COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

SENATE

SELECT COMMITTEE ON FUEL AND ENERGY

Reference: Issues relating to the Fuel and Energy Industry

FRIDAY, 26 JUNE 2009

CANBERRA

BY AUTHORITY OF THE SENATE

TO EXPEDITE DELIVERY, THIS TRANSCRIPT HAS NOT BEEN SUBEDITED

INTERNET

Hansard transcripts of public hearings are made available on the internet when authorised by the committee.

The internet address is:

http://www.aph.gov.au/hansard

To search the parliamentary database, go to:
http://parlinfoweb.aph.gov.au

SENATE SELECT COMMITTEE ON

FUEL AND ENERGY

Friday, 26 June 2009

Members: Senator Cormann *(Chair)*, Senator Hutchins *(Deputy Chair)*, Senators Bushby, Fifield, Joyce and McEwen

Senators in attendance: Senators Bushby, Cormann, Hutchins and McEwen

Participating members: Senators Abetz, Adams, Back, Barnett, Bernardi, Bilyk, Birmingham, Bishop, Boswell, Boyce, Brandis, Carol Brown, Cameron, Cash, Colbeck, Jacinta Collins, Coonan, Crossin, Eggleston, Farrell, Feeney, Ferguson, Fielding, Fisher, Forshaw, Furner, Heffernan, Humphries, Hurley, Johnston, Kroger, Lundy, Ian Macdonald, McGauran, McLucas, Marshall, Mason, Milne, Minchin, Moore, Nash, O'Brien, Parry, Payne, Polley, Pratt, Ronaldson, Ryan, Scullion, Stephens, Sterle, Troeth, Trood, Williams, Wortley and Xenophon

Terms of reference for the inquiry:

To inquire into and report on:

a. the impact of higher petroleum, diesel and gas prices on:
   - i. families,
   - ii. small business,
   - iii. rural and regional Australia,
   - iv. grocery prices, and
   - v. key industries, including but not limited to tourism and transport;

b. the role and activities of the Petrol Commissioner, including whether the Petrol Commissioner reduces the price of petroleum;

c. the operation of the domestic petroleum, diesel and gas markets, including the fostering of maximum competition and provision of consumer information;

d. the impact of an emissions trading scheme on the fuel and energy industry, including but not limited to:
   - i. prices,
   - ii. employment in the fuel and energy industries, and any related adverse impacts on regional centres reliant on these industries,
   - iii. domestic energy supply, and
   - iv. future investment in fuel and energy infrastructure;

e. the existing set of state government regulatory powers as they relate to petroleum, diesel and gas products;

f. taxation arrangements on petroleum, diesel and gas products including:
   - i. Commonwealth excise,
   - ii. the goods and services tax, and
   - iii. new state and federal taxes;

g. the role of alternative fuels to petroleum and diesel, including but not limited to: LPG, LNG, CNG, gas to liquids, coal to liquids, electricity and bio-fuels such as, but not limited to, ethanol;

h. the domestic oil/gas exploration and refinement industry, with particular reference to:
   - i. the impact of Commonwealth, state and local government regulations on this industry,
   - ii. increasing domestic oil/gas exploration and refinement activities, with a view to reducing Australia's reliance on imported oil, and
   - iii. other tax incentives; and

i. the impact of higher petroleum, diesel and gas prices on public transport systems, including the adequacy of public transport infrastructure and record of public transport investment by state governments.

WITNESSES

BARNICOAT, Dr Andrew, Group Leader, Energy Minerals Systems, Onshore Energy and Minerals Division, Geoscience Australia 2

BRADSHAW, Dr Marita Theresa, Senior Geoscience Adviser, Geoscience Australia 2

COMLEY, Mr Blair Robert, Deputy Secretary, Department of Climate Change 42

CONSTABLE, Ms Tania, Principal Adviser, Resources and Energy Policy, Department of Resources, Energy and Tourism 16

FOSTER, Dr Clinton, Chief of Petroleum and Marine Division, Geoscience Australia 2, 16

GORDON, Mr Robert (Bob), Executive Director, Renewable Fuels Australia 52

GRIFFITHS, Mr John Frank Lewis, General Manager, Energy Security Branch, Department of Resources, Energy and Tourism 16

le POIDEVIN, Mr Stephen Robert, Senior Reservoir Engineer, Geoscience Australia 2

LIVINGSTON, Mr Andrew, Renewable Energy Regulator, Office of the Renewable Energy Regulator 42

MORLING, Mr Brendan John, Head of Division, Energy and Environment Division, Department of Resources, Energy and Tourism 2, 16

PAGE, Mr Bradley, Chief Executive Officer, Energy Supply Association of Australia Ltd 28

SINGH, Mr Amarjot, Manager, Data, Audit and Compliance, Office of the Renewable Energy Regulator 42

SQUIRE, Mr Martin, Acting General Manager, Offshore Resources Branch, Department of Resources, Energy and Tourism 16

Committee met at 9.17 am

CHAIR (Senator Cormann)—I declare open this public hearing of the Senate Select Committee on Fuel and Energy. The Senate has referred to the committee matters associated with fuel and energy, including the price of fuel, regulation and taxation arrangements and alternative fuels. The committee is due to provide its final report to the Senate on 21 October 2009. Today the committee is focusing on energy and fuel security and in particular to the terms of reference relating to the existing set of federal and state regulatory powers as they relate to fuel and energy products, taxation arrangements on fuel and energy products, the role of alternative sources of energy to coal and alternative fuels to petroleum and diesel, and domestic energy supply and the domestic oil and gas exploration and refinement industries.

This is a public hearing and a *Hansard* transcript of the proceedings is being made. Before the committee starts taking evidence, 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. The committee prefers all evidence to be given in public but under the Senate's resolutions witnesses have the right to request to be heard in private session. It is important that witnesses give the committee notice if they intend to ask to give evidence in camera. If a witness objects to answering a question, the witness should state the ground upon which the objection is taken and the committee will determine whether it will insist on an answer having regard to the ground which is claimed. If the committee determines to insist on an answer, a witness may request that the answer to be given in camera. Such a request may, of course, also be made at any other time. Finally, on behalf of the committee, I would like to thank all those who have made submissions and sent representatives here today for their cooperation in this inquiry.

[9.19 am]

MORLING, Mr Brendan John, Head of Division, Energy and Environment Division, Department of Resources, Energy and Tourism

BARNICOAT, Dr Andrew, Group Leader, Energy Minerals Systems, Onshore Energy and Minerals Division, Geoscience Australia

BRADSHAW, Dr Marita Theresa, Senior Geoscience Adviser, Geoscience Australia

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

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

CHAIR—I welcome officers from the Department of Resources, Energy and Tourism and Geoscience Australia. I remind senators that the Senate has resolved that an officer of a department of the Commonwealth or of 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 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. Officers of the department are also reminded that any claim that it would be contrary to the 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. I particularly draw the attention of officers to an order of the Senate of 13 May 2009 specifying the process by which a claim of public interest immunity should be raised.

Mr Morling—We from the department do not have any opening statement. We are happy to take your questions. But I understand Dr Foster from Geoscience Australia has a presentation. If it suits the committee, we might start with that.

Dr Foster—I would like to introduce Geoscience Australia in the context of this committee inquiry. It is a prescribed agency within the Department of Resources, Energy and Tourism and it is the national geoscience and spatial information agency. Our activities cover three broad areas: spatial information in the Geospatial and Earth Monitoring Division; Onshore Energy and Minerals Division; and offshore, Petroleum and Marine Division. The Petroleum and Marine Division's coastal and marine activities involve seabed mapping and documentation of Australia's maritime boundaries. In this connection senators will be aware that on 9 April 2008 the UN Commission on the Limits of the Continental Shelf awarded 2.5 million square kilometres of continental shelf to Australia's jurisdiction. This includes areas that may have resource potential.

With respect to petroleum, Geoscience Australia produces the annual publication *Oil and Gas Resources of Australia*, which is a national inventory of 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 occurrences as well as forecasts of future production and estimates of undiscovered resources. Geoscience Australia also publishes estimates of resources

of brown and black coal, coal seam methane, oil shale, uranium and thorium in a web-based document called *Australia's Identified Mineral Resources*. These estimates are relevant to the production of alternative fuels from those commodities.

Geoscience Australia provides technical advice to government on the administration of the Offshore Petroleum and Greenhouse Gas Storage Act. This is in relation to 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 geological storage of carbon dioxide. In 2006 the Australian government funded two programs under the energy security initiative: the Offshore Energy Security Program, with $75 million over five years; and the Onshore Energy Security Program of $59 million over five years. Both programs conclude in June 2011. Results are being progressively released and used by industry.

Australia's oil and gas is produced from six offshore basins and from one major onshore area, the Cooper-Eromanga basin. It is evident that oil production in Australia is in decline and we are approximately 55 per cent self-sufficient in liquids. That means oil and condensate. With respect to gas, Australia has significant reserves that satisfy domestic demand and support a growing LNG export industry. However, Australia remains lightly explored for oil and conventional gas, and about 20 per cent of the area of Australia's 40 prospective geological basins is currently under licence.

Both energy security initiatives recognise the need to acquire modern geoscientific data in both onshore and offshore frontier basins to assess Australia's potential energy resources, and work programs are determined in consultation with stakeholders. Geoscience Australia's offshore technical program of acquisition of precompetitive data and integration of existing information underpins the Department of Resources, Energy and Tourism's annual gazettal of petroleum acreage release, and I will discuss later how this has been effective in offshore areas of Western Australia, South Australia and the Northern Territory. The Onshore Energy and Minerals Division provides precompetitive data to support and facilitate onshore energy and mineral exploration in Australia. It advises the government on mineral resources, mining and land use and new research methods to enhance the chances of mineral discovery. The onshore energy program is developed in conjunction with state jurisdictions under the National Geoscience Agreement and assesses the prospectivity of four energy commodities: geothermal, petroleum, thorium and uranium. During the last three years, new regional airborne geophysical data has been acquired to help image the vast onshore frontier basins. In addition, several deep seismic surveys have been acquired over selected areas that show the internal basin architecture which assists in hydrocarbon prospectivity determinations and other details relevant to both geothermal and uranium potential. The program provides great opportunities to broaden our understanding of the largely untapped energy resource potential.

With your permission, Chair, I would like to table a handout that relates to our activities and briefly refer to them. It further demonstrates what I have given in the opening address.

CHAIR—We accept that as tabled.

Dr Foster—Thank you. You will notice that for convenience each page is numbered. I refer to the first figure, figure 1. It shows Australia's sedimentary basins and exploration and development wells. The wells are in red. Fewer than 10,000 petroleum exploration and

development wells have been drilled in Australia to date. By world standards, this is low. Despite highly localised drilling in some of these areas—you will see there has been drilling in the Gippsland Basin, the Otway Basin, the Perth Basin, the Carnarvon Basin and the Bonaparte Basin—there still remains potential in these areas. But, as you can see, many of the offshore areas—without red dots in this field—remain largely underexplored or unexplored. Priority areas for offshore frontiers will be discussed a little later.

If we turn to figure 2, we look at the crude oil volumes and the remaining reserves for Australia. Australia has remaining reserves of about 1,426 million barrels of crude oil and produced 117 million barrels of oil in 2008. The first major crude oil province discovered in Australia was in the Gippsland Basin, and this was indeed a massive and supergiant province. It was producing approximately 62 per cent of Australia's crude oil but currently contributes only 19 per cent of Australia's crude oil—that was the figure in 2008.

CHAIR—Excuse me; can I just interrupt you. This is very interesting, and I am very keen for us to get back to this in a minute, but I have just been advised that Mr Morling has to leave at 9.40 am, so I am just wondering whether we should quickly ask a few questions while he is here, because otherwise we will not have the opportunity. Do not leave, Dr Foster. Sorry for doing this. Mr Morling, you did not have an opening statement, but I am just wondering whether, to get us into the subject, you could give us a bit of an outline of the process your department is following in the lead-up to the energy white paper.

Mr Morling—Sure. I will just explain that I do have to leave at 9.40 but that there are other officers from the department who can answer your questions.

CHAIR—Sure.

Mr Morling—I will call Ms Constable; she is leading the team that is developing the energy white paper. Oh, I am advised that she has just had to leave to go to the minister's office. I am happy to give you a broad outline, but it is her particular task within the department. We have set up a separate group to do the energy white paper, simply because the energy white paper goes across both the resources and the energy divisions; it is a comprehensive statement from upstream to downstream energy.

