuration we are looking at, because they are very small weights when they are done on axles. There has been a lot of money—and it should be a lot of money—spent on the hotspots where there are weaknesses, whether that is bridge loadings or whatever, and testing should be done on those bridge loadings. I find it strange that on the Hume Highway we can have a wonderful four-lane divided highway from here to Sydney but there is a bridge halfway along that may not take the increased weights. As a member of the industry, I cannot understand why they would build the road and have one weak link in that whole road.

Senator MILNE—Given that there has been money in the budget for the upgrading of the Hume Highway and so on, I presume it is on a COAG agenda to get the harmonisation that you are talking about.

Mr St Clair—It is, and we welcome the fact that it has been raised to the COAG level. We think from that that it will be very positive, and we have certainly welcomed the fact that it is on that particular agenda.

Senator MILNE—So, even with the productivity improvements that might come about with harmonisation, if we take the scenario that oil prices are going to continue to rise, you can become as efficient as you like but you are still going to face the likelihood of higher costs. You mentioned that some of your drivers are already using alternative fuels like biodiesel, and you also mentioned that there is debate in the industry about how successful that has been. Is it hugely expensive to convert an existing engine to take biodiesel? I do not understand. Is it reasonable to say that we should help convert the fleet, for example? I do not know if that is a technically feasible thing to say.

Mr St Clair—And I am not a technical engineer, but from my understanding it does not require much to change to biodiesel. However, what you lose is the energy content of the biodiesel—so you are using more. But my understanding is that there has been a lot of work done by engine manufacturers. I am sure that, if you wanted further data, we could access engine manufacturers to give you that.

Senator MILNE—Okay. So, if we could get biodiesel at a price that was much more competitive than traditional diesel, in theory there is not a huge impediment to that being rolled out.

Mr St Clair—In theory, that is right.

Senator NASH—On the question that Senator Milne asked about the biodiesel, if we look at moving towards renewable fuels in terms of the trucking industry, what would be appropriate and what would be the impediments? If you could supply that information for the committee, it would be much appreciated.

Mr St Clair—Price, at the end of the day. From an industry point of view, as long as what we put into our engines does not damage our engines and providing it is economic, I think you would find that most people would be prepared to use whatever.

Senator NASH—Is there a ballpark figure for how much fuel the trucking industry would use in a given year? Sorry to do that to you!

Mr St Clair—That is a good question! I think the amount of diesel consumed in Australia is about 15 billion litres a year. I think the transport industry uses 53 per cent of that. So the figure for the amount of diesel used in road transport would be around eight billion litres per year.

Senator NASH—In a perfect world, it would a significant change if we could move away from that usage to a renewable fuel.

Mr St Clair—That is 8,000 million litres just for the transport industry. That is a lot of fuel.

Senator NASH—It sure is!

Mr St Clair—Again, it comes down to availability. We still have concerns in our industry over the availability of urea, for example, in distribution coming into our Euro 4 engines. That worries us, because it is an additive that has to be actually put on board at the same time as you put your fuel on. So what still concerns us at the moment is distribution availability of those sorts of things—the sorts of safeguards that are in place to ensure that, if you are driving a road train out the back of Birdsville or in central Northern Territory, some of these things are going to be available. While biodiesel might be slightly different, I am not qualified to say that you could switch from one to another simply by saying, ' I am out of biodiesel so I will fill up with diesel.' I do not know.

Senator NASH—What percentage of trucking bodies—and I am talking about the larger ones, particularly in metropolitan areas—would have their own depots? Is that how they work?

Mr St Clair—A lot of them do—and Rob Howse might help me here—but it is my understanding that, particularly on long-distance ones, people will buy fuel from where it is cheapest, so there will be a national card or account system. I would think that everyone who went to Queensland in their truck would fill up in Queensland because it is about 11c cheaper there than anywhere else. They probably have big enough tanks to do the trip backwards and forwards; I am not sure. That is an anomaly that is good luck for Queensland.

Senator NASH—Absolutely. If we as a committee were going to look at the possibility of renewable fuels for the trucking industry, it would have to be on the basis of price and availability.

Mr St Clair—Absolutely.

Senator MILNE—You say in your submission that only 15 per cent of freight is truly contestable between road and rail. Can you explain the reference you have for this, and does that figure refer to tonne kilometres or tonnes lifted? What would taking out coal and ore, currently carried by rail, do to the calculation?