CHAIR—That is the extent of information you can provide us.

Mr Morling—I am happy to broadly answer any questions you have, but it might be better to wait until Ms Constable returns, because it really is her project within the department.

CHAIR—You are leaving at 20 minutes to 10; Ms Constable has just left—how long have you known about this committee hearing?

Mr Morling—This week. I rang the secretariat yesterday and informed them that I would have to leave at 20 minutes to 10. Clearly the issue is that we have officers of the department besides me here who can answer your questions.

CHAIR—But you are responsible for the energy and environment divisions and this is an inquiry that looks at energy security over the long term in an affordable, reliable, sufficient and

environmentally sustainable way, so I would have thought that you were the most appropriate person to be available for us. I am somewhat disappointed, given that you are scheduled to be here from quarter past nine to quarter to 11, that essentially you are unavailable in 10 minutes from now. It would have been good if I had been aware of that at the beginning of the hearing.

Mr Morling—If you will allow me to make a phone call I could ask somebody else to do the task that I have scheduled, if that would help the committee. In terms of energy security, we also have Mr Griffiths here. He is the officer responsible within the department for the national energy security assessment and can answer your questions as well.

CHAIR—Perhaps you might make the phone call and we will go back to Geoscience. Given that we started off with Dr Foster, I thought that we might deal with Geoscience until 10 o'clock and then we would deal with the department from 10 till 10.45.

Mr Morling—I will make the phone call.

CHAIR—Thank you very much. Sorry to have interrupted you, Dr Foster.

Dr Foster—You can see the crude oil by volumes and by basin, and you can see that the remaining oil in the Gippsland Basin is quite small at the moment and that our major production has moved to the Carnarvon Basin, which contributes about 66 per cent of our production. There are other crude oil areas and production in the Bonaparte Basin, and I refer you to those figures. Millions of barrels produced is shown in light green, and the dark green is what is remaining. In 2008, 118 accumulations produced that oil and only three exceeded 10 million barrels. Of the 118 accumulations that produced Australia's oil, only three exceeded 10 million barrels production for that year, with 20 accumulations accounting for 80 per cent of Australia's production. Also shown on this figure is a small brownish dot, which is the oil shale resources in Queensland. The current recoverable volumes are estimated at 28 million barrels of deposits near Gladstone and Mackay. The paramarginal and submarginal resources are more widespread and in billions of barrels, but further assessment is required. Recent production is only 1.5 million barrels and is not ongoing.

If we turn to figure 3, we will look at volumes of the other liquid production for Australia, condensate, by basin. Australia has reserves of approximately 2.7 billion barrels of condensate and produced 68 million barrels in 2008. Condensate is an oil-like liquid that separates from gas during production. It is necessary to start producing gas to access the condensate, although if the condensate content is very high you can sometimes extract it and reinject the gas for later production. Currently, condensate provides about 37 per cent of total liquid fuel production, and the major producing area is the Carnarvon Basin off Western Australia. I refer you to figure 3. There are also giant undeveloped condensate-bearing discoveries in the Browse Basin, which are shown as a full pink circle. Development planning is currently in progress for the Ichthys or Brewster, and Crux discoveries. INPEX have indicated that the Ichthys field has approximately 500 million barrels of condensate in place.

In Australia in 2008 we produced 117 million barrels of crude oil and 68 million barrels of condensate. The current demand for oil has been estimated by ABARE to be about 340 million barrels, so we produced 185 million and had a demand of 340 million. In addition to condensate, liquefied petroleum gas, or LPG, is recovered from gas reservoirs. LPG has a lower energy

content than crude oil or condensate, and Australia has remaining LPG reserves of 1.4 billion barrels, equivalent to about a billion barrels of crude oil. As with condensate, it is necessary to produce a gas field to produce the LPG, so LPG has similar gas contract constraints in its production to those for condensate. In 2008, Australia produced 55 million barrels of LPG.

If we flick to figure 4, we can look at the gas reserves of Australia. We have remaining reserves of 164 trillion cubic feet of gas. The Carnarvon Basin is Australia's major gas-producing area, and 54 per cent of Australia's gas came from that region, with 64 per cent of it exported as LNG. The Gippsland Basin produced 17 per cent, the Cooper and Eromanga Basins onshore seven per cent and the Otway Basin eight per cent. The Bonaparte Gulf Basin produced nine per cent, with the majority from the Joint Petroleum Development Area; it is exported as LNG.

Also shown on this map is the rise in significance of coal seam methane. The resource estimate is of a total of 7.1 trillion cubic feet, approaching the amount of conventional gas reserves in eastern Australia, with current production of nearly 0.15 trillion cubic feet per annum. Estimates of in-place coal seam methane resources in eastern Australia exceed 200 trillion cubic feet, but it is currently uncertain what proportion of that will be economically recoverable. There are other gas resources in tight gas reservoirs, and exploitation of this resource is at an early stage within Australia. The possibility of gas to liquids as a technology to produce liquid fuels is on offer.

Figure 5 is really an important figure. It shows crude oil volumes and numbers of discoveries by year. In green, we see the total number of discoveries of crude oil over time—that means from a producing, economic field to simply a discovery. Over 500 crude-oil-containing discoveries have been made over the time, but really no significant additions to the reserve have occurred recently. The giant and supergiant discoveries in 1967 were in the Gippsland Basin and the Barrow Island area of the Carnarvon Basin. You will see the volume of crude oil discovered, and you will see that over time this volume has fallen considerably. The total volume of discovered oil has declined significantly after the early successes. Improvements in pre-drill resolution and the advent of 3-D seismic have assisted with some better discovery rates in the 1990s, but it emphasises that there is a need to discover a new petroleum province for Australia.

Senator HUTCHINS—Excuse me, Dr Foster. The green represents the total number of crude oil discoveries?

Dr Foster—Yes.

Senator HUTCHINS—And then you have volume of crude oil discovered?

Dr Foster—Yes.

Senator HUTCHINS—So, despite the discoveries, there is just not a lot in them?

Dr Foster—Correct.

Senator HUTCHINS—Okay. I think that is what you were trying to say.

Dr Foster—Yes. That was probably a better way to say it. Australia really needs to find a new oil province the size of the Gippsland Basin, the Bass Strait or the Carnarvon Basin.

If we look at figure 6, we can see the production rates of crude oil, and you can see there are peaks along there. 'Crude oil and condensate production' shows that Australia's historical rate for oil has been maintained at about 350,000 barrels a day since 1973. The blue dots indicate the high points for production, say, in 1985 in the Gippsland Basin and in 2000, when production reached 732,000 barrels per day, as the Corallina and Laminaria fields came on stream. You can see those numbers are going down.

Figure 7 is another way of presenting the crude oil changes over time and it tells us that seven major fields contributed that amount, as opposed to the other 304 fields. So we are in a decline pattern. I do not think I need to go further into that particular one.

Figure 8 shows a forecast of crude oil plus condensate production from nine producing basins. It shows production under three scenarios. The scenario labelled P10 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 P90 has a 90 per cent probability of occurrence and represents the conservative case. We are sitting on the P90 curve at the moment. The three curves include estimates of production from currently producing fields, from fields likely to enter production and from fields to be discovered in those areas within 20 years. We do not include basins which do not have oil in them at the moment in our projections.

If we turn to figure 9, I do not need to read it but it shows the liquid resources and possible future additions from producing areas. The committee can read through those numbers. Effectively, it tells us that for self-sufficiency in oil we have about eight years out of a range of six to 13 years, normally; for condensate we have 20 years; and, for sales of gas, we have 100 years or more of gas.

If we turn to figure 10 and perhaps the role of Geoscience Australia in providing pre-competitive data to attract explorers to come to Australia, in recent years there has been an increase in uptake of acreage from a low point in 2003. If you look at figure 10, you will see squares offshore which are existing petroleum titles and the area that was released in 2003. Obviously, where there is no colour other than blue, there are no areas being examined. Uptake in 2003—and that is the red blocks—was less than 50 per cent. Areas on offer that were not taken up were the Vlaming Sub-basin offshore from Perth—and you can see a little red square near where Perth would be—and the Arafura Basin to the north—and you can see pink squares which were not taken up. No exploration acreage was held in the western part of the Great Australian Bight or in the offshore Canning Basin.

To stimulate exploration Geoscience Australia received $61 million over four years, from 2003 to 2007, to fund a new petroleum program. It focused on new precompetitive data from these frontier areas and lightly explored areas, and seismic archiving. In addition, up to 20 per cent of those blocks released were listed as designated frontier areas, with a tax uplift of 150 per cent. Of course, the price of oil started to rise over that period and hit a peak in 2008. The effectiveness of these measures when it comes to opening up frontiers and neglected basins is shown by uptake rates of about 80 per cent when compared to overall uptake rates of the general permits.

If you turn to figure 11, you will notice that there are a lot more squares on the page. Figure 11 shows the results of exploration permits in the Bremer Sub-basin—that is in the south-west corner of Western Australia; you can see the little areas there—in the Arafura Basin to the north and in the Vlaming Sub-basin offshore of Perth. All these were areas where Geoscience Australia obtained new data, conducted studies of a precompetitive nature and released them to the industry. Geoscience Australia's studies have provided new supporting data for 27 areas released in the period from 2004 to 2009. Eleven of these areas have been awarded to date in the Bremer Basin—as I spoke about—the offshore Perth Basin and the Canning Basin. You see it is labelled there: 'Canning Basin'. There are another 13 areas released in 2008 and 2009 which await uptake.

I will just move through to the showing on figure 12. Geoscience Australia's work program focuses on opening and promoting frontier areas for petroleum exploration. We have a number of potentially prospective basins under assessment, and the keys to these are in the yellow colours. I am looking at the Great Australian Bight; the Mentelle Basin and the Perth Basin, where there has been quite a lot of activity; and the Capel and Faust Basins, which are 800 kilometres east of Brisbane. Seismic data acquired in the Capel and Faust Basins has shown that there are depocentres, approximately seven kilometres deep and 50 to 100 kilometres long, which have potential. Work in the Mentelle Basin offshore of Western Australia, the Perth Basin and the Wallaby Plateau has shown that there is potential in those areas. We produce that. That completes and concludes my comments.

CHAIR—Thank you very much, Dr Foster. Just to clarify, your organisation essentially identifies and quantifies available energy sources and supply? You do not overlay that with the way demand for energy is likely to track into the future? You really look at the sources and potential supply; that is right, isn't it?

Dr Foster—Yes.

CHAIR—You mentioned a couple of initiatives like the Energy Security Initiative, which was funded for five years, from 2006 to 2011.

Dr Foster—Yes.

CHAIR—What will be happening in relation to the work you are doing after that?

Dr Foster—There will be an opportunity to assess the program and perhaps have another initiative.

CHAIR—But at this stage you have not really got any indications as to whether that is going to be ongoing or not?

Dr Foster—Not at this stage.

CHAIR—What has happened with the program to stimulate exploration between 2003 and 2007?

Dr Foster—The information is prepared by Geoscience Australia. It adds to the knowledge of the nation, so it is not lost.

CHAIR—Sorry; let me rephrase it. What I take out of your presentation is that we have a real challenge around oil, because we are running out of the resource. With gas, there are a lot of available resources—100 years. With oil it is about eight years. One of the issues that you identified is around the need to discover another oil province, and obviously to do that you need exploration. That program which was running between 2003 and 2007 had quite a significant impact in terms of improving the rate of uptake; that is what you said.

Dr Foster—Correct—attracting people.

CHAIR—What is happening now to encourage exploration or ensure that we achieve the same rates?

Dr Foster—There is the same precompetitive information, and with the new energy security program the same process is taking place: we are studying basins, producing information, packaging it up and attracting industry with it—promoting it to industry.

CHAIR—But the program that was running between 2003 and 2007 is no longer running.

Dr Foster—That program finished, and the new energy security program took it up from there.

CHAIR—What is the new energy security program?

Dr Foster—It is a program which was funded from 2006 to 2011, and that is doing the precompetitive work. That was the continuation and expansion of the new petroleum program.

CHAIR—Understood. Can you describe the work? You are doing some work around four energy sources; you mentioned geothermal, uranium and—thoranium?

Dr Foster—My colleague Dr Barnicoat will—

CHAIR—But can you just describe it for us? I am particularly interested in the work that you are doing around uranium as a future energy source. Are you making that assessment from the point of view that Australia would rely on uranium as one of its energy sources?

Dr Barnicoat—We are making an assessment of the potential for uranium resources within Australia in a broadly similar fashion to that described by Dr Foster for petroleum, but we are doing that in onshore Australia through precompetitive data sets that we are gathering, identifying areas of potential. We do not come to conclusions about the magnitude of that potential; we simply put the data out there for industry to utilise.

CHAIR—No, you are not making a policy decision as to whether it is desirable; you just quantify, identify, scope and map out et cetera. I understand that. You are not making a value judgment. How have you progressed with that work and, in terms of quantifying the potential for uranium to be a domestic energy source, what are your findings?

Dr Barnicoat—We are making significant progress in that space and have been releasing data over the past several years as a result of the Energy Security Initiative. We are not quantifying the potential because in the uranium space, as in most mineral space, the identification of the potential size of the resource is extremely difficult. It is much more difficult because we understand mineral related systems far less well than we do petroleum systems. So we are putting data out into the public domain that companies are utilising to make their own target generation efforts and progress from there.

CHAIR—Dr Foster mentioned that you are assessing this for possible energy sources, for that potential to contribute presumably to energy security into the future. Can you give us some facts and figures around what you have actually mapped out? What are your findings?

Dr Barnicoat—Our findings are very much in the geoscientific domain, so they are fundamental geoscientific data sources that we are collecting and releasing. It is impossible to directly identify uranium resources using the sort of data that one can collect. Until there is actually drilling into the ground it is impossible to actually estimate potential grades or volumes of mineral resources.

CHAIR—What is the geoscientific data in relation to uranium that you have identified and that you may or may not have released?

Dr Barnicoat—It is like airborne electromagnetic data that allows the distribution of rock layers near the surface to be identified. It is seismic surveys that again allow the distribution of rock bodies to be identified. But because we are remotely looking at the rocks that are below the surface we cannot actually predict what their uranium contents are. It is the distribution of rock masses that we are identifying, and companies then make an assessment about whether or not they are likely to be uranium bearing or not and make their own investment decisions based on that.

CHAIR—But you are assessing it as one of our energy sources about which you are specifically doing some analysis as to what it could mean for Australia into the future. You are looking at in the context of uranium as an energy source, are you not?

Dr Barnicoat—Yes, and we are producing qualitative understanding of the uranium potential rather than quantitative understanding.

CHAIR—Have you published any documentation in relation to this?

Dr Barnicoat—Yes. There are recent reports on the nature of the uranium systems, as we call them, that are distributed in Australia and that were published last month by us.

CHAIR—Is it possible for you to provide a copy of those to the committee?

Dr Barnicoat—Certainly.

CHAIR—Also, in relation to those other three energy sources, we have had a very detailed presentation around oil, condensate and gas. I see that there is also some overview in relation to

hot rocks, but the committee is very keen to get some further information on those other energy sources and the potential that you have assessed.

Dr Barnicoat—I can forward to you the reports we have published on uranium and on thorium as well.

CHAIR—You finalised that about a month ago, you said.

Dr Barnicoat—Uranium is still a work in progress, but we have reports to date that we can produce. We conducted an assessment of thorium two years ago. That has been published and we can forward that to you.

CHAIR—Thank you for that. When you say 'work in progress', when do you expect that you will finalise your assessment of the potential of uranium as an energy source?

Dr Barnicoat—I think that will be finalised in 2011 at the conclusion of the Onshore Energy Security program.

Senator McEWEN—I just noticed that in the folder there is more information about geothermals that you have not taken us through. Is somebody intending to do that?

Dr Barnicoat—Yes. With your permission, I was going to take you through that subsequently. Would you like me to do that now?

Senator McEWEN—I am happy to hear that now. I do not know about the chair.

CHAIR—Sorry?

Senator McEWEN—Can we do the geothermals now?

CHAIR—Yes.

Dr Barnicoat—Australia's geothermal resources, figure 13, are not associated with active volcanoes, unlike well-known examples in places like New Zealand and Iceland. Instead, they are most commonly related to high-heat-production granites that are deeply buried beneath insulating rocks. Extractable heat may be accessible in what are called hot sedimentary aquifers, where naturally occurring water is present in sufficient quantities that it can be brought to the surface and used. Alternatively, the hot rocks may be artificially fractured and water circulated from the surface. In either case, the hot water may be used to generate power, if it is sufficiently hot, or may be used as a source of heat in a variety of other applications that I will talk briefly about later.

The coloured map on the right-hand side of figure 14 shows our best estimate of the temperature distribution at a depth of five kilometres. Five kilometres is selected as a depth to which it is possible to drill to extract energy relatively—and I stress the word 'relatively'—straightforwardly. It is based upon a rather uneven distribution of data points, shown in the small figure in the top left, and it has been extrapolated across the whole continent. So there is a degree of uncertainty about that temperature distribution. Temperatures in excess of 250 degrees Celsius

are known or inferred in several places, including the Cooper Basin in the central part of Australia. The energy that is at least theoretically extractable at five kilometres or shallower has been estimated by Geoscience Australia at 1.9 joules times 10 to the power of 25 or 1.9 petajoules times 10 to the power of 10. That is a very, very large number. To put that in context, one per cent of that total equates to 25,000 times Australia's total energy consumption in financial year 2004-05. However, the economics of recovery of this energy are yet to be clearly demonstrated.

Turning to figure 15, the geothermal industry in Australia gained its first exploration licence only in 2001. Now there are 43 companies with exploration licences, which are shown in the red areas on the map. At least 10 of those companies are listed on the Australian Stock Exchange and they hold or have applied for 383 licences. Work programs worth more than A$1 billion have been planned for the period between 2002 and 2013. So the industry is a very young industry but moving as rapidly as it can to demonstration of the true commercial potential.

Figure 16 shows that geothermal energy has substantial potential for power generation. In some situations it is possible to use waters at less than 100 degrees Celsius. In fact, this is the case at Australia's only current geothermal power plant, one which generates a maximum of 120 kilowatts, at Birdsville in south-western Queensland. Temperatures above 150 degrees Celsius allow for much more efficient and cheaper electricity generation. Lower temperature waters have many uses as a substitute for electricity, including providing much of the power to desalination plans, for district heating and for refrigeration or air-conditioning.

In the context of air-conditioning, figure 17 is an illustration of ground source heat pumps, which represent perhaps the most widely applicable use of geothermal resources, either by using natural waters or, more likely, by circulating water from surface to a depth where temperatures of, say, 17 degrees Celsius, as shown here, are realised. Significant energy savings can be realised in reverse cycle heating and cooling systems. The building occupied by my agency, Geoscience Australia, has had one of the very largest systems, if not the largest system, in Australia installed since it was built in 1997.

Senator BUSHBY—How far down would you have to go to achieve that?

Dr Barnicoat—It goes down about 100 metres in the Geoscience Australia building. There is a borehole field of a significant number of boreholes down to about 100 metres, where water is recirculated in a closed loop.

Senator BUSHBY—Thank you.

Dr Barnicoat—The final figure, figure 18, is an illustration of the areas where we are collecting data as part of the Onshore Energy Security Program, which my colleague Dr Foster referred to earlier. It shows where Geoscience Australia is collecting new precompetitive data to aid in the search for energy resources. Seismic surveys, shown by the coloured lines, that can image the distribution of rocks below the surface are relevant to exploration for petroleum and geothermal energy, as well as uranium. At this very moment, data is being acquired in the south-eastern Northern Territory.

Airborne electromagnetic survey data has also been acquired in the areas shown with the red boxes in Western Australia and the Northern Territory, and is planned for an area in South Australia in the next 18 months. This is of significant use in evaluating the potential distribution of uranium, as I discussed earlier. Geoscience Australia is also participating with the state and territory geological surveys in a nationwide program of gathering new temperature data from selected existing drill holes to help refine the map of temperature distribution beneath the surface in Australia. The areas where we have collected data so far, or are in the very near future going to be collecting data, are shown in the black circles.

CHAIR—Can you remind me what the four energy sources were that you were particularly looking at? There was geothermal, thorium, uranium and one other.

Dr Barnicoat—Petroleum onshore.

CHAIR—This is a very good presentation. Obviously it goes into a bit of detail around oil condensate, gas and geothermal. Can you perhaps complement the presentation by giving us a similar in-depth outline around your work on uranium and thorium?

Dr Barnicoat—At this stage I am afraid that it is rather hard, given the notice we had for appearing here.

CHAIR—I am not asking you to do it now. You can take it on notice.

Dr Barnicoat—In a written submission like this?

CHAIR—I congratulate you on your submission, but can you do the same and just add those two additional energy sources and the work that you are doing there so that we get a good understanding of what it is that you are doing.

Dr Barnicoat—Certainly. We can take that on notice, yes.

CHAIR—We might ask you to come back, in fact. Thank you very much. This has been very useful information for the committee.

Senator McEWEN—You mentioned the 43 companies that have licences at the moment. Are they supported in any way by federal government funding to do that work?

Dr Barnicoat—There are a number of federal government initiatives that support renewable energy as a whole—in particular the Geothermal Drilling Program, which is partway through distribution. I will turn to my colleagues in the department to amplify the other programs that are supporting that.

Mr Morling—If you are asking specifically about geothermal then, yes, we do have a $50 million Geothermal Drilling Program, of which we have had one round and two successful applicants. We expect to announce the second round reasonably shortly. In terms of the broader suite of renewable energy programs, there is the Renewable Energy Demonstration Program and, of course, geothermal proponents are able to apply for grants under that program. That program is closed. We are currently in the process of assessing those grants, but of course it is for

demonstration. So it is a bit further up the chain than proof of concept and research and development.

Senator McEWEN—Of those 43 companies that Dr Barnicoat mentioned, would they have been recipients of any government funding?

Mr Morling—Two of them would have been recipients under the Geothermal Drilling Program.

Senator McEWEN—I take it from what you said, Dr Barnicoat, that the incidence of uranium and the incidence of geothermal energy are in the same area.

Dr Barnicoat—At times they are in the same areas, because the heat production in the high-heat production granites I referred to is generated by the spontaneous breakdown of uranium and other naturally radioactive elements within the rocks. Uranium, thorium and potassium are the key heat-producing elements that give rise to those heat sources that are tapped by those geothermal systems.

Senator BUSHBY—I have a parochial question containing two aspects with regard to my home state of Tasmania. One, there have been a lot of media reports over recent years in Tasmania about exploration by Empire Energy Corporation International and Great South Land Minerals Ltd for onshore petroleum. I note that does not show up anywhere in your report and I am asking whether that is because it is entirely speculative or, if not, why. The other aspect to my question is that I note you also have the Sorell Basin showing here as an area of interest in terms of offshore exploration and that does show up. I am interested in the prospects there.

Dr Foster—Can I reply in relation to the offshore exploration. Sorell Basin should have shown up as an area—it does show up—

Senator BUSHBY—That does show up; I am just interested in its prospects. You have obviously put it as an area of interest and I am interested in what potential there may be.

Dr Foster—I guess the information is still being gathered, considered and put together.

Senator BUSHBY—Is anybody showing any interest in exploring in that area?

Dr Foster—There have been permits over that area already. Geoscience Australia is looking at the region from Cape Mentelle through the Great Australian Bight round to Sorell to get an understanding of that complex of basins. That often gives rise to new information about how a basin may operate or how it is thicker or deeper or whatever. That is in progress.

Senator BUSHBY—And what about the onshore explorations over the last few years?

Dr Foster—That is more of a question for our state colleagues.

Senator BUSHBY—Okay.

Dr Foster—I do not believe the onshore energy program is looking at that part of Australia at the moment.

CHAIR—Thank you very much, Dr Foster, for your contribution to the committee.

[10.06 am]

CONSTABLE, Ms Tania, Principal Adviser, Resources and Energy Policy, Department of Resources, Energy and Tourism

GRIFFITHS, Mr John Frank Lewis, General Manager, Energy Security Branch, Department of Resources, Energy and Tourism

MORLING, Mr Brendan John, Head of Division, Energy and Environment Division, Department of Resources, Energy and Tourism

SQUIRE, Mr Martin, Acting General Manager, Offshore Resources Branch, Department of Resources, Energy and Tourism

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

CHAIR—Welcome. Perhaps we can go back to the question I asked before and put it a bit differently. What do you see to be the major issues for Australia in terms of energy security moving forward?

Mr Morling—If it is okay with you, we might start with your first question as Ms Constable is now here to speak on the energy white paper. Clearly energy security will be a significant component of the energy white paper process.

Ms Constable—Good morning. I head up the energy white paper secretariat.