Mr St Clair—I can only talk anecdotally. I do not know the details; I am sorry. We can certainly obtain those for you and are more than willing to do so. Anecdotally, 80 to 85 per cent is not contestable. The demands being placed on transport, particularly for on-time or just-on-time delivery, have made over the years a substantial demand on road transport. Many manufacturers and wholesalers have turned the back of the truck into the warehouse, and that has made it very difficult for us to cope with the demands. A major change is also happening in the way that people are doing the distribution. We have major distribution centres being built on the outskirts of major towns or cities. They are then running smaller trucks back into the towns. We believe that the task is going to grow so quickly that there needs to be a substantial investment in rail, but we do not believe that that investment should be at the detriment of safer roads. That is the first thing.

The second thing is that rail has to be competitive. We are fearful and concerned that the road transport industry, the road freight industry, will have imposts put on our business simply to make rail more competitive. If we do that, and I think we have said this in the submission, we might slow down the demand a little for freight, but we might also take out of the freight market a complete sector that finds that transport is not competitive and therefore it is not competitive, and it might shift that work and those jobs offshore. From a trucking industry's point of view, we want to see the investment in rail and we want to see rail become competitive, efficient and effective because of the size of the freight task. Sitting on the Australian Trucking Association's board of management are people from very large and very small operations, all of which use every mode of transport that is available to shift freight. So there is no set group of people. Our board is not made up of just road freight people.

Senator HEFFERNAN—There is enough for everyone.

Mr St Clair—There is more than enough there to deal with the task. We just do not want to see one industry made less competitive to make another one more competitive.

Senator MILNE—On the point about where the road meets the rail and that changeover, how much effort is required to make the internodal connections a lot more efficient than they currently are?

Mr St Clair—I am not sure whether I am qualified to answer that. It may be better answered from an operator's point of view. I will say that on the Hume Highway now at night-time there are very few trucks with containers, for example. Most of the container trade seems to be getting on to rail, which is appropriate. We think a lot more energy should be put into having rail freight access put into the ports. You then have a very clear pathway from and to the ports so that freight can travel on rail down to those ports. We do not want those large trucks in the middle of the cities. I do not think anyone has an issue with that, quite honestly.

What you do with it after that point becomes interesting. We still have to do deliveries by larger vehicles in cities; there is no question or doubt about that. I am sure that people will look at congestion within the cities themselves. We share the roads. We have about 400,000 trucks but there are 13 million cars, and the rate of growth of cars is getting bigger and bigger. We do a lot of our deliveries at night-time. A lot of movement to distribution centres is done at night-time. That is appropriate as well. The connection point between rail and road should be as efficient as

possible and right now many road freight operators are building their intermodal terminals, where they can, onto rail sidings et cetera.

Mr Howse—Yes, intermodal terminals are certainly the subject of an increased focus in the industry, and will be more so, I am sure.

Senator MILNE—In terms of government planning around how to improve the infrastructure, through AusLink and so on, in a way that makes industry more efficient so it therefore uses less fuel and we reduce the volumes of emissions, what is the single most important thing you think the government needs to do?

Mr St Clair—I think—and again I am very new to this job, so bear with me—I would like to see transport plans for each of the major capital cities. Those that do not have them should have them. Those plans should then link in with the AusLink concept of looking at transport corridors, so that those transport corridors are not only road freight transport corridors but also rail freight corridors.

CHAIR—What, in your opinion, is holding rail back from being more competitive?

Mr St Clair—I am unqualified to answer that. I am not involved in the rail freight industry. I have had experience, going back many years, of dealing with rail and I found it to be completely inefficient. Take, for instance, the different standard gauges. I will not go down that path because I am not qualified to do so, but I think they have a few issues they need to deal with.

Senator MILNE—I notice that your submission says that you would not support international harmonising of emission standards. What conditions might be peculiar to Australia that would make it difficult to apply those international standards here?

Mr St Clair—Thank you for an easy question on a Friday afternoon! Australia is a significantly large continent, with quite considerable distances between major regional cities. The majority of trucks with engines of larger horsepower operate in regional Australia—they are out there on the highways and on many byways, and they are out there in the middle of the deserts, carting cattle and all sorts of things. The emission levels being put out there are not necessarily the same as those in the cities. In other words, they do not do much work in the cities. As to the introduction of Euro 4 and Euro 5, they are even an advance over car engines emission-wise. We are moving to diesel that has virtually no particulate matter in it, as you are aware. The freight task in a nation as big as ours with only 20 million people is different. As I say, most of that work is done outside the cities.