CHAIR—Could you talk us through the process the department is following in the lead-up to the energy white paper. What are some of the major issues being considered, where are you at and what is happening?

Ms Constable—In the lead-up to the development of the energy white paper, the Prime Minister announced last year that we would develop an energy white paper. We subsequently formed an interdepartmental committee made up of a number of agencies across the Commonwealth. Most major agencies are represented on that committee. It becomes a question of who is not on the committee rather than who is on the committee.

CHAIR—How many people are on the committee?

Ms Constable—We have 12 agencies from across the Commonwealth and, in total, about 30 people are represented on that interdepartmental committee.

CHAIR—And you chair that?

Ms Constable—I chair that particular committee. There is also a state government and Commonwealth process in place. We operate between the Ministerial Council on Mineral and Petroleum Resources and the Ministerial Council on Energy. We have been providing

information and seeking advice from those two ministerial councils on the development of the energy white paper over the last few months. That has now stepped up as we have additional information and we are considering other issues. We also have a high-level consultative committee, which is an advisory committee, made up of a number of organisations across Australia, to help provide advice on some of the major questions that we are finding within the energy white paper.

CHAIR—You have talked us through the process. What are the major issues that are being considered within the context of the energy white paper?

Ms Constable—The objective of the energy white paper is three-pronged. We will develop long-term energy policy settings focussed on long-term energy security, economic prosperity and moving to a lower emissions economy. With those objectives in mind, earlier this year we put out a strategic direction document framed around our definition of energy security which takes into account cleaner, reliable, adequate and affordable supply of energy in the longer term. Subsequently we released six discussion papers focussed on: international energy; governance and regulatory frameworks; markets; technology; our people and demographics; and workforce and Indigenous participation.

We then held a round of consultations around Australia where we discussed the major issues within the discussion papers with 350 organisations. Over the last eight weeks I have spoken to about 500 organisations in total. We then called for submissions, and submissions for the energy white paper to date closed on 29 May. I have now received 115 submissions, which I have read and my team are now rifling through to analyse what people around Australia think the major issues are.

CHAIR—Will you publish those submissions?

Ms Constable—Those submissions will be put on our website in the very near future.

CHAIR—Can you clarify 'the very near future' for us?

Ms Constable—As we have them read, they will go up in the next week or so. Some are already up on our website. They will all be made public unless they have been identified as commercial-in-confidence, and there are not very many of those.

CHAIR—Obviously as part of energy security you would have to look at energy sources as well as energy demand into the future. Are all energy sources in scope, or is there anything that is out of scope?

Ms Constable—All energy sources are in scope. As part of the development of the energy white paper we will be putting out a companion document by the end of December. Our colleagues in Geoscience Australia, with our ABARE colleagues and CSIRO, are currently working on a comprehensive energy resource assessment. That energy resource assessment will look at all conventional resources, unconventional resources and new and emerging resources, so the whole gamut of our full energy resource program will be analysed in a lot of depth. We will be drawing on experts all over Australia to provide information into that resource assessment.

Our ABARE colleagues will provide an economic overview on all of the energy resources, and our CSIRO colleagues are also helping in providing technical advice.

CHAIR—So uranium is also within the scope of the work that you are doing?

Ms Constable—Yes, it is.

CHAIR—What about tidal power?

Ms Constable—Tidal power is also in scope; wave and tidal and marine resources are all in scope.

CHAIR—Can you describe for us the work that you have done so far on tidal, wave and uranium?

Ms Constable—Within the energy white paper?

CHAIR—Yes.

Ms Constable—On the resource assessment, our Geoscience colleagues have provided some preliminary information—which we are now having peer reviewed with Dr Michael Ottaviano, from Carnegie Corporation, with the CSIRO—to clarify and provide an objective view of the resource information that we have so far. On uranium, we have had an extensive uranium program running for many years within Geoscience Australia—and my colleagues have briefly talked about that—within an energy security program. Also, within the Uranium Industry Framework, which is led out of our department within the Resources Division, we have sought information on uranium and will be providing that into the energy resource assessment and within the development of the energy white paper policy.

CHAIR—Just looking at the energy mix, how is the increasing use of renewables going to impact on energy security moving forward?

Ms Constable—At the moment we are clarifying what the impacts of a greater proportion of renewable energy may be in the longer term.

CHAIR—So you have not identified that yet?

Ms Constable—We are currently going through a number of studies. We have preliminary information. We have information that, of course, has been undertaken very extensively by our Treasury colleagues within the context of the Carbon Pollution Reduction Scheme on the basis of a number of scenarios and also the work that has been undertaken by Professor Garnaut in his report.

CHAIR—But that is not in relation to energy security; that is on a range of other matters. Let us leave the economic impact and some of the other impacts aside. I am just interested for the purposes of this committee now in energy security, because we are currently looking at legislating for 20 per cent renewable energy targets. What is the impact of that going to be on the

energy security challenge moving forward? You are saying you are doing the work at the moment to analyse.

Mr Morling—If I could just add one aspect that I think would be worth while. The committee would be aware that the Australian Energy Market Commission is undertaking a substantial review of climate change policies and of the energy market framework. That goes to one aspect of your question, in terms of energy security.

CHAIR—Which is happening at present?

Mr Morling—It is happening at present. They have already put out one preliminary report and they will be putting out their second interim report at the end of this month. It will be, of course, focused on the energy market framework itself—and that is one of the key issues around energy security—as well as on the increasing quantity of renewables coming in. Also, are our energy market frameworks appropriate for that or are there changes that the AEMC, as the independent market body, would recommend we make?

CHAIR—Are you telling me that we do not have a good handle, at present, on how the increased proportion of renewables is going to impact on our energy security moving forward?

Mr Morling—I would answer that in this way. Each of the jurisdictions would have some information on this. In particular, South Australia would have done some significant work on—

CHAIR—But you do not have a national view?

Mr Morling—In terms of the national view, it is entirely appropriate that we get the independent market body to look at the energy market frameworks.

CHAIR—What if there is a problem? What would we change?

Mr Morling—The AEMC will come forward with actual recommendations, including potential rule changes, that they will suggest will make the energy market frameworks more appropriate to deal with the increasing amount of renewables.

CHAIR—It seems to me as if we are going the wrong way around it. But anyway, Senator Hutchins?

Mr Morling—I would just add that this work did commence some time ago. It produced one preliminary report and the final report will be out in September. So I think that is timely.

CHAIR—In September, we will know what the impact of the increased proportion of renewables will be on our long-term energy security?

Mr Morling—What you will know is what the AEMC recommends—that is, that we should make changes to our energy market frameworks, to cope with that increasing proportion and to respond to—

CHAIR—To respond to the challenges coming from the increased proportion of renewable energy.

Mr Morling—Yes.

Mr Griffiths—I would just like to note that the Minister for Resources and Energy and Minister for Tourism, in March this year, released the National Energy Security Assessment. That assessment actually addressed some of the issues you are asking questions about. For example, it addressed the likely impact of such things as the new, expanded renewable energy target on energy security and looked out from the current period to five, 10 and 15 years time. That release was fulfilling an election commitment of the government.

CHAIR—I understand that. I guess I am just trying to understand how much we have a handle on the impact of that on our energy security moving forward. By the sounds of it, the work is currently being done so that we can maybe make some adjustments to the policy framework to cater for the challenges it brings. We will be looking forward to what will come out in September, and then we will be able to make a judgment. Senator Hutchins?

Senator HUTCHINS—Ms Constable, in your deliberations, do you take on as well the alternative sources of energy like solar and wind? Is that part of your bailiwick?

Ms Constable—Yes, we are looking at that. We are looking at all energy sources, renewable and non-renewable.

Senator HUTCHINS—In those particular areas—or in the whole gamut of what you are doing—are you making assessments about whether they are reasonable alternatives to the energy we use now? Will that come out in the report?

Ms Constable—There are a couple of other studies, and Mr Morling talked about the Australian Energy Market Commission. The Electric Power Research Institute is also conducting what is a comprehensive understanding of our long-term technology mix. It will look at a whole range of technologies and provide us with the costs of those technologies over a longer term. That is one particular study.

The Australian Energy Market Commission will also inform us about the impacts of the CPRS and the RET and how we might accommodate that within the frameworks that we currently have. We also will look at the longer term. We are working with the Australian Energy Market Operator to look at the size, the location and the proportion of investment that will be needed across a range of scenarios. That will look at renewable and non-renewable resources in the longer term and what it will cost to bring those sources to the various markets. That work is also lined up to be completed around September. As I said, the Australian Energy Market Operator is working with us to do that.

Senator HUTCHINS—So that will come out in the white paper as well?

Ms Constable—Yes, it will.

Senator HUTCHINS—As the chairman may recall as well, we have been given evidence in a previous part of our inquiry that it is pie in the sky stuff to think that solar and wind energy are going to be economic and viable alternatives to the energy sources we use now.

Ms Constable—Any new resource is going to cost more but as the technology matures and we understand more about the technology the costs will come down. We have a number of programs in place now that will be focusing on the research, development, demonstration and deployment of some of these technologies. You will recall that in May the government announced the Clean Energy Initiative, which will look at both clean coal technologies and renewable technologies. There is an extensive program under way to ensure that we have a greater renewables and non-renewables in a portfolio sense available in Australia in the longer term.

Senator HUTCHINS—In your white paper will you be making suggestions in relation to the cost of energy to consumers, producers et cetera? Will that come through in your white paper as well?

Ms Constable—Yes, we will provide a significant amount of information on the price of energy. Of course, it is in a modelling context looking forward to the longer term. Importantly, the size and the location of investments that will need to be made in the longer term if we want to have a lower emissions economy—and that is what the community have said—

Senator HUTCHINS—Will the cost to the household to go to what you were just saying be spelt out in the white paper? Will people understand exactly how much they are going to pay to go to this cleaner technology?

Ms Constable—The whole area of the costs of technologies right through to the household is very complex. We are undertaking a number of programs—and perhaps Mr Morling can talk about some of the issues at a household level in relation to the demand of new and conventional energy and smart meters.

Mr Morling—I will start at a slightly different point. Part of the communique of the last Council of Australian Governments meeting that was held did ask the Ministerial Council on Energy to do some work on expected price rises over the next three years, including the components of those price rises, and to report back to COAG by the end of this year. That work has commenced. Ministers on the Ministerial Council on Energy will be discussing that at their July meeting. That work will be provided to COAG by the end of 2009. There are a number of uncertainties as to what goes into making up a household bill, but to the best of the ministers' ability they will be providing estimates of expected price increases over the next three years to COAG.

Senator HUTCHINS—Is that your department doing that, Mr Morling?

Mr Morling—Yes, it is our department, but we will be doing it through the Ministerial Council on Energy. Of course, that will be a joint effort with the states as well. We will need their expertise and input into this activity.

Senator HUTCHINS—The International Energy Agency has stated that the immediate risk to the supply of oil is a lack of investment where it is needed, rather than a lack of global resources. Does the department have a view on that? Is that your assessment?

Mr Griffiths—Yes. The department has commissioned work looking at this sort of issue. In fact, when the minister released the National Energy Security Assessment he also released an assessment of Australia's liquid fuel vulnerability. That was quite a comprehensive report prepared by our consultants, ACIL Tasman, and that report did actually conclude the same thing. I can read from the relevant part from the report, if you like. It concluded:

> … while there will be a peak in production of crude oil at some time, internationally accepted information from authoritative sources suggests that this peak is still some decades away and will occur beyond 2020. It is not anticipated to be a significant factor that will affect Australia's liquid fuels vulnerability prior to 2020.

That assessment also was taken into account in the preparation of the National Energy Security Assessment which came to a similar conclusion and which is in line with the findings of the International Energy Agency and other international bodies.

Senator HUTCHINS—So that is the International Energy Agency's view, but when we had Geoscience here earlier they had to explain it to me, in figure 5. It looks like, no matter how much exploration we are doing, we are not finding any here in Australia. That does not mean it is not out there in Uzbekistan or the Congo or somewhere like that but it is not here, is it?

Mr Griffiths—No, I guess when you are looking at peak oil you can look at it in particular fields, countries or regions or globally and certainly the conclusion you referred to from an international agency was looking at the situation globally. I guess the situation in Australia is that it would appear we may either have peaked or are approaching our peak, but that obviously depends on whether we were to find another large discovery of the sort that Dr Foster mentioned. If we found another Bass Strait then obviously the situation would change.

Senator BUSHBY—Just on that, we have heard from Geoscience Australia about exploration and you said 'if we were to find another large deposit'. To what extent is that possible? We had a presentation which showed a lot of small areas where they are looking but there are a lot of areas where there is nothing happening. Presumably that is because they have not been identified as likely areas, but is it likely or even possible that there are large unfound deposits out there?

Mr Griffiths—I will defer to my colleague Dr Foster on that point.

Dr Foster—Thank you, Senator. It is a very good question. You looked at the figure and you saw that there were wide open spaces. In the Capel and Faust Basin that I pointed out, for example,—800 kilometres east of Brisbane—these areas have never been touched by a drill bit. Sorry; there has been a single, 600-metre drill, but these have not been actively explored and these are huge areas. Similarly, in the Great Australian Bight there are approximately 13 exploration wells. In the same area in the Gulf of Mexico there are over 40,000 wells, so you—

Senator BUSHBY—Forty thousand compared to 13!

Dr Foster—Over 40,000 in the Gulf of Mexico.

Senator BUSHBY—We have 13 in that area.

Dr Foster—Thirteen aerially wise. I am not claiming that they have similar geology.

Senator BUSHBY—No.

Dr Foster—But the issue is that you have to find oil by looking at the data and we are vastly underexplored. The Great Australian Bight, for example, has blocks in the 2009 acreage release and we believe there is attractive interest in those areas. We will wait and see whether they yield oil.

Senator BUSHBY—Okay, that basically answers my question. As you say, there are vast areas here around Australia's coastline that do not have any indication of likely exploration, but that is not just because the geological make-up of those areas says, 'Don't bother going there because there's not going to be anything.' It is also because to a significant extent they have not been explored.

Dr Foster—It reflects the knowledge level, and part of Geoscience Australia's activity is to do those regional studies. Companies do not work any more on vast areas. They work on their permits, of course. We put this into context. As I have mentioned in relation to the Sorell Basin, the understanding from Western Australia around to Sorell is that it is actually a system of basins that developed as Australia separated from Antarctica. Therefore, Geoscience Australia provides regional context to understand whether there are organic-rich rocks which create oil et cetera. That is literally our mandate: to do those regional studies.

Senator BUSHBY—So you send them to the areas where they might have a higher prospect than others, but it does not mean that the others do not have high prospects as well.

Dr Foster—Part of our work is to go to unexplored areas. Let me give you an example: the Bremer Basin off the coast of WA. It had been looked at in 1974 by Esso and abandoned—but, to be fair, the drills had not gone out to deeper water. Geoscience Australia put in a program of acquiring commercial 2D seismic, studying the area and dredging the area so we could find the rocks to see what was there. We put it up for acreage release and it was taken up by a company. So our position is to provide that pre-competitive data to take away the geological uncertainty of an area so that companies can move in and look at it and make decisions. Effectively, there is competition in the world for money for exploration and if companies are unaware of the geology they will bypass it and go to, for example, off the coast of Brazil or Africa or other places.

Senator BUSHBY—So although in recent years we have not had a major discovery, and we may not, there is a possibility that it could be out there still?

Dr Foster—Yes.

Senator BUSHBY—You mentioned, and this probably comes back to the department, the competition for exploration money. In terms of exploration, what impact has the current global downturn had on exploration and, in a broader sense, on Australia's energy security in general?

Ms Constable—I think it is fair to say that there has been a significant underinvestment in exploration over a long period of time. While there has been competition for exploration around the world, only 30 per cent of Australia's total territories has been fully explored and there is a lot more to be done in Australia. The global downturn has certainly had an effect internationally on exploration activity. In Australia we have had a significant amount of exploration occurring but, as I said, there is major competition for exploration moneys internationally. One of the things we will be doing within the energy white paper is looking at how we can maintain and improve the competitiveness of our industries and draw them into Australia in the longer term. I think the effect has been worse on small to medium sized firms as opposed to larger firms, but all firms will say that access to capital is very difficult for both exploration and development projects.

Senator BUSHBY—I guess to a significant extent a lot of their activity is speculative—potentially high return if something is found, but speculative—and a lot of the more speculative dollars have dried up in the last 12 to 18 months.

Ms Constable—They have. All firms are reassessing their activities and focusing on what they see as the more speculative prospects internationally. We do have a multinational presence in Australia, but we also have a significant amount of small explorers and medium-sized explorers and you tend to find those groups doing more exploration than the bigger firms. The bigger firms then will look to partner or take over those smaller operations in the longer term. That work is continuing, and of course the government has talked about flow-through shares. We are certainly looking at that particular issue as a way to increase exploration activity in Australia.

Senator BUSHBY—In what context are you looking at flow-through shares?

Ms Constable—It is being considered at the moment.

CHAIR—It is a pre-election commitment, isn't it?

Ms Constable—It was an election commitment.

CHAIR—So there is a deadline by when it should be implemented, isn't there?

Ms Constable—The government is considering a whole range of issues within the Henry taxation review, so that matter is still under consideration.

Senator BUSHBY—That is being considered in the context of the Henry taxation review?

Ms Constable—That is correct.

Senator BUSHBY—In terms of the competition for the exploration dollar, we heard evidence that the Gulf of Mexico has 40,000 drills in an area the size of which we have 13. To what extent is the rest of the world being fully explored? We are underexplored—will there be a tendency to look in Australia because they are running out of other areas to explore, or are there still plenty of areas left in the world to explore before they come here?

Ms Constable—It depends on the availability of resources around the world and, to an extent, most countries have natural resource availability. The circumstances of various countries around the world change: they have different political considerations and the extent to which firms will explore depends on how they are able to deal with that particular country and gain access to those particular resources. Australia is very prospective: we have low sovereign risk; we have a good political system; we have good regulatory systems in place—there is always room for improvement, but we have good regulatory systems in place; and we still have a great deal of prospectivity as it relates to energy and energy resources. Making sure that we have the right frameworks and conditions will make us more competitive with the rest of the world.

Senator BUSHBY—I think that is a good answer. Looking at the Gulf of Mexico, where you have 40,000 drills going—there are only so many exploration drills you can put in an area before you have to move on to somewhere else. Is that occurring in most places in rest of the world or are there lots of other unexplored areas, like around Australia?

Dr Foster—One way of thinking about it is that success will bring people to drill.

Senator BUSHBY—Like the goldfields in the 1800s?

Dr Foster—Correct. Success will bring people to drill. If you recall, in offshore Brazil, when the first big discoveries were made there, companies moved towards it. As companies look around the world, the underexplored nature of Australia is attractive, which emphasises the importance of the pre-competitive studies to take away some risk. I am not sure that is a fully satisfactory answer, but success will always bring companies to a particular point. In the diagrams and figures that I put up before, you could see the success in the concentrations of bore holes in the North West Shelf and, of course, in the Gippsland Basin. The object of Geoscience Australia is to attract people away from those known areas to look in those less explored or underexplored frontiers.

Senator BUSHBY—We have discussed the global financial crisis in terms of exploration; what about in a broader sense of energy security? What impact has it had on Australia's energy security future, if any?

Mr Morling—In terms of the downstream stationary energy sector, it would be difficult to say there has been any explicit impact of the global financial crisis. Certainly the Energy Supply Association of Australia has noted that a number of the power generators have significant refinancing tasks—they are spread out over the next two or three years, I understand. Just like for everybody that has a refinancing task, it may be more difficult in the current circumstances than it would have been prior to the global financial crisis.

Senator BUSHBY—If a company in the business of energy production has difficulties, that can have significant flow-on consequences, which is where the energy security issue arises. Is that something the government is looking at?

Mr Morling—There are a number of factors that can feed into energy security and that is one of them. Certainly, we are aware of the material that was put out just after Easter by the ESAA; it is something that we continue to keep across. Even without the global financial crisis there are factors emerging in the market that have an impact on energy security and the investment signals

that people thinking about investing in the market might face. There are a number of factors but we are certainly aware of the financing issue and the difficulties that may arise depending on when those refinancing tasks come up.

Senator McEWEN—To what extent do you think investment in exploration in Australia is affected by our distance from markets and our small domestic energy consumer population? There are 40,000 oil wells in the Gulf of Mexico but the proximity of those oil wells to huge centres of population and manufacturing activity is a bit different to the Australian situation in the Great Australian Bight which is a long way from any kind of manufacturing industry or huge centres of population.

Ms Constable—We have very good systems in place to supply energy to Australia. That will not change in the future. I think our systems are always improving and we have a significant presence on the North West Shelf as it relates to oil and gas, certainly in the Bass Strait and now in the Northern Territory with the addition of gas operations up there. We will also have condensate coming in to that with the new INPEX pipeline that will come from Western Australia up to the Northern Territory. The systems that we are putting in place will provide a great level of energy security to Australia. The production transport of energy is always part of an initial project's planning in the longer term. They work very closely with the Commonwealth and state governments to ensure the assessment and approval processes to make certain that the whole supply chain is adequately dealt with so that we can get that produce to market in the quickest, most efficient way.

Senator McEWEN—My question was more about attracting foreign investment into Australia. You can go and invest in oil production in Mexico, for instance, with its closer proximity to big markets and presumably its possibly different kinds of environmental regulations that apply over there. Would Australia's distance from markets and small domestic population as well not have an effect on the investment?

Ms Constable—It certainly does not have much impact on investment. The Australian Petroleum Production and Exploration Association put out a strategy in 2007 to look at the conditions that we would need to make certain that a level of investment came into Australia that would ensure our long-term energy security at least on oil and gas issues. As part of that strategy they identified a whole range of areas, which we are certainly looking at in the energy white paper context, to do with the exploration development activities to ensure that the right conditions were there on precompetitive geoscience and on fiscal incentives and those issues have largely been picked up in the taxation review. At the heart of that was ensuring that flow-through shares and accelerated depreciation incentives were part of the strategy, we had the right environmental and regulatory approvals both onshore for land access and offshore for marine access, environmental planning and approval processes were in place and we had the right safety conditions available. Those things make up a whole suite of areas that will ensure that we can draw investment into Australia.

Senator McEWEN—Thank you.

CHAIR—Finally, there is a proposal to review the five-year renewable retention leases for oil and gas reserves. Is your department involved in that?

Mr Morling—Mr Squire can answer that question.

CHAIR—Can you talk us through what you are aiming to achieve and what is going to happen?

Mr Squire—Certainly. The Minister for Resources and Energy released on the 12th of this month a discussion paper particularly looking at the issue of retention leases and issues associated with the renewal of retention leases. Retention leases are provided in the case of a discovery which is currently not commercial but is likely to be commercial within 15 years. The paper seeks to address some issues around how we administer and manage retention leases, particularly looking at the issue of commerciality when a retention lease is renewed. That discussion paper is open for consultation with industry and other stakeholders for a period of two months. Following the closing of that period, we will assess those submissions and then make recommendations to the government in terms of its policy in relation to retention leases.

CHAIR—So at this stage there is not a particular direction. Will it be totally open-minded, looking at the submissions that come in and then making a decision, or is there some sort of overall strategic objective that you are pursuing?

Mr Squire—The minister in his statements both to the APPEA conference this year and, indeed, to the APPEA conference last year certainly indicated the government's commitment and desire to see development occur. The phrase 'use it or lose it' was used in describing the government's approach towards retention leases.

CHAIR—Thank you very much for your contribution to the committee today. Thank you, Mr Morling, for rearranging your diary this morning.

Proceedings suspended from 10.47 am to 11.01 am

PAGE, Mr Bradley, Chief Executive Officer, Energy Supply Association of Australia Ltd

CHAIR—Welcome. I invite you to make a brief opening statement, and then the committee will ask you some questions.

Mr Page—Thank you. Chair, thank you for the opportunity to appear before you and your committee today. The association has of course previously appeared before this committee in relation to the Carbon Pollution Reduction Scheme matter. Nonetheless, I would like to remind the committee that ESAA represents the chief executives of 45 member companies all involved in elements of the electricity supply industry as well as companies that transport and sell natural gas domestically. We are a fuel and technology neutral organisation. We believe that, for Australia to enjoy the full benefits of energy market reform, government policies and measures should achieve the following four outcomes. Firstly, open and competitive energy markets, nationally consistent and free from distortions, should be the cornerstone of our stationary energy supply system. Economically efficient incentive based regulation of the monopoly parts of the system to facilitate competitive market outcomes, timely investment and reliable energy supply should be the second objective. Thirdly, we need a reliable and sustainable energy supply system where greenhouse gas emission reductions are achieved at least cost through rational policy settings and measures that are national, long-term and complementary to competitive market arrangements. Finally, there should be nationally consistent and transparent market and regulatory settings that promote the efficient growth and development of the energy supply industry.