Senator MILNE—But how is that different from, say, Canada or a lot of the US or South America? They are big, big countries with big freight tasks similar to ours.

Mr St Clair—They are.

Senator MILNE—So why is it different here?

Mr St Clair—They have 260 million people to pay for it in the United States. They have a land mass roughly the same size as Australia, as we are aware. We have different conditions

from them. For instance, we do have a significant road length—I think we have about 810,000 kilometres of road in this nation—and there are only 20 million people to pay for it. It comes back to the use of large horsepower engines. We use bigger ones than they do in the US because we carry bigger weights.

Senator MILNE—The question I was asking was not in terms of economics. I take your point about how many people there are to pay for it, but internationalising and harmonising global emissions standards is not about financial costs; it is about ecological costs. That is why I was asking if there were any conditions here. So you are telling me that the condition that is different is the cost ratio because of population, not because of any other reason.

Mr St Clair—That is part of it. The other issue is that the trucking industry accepts that we go to Euro 4 and Euro 5 engines and that we internalise these costs. We are going to lose fuel consumption and we are going to pay more for our vehicles to do that. So there is a cost associated with it and, as I said, that cost is spread over a smaller base.

Senator MILNE—But, essentially, there is no reason you will not be passing on the costs, as every other industry does. That is where I have come to the completely opposite view to the Treasurer, Mr Costello. He suggested the industry should internalise all the costs of fuel price rises. Clearly, if the community has to pay more for its goods because of the costs of transport then the realities of energy costs will start to have greater awareness in public education and so on.

Mr St Clair—If you increase the price of transport considerably, the situation may be that we lose people from manufacturing in this country to manufacturing in other countries, as I am sure happens with energy prices generally. Our industry is built on the fact that there are 42,000 competitors out there, all in small business. They want to see their businesses grow and they want to ensure that there are employment opportunities in regional, remote, rural and city areas. We do not want to see costs get forced so high that people move.

Senator MILNE—If any information comes to hand about retrofitting a truck fleet to alternative fuels—in particular, biodiesel et cetera—then we would be interested to have you send us that.

Mr St Clair—We could certainly talk to people about that and get it through to the committee.

CHAIR—If you could include CNG in that, that would be useful.

Mr St Clair—Yes. Do you know whether the report has actually been released? They said April, but we have not seen it. I am not sure if the committee has seen it.

CHAIR—I do not know. I have not seen it.

[4.23 pm]

STRANG, Mr Peter McKenzie, Executive Director, Bicycle Federation of Australia

FISHMAN, Mr Elliot, Director, Institute for Sensible Transport

CHAIR—Welcome. I will not bother outlining again the terms of reference. I am sure you have read them. I would just like to remind you that these are public proceedings. Although the committee may agree to a request to hear evidence in camera or may determine that certain evidence should be heard in camera, witnesses are protected by parliamentary privilege. It is unlawful for anyone to threaten or disadvantage a witness on account of evidence given to a committee. Such action may be treated by the Senate as contempt. It is also contempt to give false and misleading evidence to a committee. If you do not want to answer a question, the committee may decide whether we want to insist on you answering the question. If we insist, you may decide that you want to do that in camera. I invite you to make an opening statement.

Mr Strang—Thank you for the invitation to speak to you today. Elliot will now speak briefly about the importance of the peak oil issue and its implications for Australians, and then I will follow.

Mr Fishman—We will keep our opening remarks fairly short to maximise the time for questions. I will start by going over some demand situation issues, supply and the impact that high oil prices might have on Australian society. The year in which most oil was discovered was 1965. Saudi Arabia is the world's largest producer of oil and some 90 per cent of Saudi oil is found in just six reserves, all of which are over 40 years old. Globally, we consume four barrels of oil for every one discovered. Australia is rapidly becoming more dependent on foreign oil. World demand is surging, especially in China but also in India, where they have just started the construction of a national highway system. Many oil-producing countries are unstable. Over 50 per cent of all oil is produced in just five countries, including Saudi Arabia, Iran, Iraq and Venezuela.

The impacts of higher oil prices are going to be felt most immediately in outer suburban areas and rural areas where you have a confluence of factors. You have low income, high trip distances and also a lack of non-car alternatives. That is a real problem, and it is already starting to be a problem and it is going to become a bigger problem in the future as prices rise. I will hand over to Peter to explain some of the options we have available.