I would like to note at this point that our currently referenced submission relates almost entirely to the CPRS matter. The association will shortly provide to the committee a further submission that focuses more on the parts of your terms of reference we are examining today. As a result, we would be happy to answer questions at a later date on that detailed submission. Nonetheless, I would like to touch quickly on a range of matters that I think are relevant to today's hearing.

The stationary energy industry—and I should be clear that that is the electricity and downstream national gas sectors—is the subject of an unfinished and delayed market creation and reform process. This process actually started back in the early 1990s with the industry commission inquiry into energy generation and distribution. That report was released in 1991 and was followed up with years of reform efforts between the Commonwealth, states and territories, all of which aimed to give effect to the vision that the commission had of a fully competitive stationary energy market free from unnecessary government intervention but with the monopoly elements efficiently regulated. We are now nearly 20 years on from the commission's original work. Much has been achieved and Australia has a lot to be proud of. We have a stationary energy market that has been cited as one of the better functioning markets in the world, yet most of the gains that led to that conclusion were achieved some years ago and progress, regrettably, has slowed dramatically.

It is important to understand the supply-demand outlook and the investment challenge against this background. Work done for ESAA in 2008 suggested that, without a carbon constraint, meeting increased electricity load to 2020 would involve new capital expenditure of $13 billion

on generators. In addition to that, network augmentation and replacement would have to be undertaken and, speculatively, that is probably of a similar order. Some sense of magnitude is given to $26 billion over a 10-year period when you consider that today the electricity sector alone employs assets of a value of around $110 billion.

The new investment requirement is large but, if we were to overlay the renewable energy target and the CPRS in its current form, modelling that we had done at the same time would suggest that that investment requirement in generation increases up to threefold through carbon constraint and renewable energy requirements from $13 billion to somewhere between $33 billion and $37 billion in that same period. By any reasonable measure, stable, efficient and predictable government policies and market settings are going to be imperative to source the capital required by the industry over the next 10 years and beyond.

I would like turn to some of the incomplete reforms that we believe are important to focus on. For the information of the committee, the Productivity Commission has this morning released its draft report into regulatory burden. The matters I raise with you today are repeated by the Productivity Commission and their draft findings are almost entirely consistent with our submission to you. There are important unfinished reforms. Some of these mean that Australia's energy supply industry could, in certain circumstances, be compromised in terms of ensuring a vibrant, competitive market for electricity and gas that delivers requisite energy in a reliable and efficient manner.

The issues that remain unresolved and warrant resolution include, firstly, a matter we have brought to you before, regarding the application of retail price controls in contestable markets. We have previously published work on this. I am happy to provide copies of that to the committee out of session. Disturbingly, a number of jurisdictions continue to apply retail price controls that are less than the cost of supply. This is frankly an unsustainable and inefficient approach. It also sends the wrong signals for new investment and it threatens the viability of energy retailers.

Economic regulatory regimes for the monopoly elements of the energy supply industry were intended to be light-handed. The outcome, however, has been anything but that. Instead, we have intrusive and quite heavy-handed regimes. Intrusive regulation results in additional costs being passed through to consumers. Often these costs do not outweigh the marginal benefits that they bring. Of concern is that, as the frameworks are further evolving, the extent of intrusion and regulatory overhead has been increasing substantially but without any cost-benefit assessment being performed.

As an example, we have recently witnessed an Australian energy regulator process where, under market rules, the regulator has developed and decided upon a methodology for determining the cost of capital to be allowed over the coming five years for regulated businesses. At a time of limited capital availability and much higher costs than has been the recent experience, the regulator effectively reduced the allowable cost of capital by up to 20 per cent, yet there is no avenue to appeal or have such a decision reviewed. A longstanding criticism of the framework by the industry is that the merit review process is indeed very limited.

A second example is the application by the regulator of regulatory information notices and regulatory information orders. These powers were provided very recently by governments in

2007-08. Yet, in doing so, governments have enabled the regulator to demand an array of information from regulated businesses never before required and often in excess of what most businesses assemble for normal commercial activities. One gas network business estimated the additional cost of regulatory information provision at $90,000 per annum, an amount that the regulator in fact allowed to be added to the business's costs to be recovered from consumers.

National frameworks for retail consumers remain a much overdue initiative. We are now, in 2009, finally commenting on draft arrangements to apply nationally. These were originally programmed by a COAG decision to be developed and implemented in 2006. Most concerningly, the latest plan would see the frameworks legislated in 2010 but with adoption to be left to the discretion of individual jurisdictions. This is hardly a national approach to important aspects of the stationary energy market.

As a final note—and I noted earlier the very large capital intensive infrastructure construction task that our industry faces—I have to return to the financing question. It will depend on policy and regulatory settings that are conducive to equity, and debt providers being confident about the security of their investments and the viability of the assets in the Australian energy market. Put simply, sovereign risk must be avoided. In this regard, it is not possible to comment on regulatory matters affecting the domestic energy supply sector unless we include the potential impacts of the Carbon Pollution Reduction Scheme. As that scheme stands, it will significantly devalue the balance sheets of Australia's coal fired generators by at least $10 billion, according to the government's own consensus modelling, while concurrently requiring an additional $10 billion of working capital by these companies to effectively hedge their carbon permit exposure. While these matters have been brought previously before this committee, they and others remain unresolved and continue to bring uncertainty to the industry.

CHAIR—Thank you. As tempted as I am to ask you about your comments about the CPRS, given that the committee has reported on that, I will just take note of what you have confirmed with us again this morning. No doubt the Senate, as it is considering the legislation, will reflect on those statements. But, very specifically, in your opening paragraphs you talked about the need for a nationally consistent energy market and nationally consistent regulation. This is perhaps a parochial question from a Western Australian point of view: how can you achieve nationally consistent energy markets and regulation when Western Australia is not actually part of the national electricity grid and probably never will be, given the geographical dimension and challenges?

Mr Page—I think that there are very important opportunities in fact to get national consistency and I did choose my words quite carefully.

CHAIR—Perhaps you can go into a bit more detail.

Mr Page—I will. The observation we would make is that over the course of the last 15 years we have seen the whole nature of the commercial servicing of Australia's stationary energy markets overhauled massively. We have gone from state electricity commissions to dynamic businesses, many of them privately owned and listed, that operate nationally in all jurisdictions. That includes in Western Australia. We have quite a number of east coast based companies that now actually operate in the Western Australian electricity market. One of the observations we make consistently is that, while you can recognise that there is not an interconnector across the

country so that you have a fully national market in electricity, there are however commercial drivers to try to ensure that as far as possible all of those frameworks are consistent across the country, even if they are applied in the case of WA by that state government. That enables many more companies seamlessly to move into and out of that market and add to the depth of the competition and to the depth of the capital availability. So you are actually removing some of the regulatory burdens from the business and in the end you wind up delivering a much better outcome for consumers.

With the previous Western Australian government having sought and, I believe, the current government seeking to get to a point of as much retail competition as they can, for example in electricity, the observation we would make is that in a small market one of the most important things you need to do is try to make sure that your frameworks encourage rather than discourage larger players out of other markets in the country to come in and also service the demand over there so that the consumer winds up being the beneficiary. The observation I will leave you with is that we are not saying they are connected markets, but we think that the extent to which the frameworks are consistent adds enormously to efficient outcomes and encourages seamless entry and exit.

CHAIR—So when you are talking about the need for nationally consistent energy markets what you are really saying is that Western Australia should change its energy market structure to make it consistent with what is currently the arrangement in the eastern states.

Mr Page—Not necessarily. If you are talking particularly about the electricity market, then I do not think that is actually our point. The electricity market arrangements in Western Australia are different to the east, but I do not believe that there is a view in my association that the model that is used for the so-called national electricity market is necessarily the model for the wholesale market you should apply in Western Australia. In fact there are probably very good reasons why it should not be the same.

CHAIR—That is nationally inconsistent, isn't it?

Mr Page—The market model may be inconsistent but I will make an observation about some of the other competitive aspects of the market. The arrangements and the licensing arrangements for retailers in each state, including WA, are different state to state to the extent that if you align all of the retailer conditions and arrangements—the way they have to provide their bills to consumers, the information on it and the back office systems they have to have—to make it consistent nationally, that just plain lowers the cost of entry into a market. That is an advantage for West Australians in that you make it easier for new entrants. That the new entrant has to deal with a slightly different market design is something they have to make their own judgment about. We are not suggesting nor advocating that the NEM model be rolled out in Western Australia or, for that matter, the Northern Territory, which does not have a market at all and is still smaller than Western Australia. I would not want that to be confusing for you.

CHAIR—That is why I thought I would clarify it.

Mr Page—I accept that at face value it probably looks that way but it is actually about removing the barriers to entry for companies.

CHAIR—If you had to summarise for us in a few sentences the major things that a government should do to ensure energy security moving forward, what would they be?

Mr Page—I would say that energy security, from a stationary energy perspective, really hinges around making sure that we can access capital in a timely fashion. First of all, the key things to resolve there—I cannot help myself—are CPRS and climate change arrangements. They top the bill. The second thing that we would follow up very quickly with is ensuring that we have a renewed commitment to finalise the outstanding matters before the Ministerial Council on Energy so that we have completed a reform agenda that started in 1991, was reinvigorated in 2003 and was supposed to be finished in 2006. That remaining uncertainty is not helpful.

Finally, we actually must get economic regulatory regimes around the monopoly elements of our business—that is, the networks—such that they recognise, first of all, that the cost of capital is not some arbitrarily determined number in the mind of a regulator; it is a market based outcome that has to be properly settled. Also that we stop regulating for the short run but we understand better that we are going to have to move to intelligent networks and the whole design of our current electricity system is likely to require a complete overhaul in the course of the next 20 years. We cannot keep regulating for the short term. We have to open our eyes to the complete change that will happen through our sector.

CHAIR—I am looking at the order in which you raised the issues. Your major concern, in terms of energy security moving forward, is the impact of the CPRS?

Mr Page—Our major concern is about uncertainty in climate change policy. It has been our concern for at least the last five years.

CHAIR—If the CPRS was passed tomorrow, you would be—

Mr Page—We might have certainty but we would not like every element of it and it would have a deleterious effect in its current form. I think the evidence before this committee previously has pointed out that, in principle, we agree with an emissions trading scheme and have done so for a number or years.

CHAIR—But not this one.

Mr Page—The one that is before us is not completely broken but there are critical elements there—and I can list them if needs be—that would have a deleterious rather than a positive effect on our industry.

Senator HUTCHINS—Can you spell out clearly for the committee the regulatory burdens your membership has.

Mr Page—The regulatory burden is something that I think we should cover fulsomely in our submission to you. It occurs at a range of levels. Undoubtedly, the regulated network businesses are exposed to very substantial regulatory burden. The electricity sector in distribution and transmission networks undergo so-called resets every five years. Every five years they have to bring forward an expansive amount of detail of all of their expected costs and the capital

programs they propose to undertake. All of these things are to be tested by the Australian Energy Regulator for reasonableness. They are guided by the market objective, which is that all things are to be in the long-term best interests of consumers. So timely investment, adequate networks and adequate generation all fit fine with that objective—and we have no difficulty with them—

Senator HUTCHINS—So the regulator sets the objective?

Mr Page—The objective is actually set in the law. The objective has been set by ministers in the law. The regulator is obliged in all that they do under the subsidiary rules and other aspects of the law to ensure that overall they are seeking to achieve that outcome.

In these reset cases we have seen the demands of the regulator growing for information. Nobody is going to say to you for a regulated monopoly that somehow they should not provide information to the regulator. More than 50 per cent of my members are dependent on those networks and they watch the costs that are there because they pass through every other sector to the final consumer. But it has been getting out of hand. In a submission we made recently to the Productivity Commission, which lead to their draft report today, we looked at how much longer the regulatory decisions themselves are becoming. When you see the graphs—and we will provide them to you—it is quite apparent that the regulators are digging deeper and deeper. These reports are getting towards double the size they were only a few years ago.

We have new information disclosure requirements—powers which I mentioned in my opening statement—where the Australian Energy Regulator is able to require of network businesses a range of information without necessarily having to declare the purpose to which it is going to be put and without having to take into account any notion of what it may cost to provide. As I said, our members are reporting back to us that much of the information that is now being sought through this mechanism is not information that you maintain on a commercial basis. It is not central to the running of the business and it requires completely new systems. Yet we are not especially seeing different outcomes in the final analysis from regulation.