Mr Strang—I will talk about creating some transport options for Australians to reduce the impact of high fuel prices and also to gain other benefits from increased cycling and walking. First of all, there is a great opportunity for replacing some car trips with cycling and walking. I am not sure whether you are aware that some 30 per cent of car trips in urban areas, and that includes suburban centres as well, are under three kilometres in length and half of them are less than five kilometres. These are generally distances that are readily covered by bicycle and a lot can be walked as well. There is a high level of bicycle ownership. In the last five years more bikes have been sold than cars. Each year for the last four years, over one million bicycles have been sold. That is four million bicycles over those four years. A lot of people have bicycles.

What we are talking about is not rocket science, it is not a high-tech solution. We are talking about the proven options of cycling and walking, which are especially used in many European cities and they have much higher cycling and walking rates than we do. There are many other benefits from increased cycling and walking, apart from reducing fuel consumption. Increased health and fitness are important. Studies have shown extension to healthy life for people who cycle regularly. Obviously, childhood obesity is becoming a major issue. Some of that is due to the food that these kids consume but some is also due to their low levels of physical activity. Increased cycling and walking can reduce the emission of small particles, and this is an issue of growing concern. There was a *Catalyst* program a couple of weeks ago on this issue. Greenhouse gas is an issue that is partially addressed by this technology, and reduced traffic congestion can produce economic savings. We are also talking about something that is socially equitable—bicycles and shoes are things that are affordable for most people.

Some of the measures we think should be taken to create better transport options are outlined in our submission. Briefly, I will summarise them. There are publicity campaigns that can be produced to promote cycling and walking, especially for short trips—trips down to the shops or to take kids to school can be done on foot or by bicycle. There should be increased funding for travel behaviour change programs. Some of you may have heard of the successful TravelSmart programs that have been run in the states. These are being rolled out more slowly than we would like to see.

We would also like to see significant federal funding for cycling and walking infrastructure, and probably the best way to direct that is to local councils. We would like to see a program similar to the Roads to Recovery program, where, as you know, money goes straight to councils. They can spend some of it on cycling facilities, but not much of it is. We would like to see a parallel program which we would call paths or trails to recovery. There have been similar programs in the US, and I know other submissions have supported this recommendation. We would like to see better transport planning to integrate cycling and public transport, which includes providing bicycle lockers at public transport interchanges and better facilities for bikes on buses and other public transport.

Better land use planning is very important to connect cycling facilities. Sometimes some developments have good cycling facilities within them but they do not connect anywhere, so you cannot get to where you want to go. You also need direct routes. It is no good having lots of cul-de-sacs that do not allow you to go anywhere. You may be very close to the shops but you may have to travel a large distance to get to them. So that is not good urban planning. Last but not least, we would like to see a change in the FBT legislation to eliminate incentives for increased car use. We see this as a very progressive measure. Basically, that summarises our position, and we would be happy to answer questions.

Senator NASH—I am interested in your suggestion about having a fund for cycling and walking infrastructure, with the money going direct to local councils. That is certainly of interest. Anything we can do to improve not only fuel issues but health issues is something that we will certainly consider. One of your recommendations is to introduce higher fuel taxes to reduce oil consumption. I am sure there would be quite a few screams about that. With that, did you take into account that that would probably affect the lower socioeconomic demography the greatest? We have had some discussions in the committee about how people living on the outer fringes in metropolitan areas are less able to deal with the rising fuel costs, and it seems to me

that this would put the burden even more on those people. Did you take that into account when you came up with that recommendation?

Mr Strang—We have quoted from the study of Dodson and Sipe, which shows that increased fuel prices have more of an impact on disadvantaged people. It is a difficult one. The situation perhaps has changed a little, not that I resile from that position. We should still be encouraging options. We certainly do not think that we should be reducing fuel prices. We do not agree with the position of at least one of your colleagues—not from your party—who has been very prominent in saying that the government should reduce the fuel excise. That is a difficult issue.

Senator NASH—I understand the premise of what you are getting at—that the greater awareness that we have of the impact of our use of oil will hopefully lead to a personal decrease. But particular aspects of that recommendation concern me.

Mr Strang—Other transport options should be created for people in outer suburban areas. We need to look more closely at public transport options, as well.

Mr Fishman—I think that that is a really good question you brought up, Senator Nash. The social impacts of this rise in fuel prices are going to hit really hard on low-income, outer suburban families. I think, before fiddling with fuel prices, probably the most important thing to do is to give low-income communities—and everyone, really—other transport options. I go out to a lot of local councils to speak at their sustainability weeks and one thing a lot of the residents of these outer suburban communities bring up is that they want other choices. For young people who like to travel after, say, 6 pm, it is very difficult to get around without a car.

Mr Strang—We had an example last night. We had dinner together in Canberra. We finished at about 9 pm and Elliot could not get a bus.

Mr Fishman—I could not get a bus back to my hotel because they stop at six o'clock or something, so I had to get a taxi. That is the sort of thing I mean. I am okay because my wage is sufficient, but I suppose for people who cannot afford to get taxis all the time, it is tough.

Senator NASH—It is a very good point. What is the average cost of a bike?

Mr Strang—For $400 or $500 you can get a reasonable bike.

CHAIR—It depends how fancy you are at riding.

Senator NASH—True.

Mr Strang—You can get less expensive ones.

Senator NASH—I was just thinking about the impact of cost given we are looking at alternatives and alternative ideas. I suppose if you are a family with three kids, it is quite a significant outlay.

Mr Fishman—It is about seven tanks of petrol. Maybe that is a good way to frame it for this committee.

Senator NASH—Touche! Forget the Commonwealth cars; we will have a bike fleet. That is a very good way of putting it. Thanks, gentlemen.

Senator MILNE—I think one of the biggest disincentives is safety for those people who are inclined towards thinking: 'Okay. That's a good idea. I would like to get a bike. I will be fitter and it will be cheaper and all that.' People are really afraid to ride on most of our suburban roads because they are fearful of being hit by a car, rather than being put off by any other disincentive about price or whatever. Part of that is the lack of planning to provide a bicycle lane and part of it is cultural where a lot of people just do not even think about bikes being on the road. I recognise the latter is about public education. To go back to the former: do you have any examples of where cities that were built for the car have now decided to retrofit the city to become bicycle friendly? Hopefully, when you get new developments, you could get some education in urban planning. But we are talking about actually changing what we have so that we can retrofit for the safety issue.

Mr Strang—That is certainly happening in our major cities now. In Melbourne, for instance, there are a lot of bike lanes going in and they are being used. On the Bicycle Victoria website, they publish details of what has happened on St Kilda Road over quite a long period of time since bike lanes were put in. That shows that the accident rates have been pretty steady but the number of people using St Kilda Road has increased enormously. Also in Canberra, for instance, if you get a chance to get out and about in Canberra, there is a bike lane that goes all the way from Woden to Dickson—right through the centre of town—and that gets a lot of use. That is quite safe. So there is opportunity, but it is slow and it needs some funding.

Mr Fishman—I think a good example of a city that once was car dependent and which has become much more bicycle friendly would be Davis in California where, before the changes started, about one or two per cent of all trips were done by bicycle. It is now up to 26 per cent; it is a significant change. A northern European standard of bicycle friendliness has been achieved in California, which has traditionally been the domain of the car. There are some examples from car culture cities that have made that conversion to a more bicycle-friendly situation.

CHAIR—How did that happen?

Mr Fishman—The University of California has a transport studies campus there. I think some of the sustainable transport planners there, along with a progressive local council, were mainly responsible for that.

CHAIR—There would have to have been investment by the local council, or whatever their local body is called over there. I presume there was a level of investment in the infrastructure.

Mr Fishman—I do not know the full story on that; I would have to take that on notice.

CHAIR—That would be really useful I am sure.

Senator MILNE—The other thing that I would like to ask you is about the electric bike—I am very taken by this idea—for people who may not be so fit or those who may decide to return to a bike in a transitional mode.

Senator NASH—I think that the senator is asking this on more than just her own behalf—

Senator MILNE—You mentioned here that there needs to be an increase in power capacity. Can you outline that a bit more for me, please.

Mr Strang—I guess it is reasonably straightforward. The rules in Australia limit the power output of electric bikes to, I think, 200 watts and that is not really sufficient to get up hills and to cover longer distances—

Senator NASH—It is only twice a light bulb, isn't it?

Mr Strang—Apart from people who are not too fit there are some people who may have a disability. It means that they can get along on the flat but hills are a major problem. The international standard is 300 watts, which is significantly more and gives more range and better climbing capacity. You can still have a limit on the speed even though it has got more power for these things. It does not mean that you are going to be doing a high speed because they are designed for bike paths and shared paths and, in some locations, footpaths.

Senator MILNE—Has there been any attempt to increase that wattage—and that has been resisted by someone—or is this just a proposal?

Mr Strang—It has been resisted. We have been working on that through the Australian Bicycle Council for some time.

Senator MILNE—And what has the resistance been? Is it because of the fear of people hooning in bicycle lanes?