Our regulated businesses are investing more and more in lawyers, accountants and systems. I gave one example—and I am sure there are more—of an additional $90,000 per annum on a recurrent basis. I am sure that will increase with inflation. If we get more of these information notice requirements, the costs will only balloon. The problem we have is that we do not see the cost-benefit analysis being done anywhere. It is simply to make the regulator feel good for some reason.

If I go to the merchant part of the market, the competitive end, we have in the national electricity law a requirement that any time the spot market price rises above $5,000 a megawatt hour the Australian Energy Regulator is obliged to investigate the circumstances around that. Without wasting too much time on the design of our wholesale market on the east coast, the price can at any one time rise to $10,000 a megawatt hour. We are not talking about the maximum price being triggered; we are talking about a midrange price. For the most part, energy trades on average around $30 to $40 a megawatt hour—that gives you some sense of the range. It is very hard to understand from a policy perspective why the $5,000 investigation trigger is even there.

The second observation to make is that we are seeing from the Australian Energy Regulator fairly consistent statements that not only will they simply pursue that requirement, as they should in the law, but they are now on the lookout for anybody colluding and they are the protector of the consumer and so on. That is okay, except that these investigations wind up taking months to conclude and they require generators to get involved in very extensive data provision and explanation that involves lawyers inevitably because, if wrongdoing is found, they can be exposed to substantial fines.

We also see that the energy market operator is required to start providing to the regulator very substantial amounts of data as well, and yet, from my recollection, over the past three years there has not been one case where we have found any breaching of the rules. All of the circumstances are understood. What I think is unfortunate is that in the industry, when these sorts of price events occur, within half an hour most people understand exactly what happened and why the amount was there. The point we make is that this is almost regulation for regulation's sake. At any time the Australian Energy Regulator can inquire into instances where they are concerned that there may be inappropriate behaviour or rule breaches. But to automatically investigate every time the price goes over $5,000 is, frankly, burdensome and is not leading to particularly different outcomes. They are but two examples. In the interests of time, perhaps I could put more in our submission to you.

Senator McEWEN—Can I just clarify: have there actually been many instances where it has gone over $5,000?

Mr Page—Yes, regularly. I do not mean every single day of the year. The price is very reactive to supply and demand. Most of the time when we see very high-priced events it is usually when load is very high, demand is very high—perhaps on very hot summer days. Unfortunately, this is an industry that is built on very large pieces of equipment that from time to time fail. When you get unexpected failures or planned unavailability, the supply-demand balance tightens and much more expensive, fast-start, low-use generation kicks in that is much higher cost, so you get those higher prices occurring.

Senator HUTCHINS—I am sure you have asked them, but why $5,000? Why not $6,000 or $4,000?

Mr Page—My point exactly.

Senator HUTCHINS—You no doubt have asked them.

Mr Page—Indeed.

Senator HUTCHINS—Did they have an answer?

Mr Page—Not one that I can recall as having much logic or making much sense. I think it simply represents the halfway point between zero and the maximum, so at the moment we have a trigger of $5,000.

Senator BUSHBY—I have a couple of questions. I am interested in the impact of the global financial crisis on your members.

Mr Page—I think my former colleagues at the department who gave you evidence before very kindly set me up for this in mentioning a report that we have. I will provide that to the committee separately, if I may. It is a survey of all of our members and a couple of other players who are not part of our membership, but it is comprehensive for the electricity and downstream gas sector. It looks at the sort of task that we have before us in the global financial crisis with credit availability and the need for very substantial debt refinancing. I do not have it with me, so I am working from memory. I will clarify these numbers in our submission. I think over the course of the next five years we are looking at debt refinancing of around $48 billion required in the industry. That is largely between generators and network businesses. The networks have the majority of that, around $30 billion. The generators, nonetheless, are just under $20 billion. Importantly, in the next two years we see nearly $18 billion in the networks having to be refinanced and approaching $6 billion in the generation sector. We have had reports already from some of our members who are now engaged in the early stages of debt refinancing, particularly in the generation sector, that it is proving to be quite difficult.

Senator BUSHBY—Have they given reasons for the challenge occurring? Is it just a simple lack of availability of funds, or are they being told that they are being more discriminatory in terms of the criteria that they apply to refinance? What feedback are they getting?

Mr Page—The feedback differs according to the particular sector. If we look at the network sector, my understanding is that it is not quite as difficult for them as it might be for the generation sector. In the network sector it has generally been regarded as a lower risk, quite stable investment because of the regulated nature and because, to date, the regulatory regime had provided adequately for the cost of capital, both debt and equity. So it was actually quite easy in relative terms to raise the requisite debt.

One of the things that the debt providers are now looking at and questioning is quite what the allowed rate of return is out of the Australian Energy Regulator. I understand the terms for the length of time for debt refinancing are contracting so that it is available for shorter periods at the moment. Its cost is higher. It varies enormously company to company, so generalisations are a little dangerous, but there are some circumstances where the likely final outcome on the cost of debt is unfavourable compared to where the company finds itself in its current regulatory coverage period so that the allowed rate of return is somewhat inconsistent with what they are now facing for the next period.

Senator BUSHBY—So what does that actually mean in practice for your members if they are firstly not able to get finance because they just cannot or secondly because the finance that they can get is on a rate of return that just is not feasible?

Mr Page—If you go to your second point, we will wait and see. Most networked businesses so far have been able to secure the financing. There is still a long way to go and a lot of money to be raised yet but, so far, they have been okay. Again, I am cautious about generalising. Cost of capital that is outside of what was allowed by the regulator does not necessarily mean that you cannot proceed. It might mean that your margins are not as good as they were and your shareholders are going to be slightly disappointed, but I think that so long as we can get some sensible outcomes going forward with the regulatory settings that will be okay. At the end of the day unfortunately consumers will pay more because the cost of capital is higher but that is true across the economy. I think it is the generation sector that actually presents as an area for greater

concern. Our report does show and our advocacy on the record consistently shows that it is around the design of the CPRS where we have some concerns. So for coal fired generators, especially the privately owned coal fired generators who at the moment just happen to be the ones that are most directly and immediately facing debt refinancing—

Senator BUSHBY—Unfortunate concurrence of timing.

Mr Page—Unfortunate indeed. A number of these facilities are project financed with non-recourse debt. Not surprisingly the syndicates of banks looking at the refinancing are asking fairly difficult questions around future profits, future revenues, disposition of the asset, what it means for actually hedging into the future under a CPRS and how much permits are going to cost. They are running the rulers over these businesses. There are no concluded outcomes as yet but the reports we are getting back are that the timing is unfortunate because there are those sorts of outstanding questions still around the CPRS. But in any case the criteria for lending has tightened very substantially—

Senator BUSHBY—That is because of the global financial crisis.

Mr Page—That is straight GFC. It has little to do with the sector or the CPRS. It is just an added burden that is unfortunate at this time. And the cost of the capital is higher. I think we have also seen fairly well demonstrated that there has been a retreat of capital back to home lands and so there is not quite the diversity of credit providers available that we have seen in the past. So there is a mix of issues there. I think that it is a little too early to start drawing conclusions about what the outcome will be but we are concerned by the early—

Senator BUSHBY—It is a little too early to say what the conclusions are but you are concerned that there are real risks and uncertainties as a result of those factors that have yet to resolve themselves. Looking forward there are some real risks and that could have a real threat to energy security in areas of Australia.

Mr Page—Again it depends on the outcome.

Senator BUSHBY—Is it more likely that, say, a private operator of a coal fired power station might go bankrupt because they cannot refinance and somebody else will buy in at a cheaper rate at a mortgagee sale and pick it up at a price that they can afford to operate it at?

Mr Page—It would certainly be classic economic theory that that would be the outcome, but classic economic theory does not always work when you have a whole series of other commercial realities and policy uncertainties at this stage. I have to stress that the CPRS at this stage is a policy uncertainty. We do not know where it will finally come out. I have to say to you that there are really two legs to the problem. One is the uncertainty of where it will come out; the second is that the current scheme design, if it were to pass as is, allows, to a certain degree, some calculations to be made that are not conducive to debt refinancing for coal-fired power stations.

Senator BUSHBY—To quote another industry, it is ‘the certainty of a bullet’.

Mr Page—Possibly so. I am very cautious about saying that there will be a security of supply problem. I think that you can construct a theoretical or hypothetical case that sees, in the worst

of all circumstances, the current owner of a power station finding that it is bankrupt or financially impaired, it cannot trade, it cannot run the station and it has to close it. Without speculating—because I do not think there is a lot of point to that; there are too many possibilities there—I still think that electricity supply is so fundamental to our economy and the expectations of all of the community that, in some form, governments would work with operators of facilities to find some way of ensuring the continuity of the electricity supply. In saying that, I say that that brings with it enormous risks to all of the progress we have made on energy market reform over 20 years. The reinsertion of governments trying to run what are commercially unviable plants is a very slippery slope that you get on very quickly. We are working very hard to try to avoid such an outcome—sensible government policy can avoid that outcome—but, if it were to come to pass, we would want to see that those sorts of outcomes are very short-run in nature and that we get a stable position back.

But I go back to the very start: this is actually about design of the CPRS and resolving a problem of the arbitrary loss of balance sheet value. That is not about maintaining the operation of these coal-fired stations forever; it is about sovereign risk and balance sheet security and nothing more. These stations, under the CPRS, should close as they become uncommercial against a proper carbon price. That is how we will achieve the environmental outcomes sought. But it is a very risky approach to simply allow balance sheet loss to occur and stations to be forced into a place where they are facing impairment and start behaving not in a rational way as they exit but in an irrational way as they struggle for survival. That has many potential outcomes, all of which would be utterly speculative and need to be treated with caution.

Senator BUSHBY—There is a whole matrix of possibilities depending on policy decisions and other factors.

Mr Page—Yes, there are.

Senator BUSHBY—But there are risks in there. I guess that, to a significant extent, the fact that we are sitting here in front of you today listening to you is designed to assist and ensure that there are sensible policy decisions made. Thank you.

CHAIR—Just quickly, you had a reasonable interchange around the CPRS, but can you please talk to us about how the increase in renewable energy targets will impact on energy security moving forward?

Mr Page—I will certainly endeavour to do so. Let me say that I think that, per se, renewable energy itself is not at issue. I think that what sits behind your question, if I may, is a question about the intermittency of some renewable energy generation facilities, such as wind.

CHAIR—That is one aspect of it. I guess you have the questions of affordability, reliability of supply and investment. There is a whole lot of stuff wrapped up in the question, 'How is it going to impact on energy security moving forward?'

Mr Page—I was just wondering how much time I had.

CHAIR—Give it a go for five minutes and then, depending on how interesting you are, we might call you back.

Mr Page—That is a very interesting challenge. I have to think carefully about my answer now! Let us be quite clear about it. I think you have to divide this issue up, almost into time stages. Our organisation is not about challenging the science of climate change, so I am going to work from a—

CHAIR—Sorry; can we just go straight to the—we are not going to go into all of that philosophical discussion.

Mr Page—Good.

CHAIR—It is a very interesting question.

Mr Page—If, in the long run, what we are seeking to do is have a near-zero-emission energy supply system, there are a range of technologies you have to deploy, and you have to get on with deploying them today. That is an R&D set of questions, and that should be pursued. A 20 per cent renewable energy target by 2020, in the way that the legislation has been brought forward, will likely result in substantial interest in wind energy development. That will potentially bring with it some issues around system stability because of its intermittent nature—and I note today that, in South Australia, the regulator, in licensing a new wind farm, has indicated that, with South Australia's installed capacity of wind approaching almost one-third of their peak load, he has concerns about the implications for the network in certain circumstances and that the licensing conditions around wind farms will be tightened to ensure that their voltage outcomes can be controlled. So there are physical system issues around intermittent supply.

In terms of cost, I think that this keeps coming back to the whole R&D question and the further commercialisation of new technologies. I will give you an example around geothermal. There are very prospective geothermal sites through South Australia and western Queensland. They are being exploited today. By some estimates, those forms of zero-emission renewable electricity that operate in a baseload that is 24 hours a day, seven days a week—leaving aside some of the challenges of transmission over the distances that they have to go—have short-run marginal costs that look like being quite competitive with today's fossil fuels. So there is that technology. In Western Australia we have some wave technology that is well advanced and is starting to be rolled out and, again, looks cost competitive.