Mr Strang—I guess so.

Senator NASH—An extra hundred watts will do it every time!

Mr Strang—There are a number of federal government bodies involved in the process. I can send you some more details if you are interested.

Senator MILNE—I think that it is really important because, whilst you can change the culture for younger people, you are going to have more chance of getting people onto bikes if you provide the safety aspects and if you give them some transitional encouragement, and that is clearly a transitional strategy. I would be interested to know what is being said about the impediment and whether there is anything that this committee can do to address that.

Mr Strang—Okay. I will get you some more details of exactly where that is at.

Senator NASH—Senator Milne asked before about retrofitting cities. Is there a particular city around the world that is a model example of a good cycle city?

Mr Strang—Yes, Odense in Denmark.

Senator NASH—Could the committee be supplied with some information on that city?

Mr Fishman—I can also supply some information of what has been noted as the world's most bicycle-friendly city—Groningen in the north of Netherlands, where 49 per cent of all trips are done by bicycle. It is an interesting city and of use to the committee, I think, because it is a city that has not always been bicycle-friendly. In the sixties they had huge congestion and pollution problems and so they decided to deal with that with a massive upgrade on bicycle infrastructure so that that main problem which cyclists have with cycling, which is fear of having to share the road with cars—which is quite a legitimate fear—was taken away by the provision of segregated bike paths that are dispersed across the city to give cyclists more transport options than car drivers. In Australia we have got it the other way round really. So Groningen in the Netherlands is an excellent example of where they have really done everything they can to reduce car use and increase the alternatives.

Senator NASH—That would be really helpful I think.

Mr Strang—Can I throw something else into the mix? One of the projects that we are working on with the Amy Gillett Foundation—Amy Gillett was the cyclist killed in Germany—is a project to set up a cycling training program. The idea is to enable adults, especially, who have not ridden or have not ridden for some time, to build up confidence and skills so that they are more likely to ride and, if they do ride, they will ride more safely. Our federation believes that if it is something that is established on a national basis it would be very useful and successful.

CHAIR—I have a follow up question about TravelSmart. I come from Perth, and while Perth, in my opinion, has not put enough money into TravelSmart, it has invested in it significantly and it has been very successful where it has been trialled. Which other cities in Australia are running a similar program?

Mr Fishman—I know that Melbourne is running an extensive and rapidly expanding program.

CHAIR—Is it of a similar nature to TravelSmart?

Mr Fishman—It is actually called TravelSmart. It is a TravelSmart program.

Mr Strang—There is a fairly large program about to start in Canberra and TravelSmart programs are operating in Queensland. A lot of these programs are funded by the Australian Greenhouse Office. There is nothing in Tasmania, and there is a program in South Australia. I am not sure about New South Wales, but I can get you that information.

CHAIR—That would be good, and the level of funding that each of them is receiving. I know that in Perth they went to a lot of trouble and had to convince the AGO to fund it. I would be interested to know what level of funding they are getting now.

Mr Strang—Sure.

Mr Fishman—I think the general experience from TravelSmart has been that they have often exceeded their targets of how many car trips they are going to convert to bicycle, walking and public transport.

CHAIR—In Perth we were getting a very high retention rate, so the behaviour was a permanent behaviour change—certainly when they reinterviewed people involved up to two years later. It was a pretty impressive retention rate. Are they getting similar retention rates in other cities?

Mr Fishman—I know they are in Melbourne. In Melbourne, they have exceeded their targets of retention. They have been pleased, and I think that is part of the reason why it has expanded as rapidly as it has in Melbourne.

CHAIR—As there are no more questions, I thank you very much.

Mr Fishman—As we have 10 minutes, can I make one concluding remark, which will last one or two minutes?

CHAIR—Yes.

Mr Fishman—During this debate—and I have been here since nine o'clock, just like you guys—people have put a lot of ideas forward to get us out of this mess that we look like we are heading into with rapidly increasing prices of oil. A lot of the ideas are things that might happen; research is being done on it, and it could happen in 10, 15 or 20 years. To deal with this situation, even if the peak is in 20 years time, things are going to have to start two or three decades before, and bicycles represent the low-hanging fruit to start the process of reducing our society's dependence upon oil. It is a really great place to start, because it is achievable and it is proven and it has a lot of different spin-offs such as increased health, increased environmental quality, decreased congestion and all those things. I think bicycles represent a really good place to start with this problem.

CHAIR—A point well made and well taken. Thank you very much.

Committee adjourned at 4.48 pm