I think the issue when you come to renewable technologies is that there is an enormous spectrum of possible technologies, from the cost competitive to the extremely expensive. Today, one of the most expensive technologies you will see is solar photovoltaics, especially those that are rolled out onto household homes. Most of those are running at around $200 to $300 a megawatt hour, compared with geothermal, which will shortly, hopefully, be fully demonstrated and within the next 10 years be at market at around $50 a megawatt hour. We see wind somewhere between $80 and $100 a megawatt hour, vastly cheaper than solar photovoltaics. That is not to say that the policy measures are necessarily wrong, but it is to say that there are a range of costs and there are a range of sensible applications.

One of the things that are going to be a big challenge over the next decade and beyond is reconfiguring our networks to pick up a fundamentally different electricity supply, where the generation is coming from locations, from sources and with predictability that we have not had in the past. There is geothermal coming out of Central Australia, wind farms concentrating in the

lower third of the country—and, for example, South Australia being a very strong hub for wind—and a range of locations for promising wave technology. And then we have some of the advanced solar starting to come on as well, let alone the embedded generation through solar photovoltaics on household roofs. That means that the network is going to undergo a very substantial transformation to manage flows that it has never managed before.

CHAIR—What does all of that mean for affordability of energy supply moving forward?

Mr Page—Undoubtedly there will be costs involved. How much that is is very difficult to forecast right now. But it does come at a time when a lot of our networks are ageing. They need probably greater capital injections than they have for a little while. So the opportunities are actually opening up for that reinvestment to be sympathetic with those new dynamics in the networks, and our member businesses are very mindful of that and are looking for regulatory cover to move down those routes.

I think that it is beyond question that, the more that you are using technologies that are new, that are intermittent and where you have to change your grid, it has to be more expensive than it is today. That is one of the outcomes of having to deal with the climate change challenge. How much more expensive? Across the board I cannot tell you. We have only had some modelling done around the cost of the RET—

CHAIR—Do you think that anybody knows how much more expensive, or is it all pretty uncertain?

Mr Page—In terms of the actual energy cost we have some reasonable numbers, and our numbers and the government's are not especially far apart.

CHAIR—But you just said you could not tell us.

Mr Page—What I cannot tell you in the end is: what is all that, plus the various network elements that might have to be built, depending on the sorts of technologies that get rolled out over the next 10 and 20 years? You would be pretty brave to start predicting what all the energy generation will be in 15 years time, and I am certainly not about to do that.

CHAIR—The objective of this committee is to get a handle on the affordable, secure, reliable supply of energy into the future in an environmentally sustainable fashion, and there is obviously a bit of tension in that. We are trying to get a bit of a handle on where these things are going to be pitched. We understand that, as you make forecasts over a 10-year period, there is going to be some uncertainty around that.

Mr Page—We have already done work that suggests, with the renewable energy target plus an emission reduction task for our sector of anywhere between 10 and 20 per cent, that we would expect retail prices to rise by 25 per cent, and that includes a modest allowance for network augmentation. We would see over the next 10 years somewhere in the order of a 25 per cent, in real terms, increase in retail prices against those assumptions.

CHAIR—Does your association have a view in terms of the role of nuclear energy as part of the energy mix for Australia?

Mr Page—We do not.

CHAIR—You do not have a negative view and you do not have a positive view. You do not care because you are energy neutral.

Mr Page—We are technology and fuel neutral, yes. If you were to work on that basis, we neither support nor disavow ourselves of nuclear energy. You can observe that it is possibly the only form of electricity generation technology that is currently banned in the country. You might see that as a barrier to entry.

CHAIR—We had evidence this morning from Geoscience Australia and from the Department of Resources, Energy and Tourism that they are assessing the potential of uranium as an energy source for Australia. That might be a baby step towards at least having an open mind on the matter.

Mr Page—Our association has an open mind on the matter. The question of nuclear energy is an extraordinarily complex one. It goes well beyond just a question of policy about whether it will be allowed or not. Nuclear energy is undoubtedly attractive because it has zero emissions. But what also comes with that are very substantial systems of control and regulation, technologies we do not have in this country today and a skilled workforce able to actually operate this sorts of plants. These are all things that you could acquire over time if it was enabled and you chose to do it. It is also very capital intensive.

CHAIR—As indeed we have to for renewable energy technologies which we are currently developing. We are running out of time. If any of my colleagues have a final question—

Senator McEWEN—I did have a question but I am mindful of the time and I am also mindful that Mr Page is going to provide a subsequent submission to the committee.

Mr Page—We will.

Senator McEWEN—I am interested in allocation of blame, if you like, with regard to the regulatory system. Could you give us an indication of whether you think state, federal and even local government are more difficult than each other with regard to the regulatory system? Also, could you have a look at whether the complexities of the regulatory system have arisen because of the privatisation of energy distribution and generation through the nineties?

Mr Page—Can I answer the last one right now?

Senator McEWEN—Yes.

Mr Page—My answer is very simple: no. The answer is no because all of the state governments and the Commonwealth and the territory governments sit around the same table in the Ministerial Council on Energy and apply the same rules, regardless of whether the assets are owned by governments or the private sector—they apply universally. And I have not seen evidence that the approach taken by ministers or governments or officials has been discriminatory between whether it was privately owned or whether it was government owned—it

applies universally. I cannot immediately think of any instance where I would say to you that the reason we have got burdensome regulation is that there is a private sector involved.

Senator McEWEN—So what is the impetus? Presumably the regulations are put in there to protect the consumers and the competitiveness in the industry. There must be some reason for it.

Mr Page—Yes, sure. I guess where the debate lies is about the extent to which that actually is in the interests of consumers or not. In a number of instances—we will flesh them out in our submission—we would contend that they are having the opposite effect: they are in fact adding a cost burden to the consumer without delivering a benefit. That is where the balance question lies for us. Perhaps I can answer all of those in our submission, Senator.

Senator McEWEN—All right. There is another thing you might address in your submission. We heard about possible increases in the retail prices of electricity in the future. Have you done any assessment of how a more, as you call it, transparent and consistent regulatory system would reduce the cost of electricity to consumers in particular?

Mr Page—We will endeavour to look at that. We contend by and large that what we are seeing is regulatory creep with no cost-benefit analysis, and therein lies the problem. To be honest, a lot of the regulation that is being made in our space is not going through the proper RIS process, and there has been criticism of that already.

Senator McEWEN—But if this committee is going to make recommendations about the benefits of a less complex regulatory system, one of the buttons to push that is going to assist us in taking that matter to the government would be the benefits to consumers.

Mr Page—We will endeavour to address that.

CHAIR—Thank you very much for your contribution to the committee today, Mr Page.

Mr Page—Thank you.

[11.52 am]

COMLEY, Mr Blair Robert, Deputy Secretary, Department of Climate Change

LIVINGSTON, Mr Andrew, Renewable Energy Regulator, Office of the Renewable Energy Regulator

SINGH, Mr Amarjot, Manager, Data, Audit and Compliance, Office of the Renewable Energy Regulator

CHAIR—Welcome. I again remind senators that the Senate has resolved that an officer of a department of the Commonwealth or of 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 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. Officers of the department are also reminded that any claim that it would be contrary to the 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. I particularly draw the attention of officers to an order of the Senate of 13 May 2009 specifying the process by which a claim of public interest immunity should be raised. I now invite you to make a brief opening statement and then the committee will ask you some questions.

Mr Livingston—I will read a brief statement and we have a submission which we will hand to the committee. This submission is provided by the Office of the Renewable Energy Regulator, ORER, which is responsible for the administration of the Renewable Energy (Electricity) Act 2000 and associated legislation. The objective of the MRET described in the act is to encourage additional generation of electricity from renewable energy sources and reduce emissions of greenhouse gases. The ORER was established in February 2001 under the act to administer the provisions of the act, its regulations and the associated Renewable Energy (Electricity) (Charge) Act 2000. While ORER administers the operation of the MRET legislation, the Department of Climate Change deals with the policy matters regarding MRET, which is why Blair is here today.

The MRET legislation sets the framework for both the supply and demand of renewable energy certificates, or RECs, via a REC market. Each REC represents one megawatt hour of additional renewable energy generation over a 1997 baseline. Eligible renewable energy power stations and deemed units such as small generation units and solar water heaters supply RECs to the market. RECs that become registered are tradable commodities in the REC market and provide a financial incentive to the renewable energy sourced power stations. The act places a legal liability on individuals or companies making wholesale purchases of electricity on grids of more than 100 megawatts capacity. Wholesale purchasers of electricity are defined as liable parties under the act and are required to proportionately contribute towards the generation of 9,500 gigawatt hours of additional renewable energy each year by 2010.

The MRET scheme was the first of its kind globally and has been a key factor in the growth of renewable energy generation within Australia. The success of the scheme is evidenced by the

following. There has been increased investment in renewable energy industry since 2001. The ORER estimates that by June 2009 total investment stands at approximately $5.5 billion and the generation capacity of the system is in the order of 9 million megawatt hours of eligible renewable energy per typical year. This is equivalent to the residential electricity needs of over 1.4 million households. Since the beginning of 2001 over 43 million RECs have been created. The act requires the regulator to maintain four public registers by electronic means. A REC registry is made available for this purpose and allows for the online creation of registration, transfer voluntary surrender and surrender of RECs. The REC registry has been operating since April 2001, and to date MRET liable parties have offered over 26 million RECs to comply with the MRET scheme.

In summary, ORER was established in February 2001 to administer the MRET. The Department of Climate Change deals with policy matters regarding the MRET scheme. The MRET legislation sets the framework for both supply and demand of renewable energy certificates via a REC market. The act sets annual interim targets towards achieving an annual target of 9,500 gigawatt hours by 2010 and they will remain unchanged at that level to 2020. To deliver the government's goal of 20 percent renewable energy in Australia's electricity supply by 2020, a national renewable energy target, or RET, scheme is being established. That will expand the current MRET by over four times to 45,000 gigawatt hours by 2020.

By June 2009, ORER estimates that the total investment in the MRET accredited power stations and deemed system stands at approximately $5.5 billion and the generating capability of the system is in the order of 9 million megawatt hours of eligible renewable energy per typical year. The MRET has provided financial incentives to renewable electricity power stations and deemed systems, thereby increasing the amount of renewable sourced electricity in Australia by imposing a relatively small additional cost on wholesale electricity prices.

I invite questions.

CHAIR—Thank you very much, Mr Livingston. You said that this framework to encourage renewable energy and a reduction in greenhouse gas emissions was the first in the world.

Mr Livingston—Pretty close to the first in the world, yes.

Mr Singh—That is right, actually. When this program first started it was the first of its kind in the world.

CHAIR—When did it start?

Mr Singh—It started on 1 April 2001.

CHAIR—So it was a very good initiative of the former government, then. I do not ask you to comment. Obviously you have responsibility for administering the act and you issue those renewable energy certificates. Can you perhaps explain in a little more detail the role of the renewable energy regulator—how you go about your business and, I guess, your strategic plan. Where are you going as an organisation and what are some of the things that you are looking to achieve?

Mr Livingston—You have asked several questions there. Basically, it is in our submission. Our approach is a number of—

CHAIR—We have not got that submission yet have we?

Mr Livingston—We can hand it in.

CHAIR—That would be very useful. Obviously we have not had an opportunity to review your submission.

Mr Livingston—The act requires several dates. Liable parties exist. They have a liability under the act. ORER assesses the output of renewable energy generation. We accredit power stations and assess their output. As a result of that, we create RECs in the REC registry. We also assess liable parties. That allows the liable parties and the generated RECs to be met and closed out. There is a separate REC market which we do not administer. We are aware of it, but we do not administer the market. Our role is to administer the REC system from liable parties and for the creation from accredited renewable energy generators. That is basically what we do.

CHAIR—Have you got a handle then on the extent of investment in renewable energy across Australia?

Mr Livingston—We quote 5.5 billion. That is the number we calculated based on the additional renewable energy generated since 2001, when the act started. That is all the wind farms, the minihydro schemes, bagasse, the landfill gas and small generation from PV panels and so on. We have a handle on that. That is additional since 2001. Is not the generation that occurred before then.

CHAIR—If you had to put a growth trajectory on a graph since 2001, what would we be looking at?

Mr Livingston—We have some figures on that.

CHAIR—Is that in your submission as well?

Mr Livingston—Yes.

CHAIR—I am looking forward to getting a copy of it.

Mr Singh—The numbers in our annual report are for calendar year 2001 going to calendar year 2007. We are still assessing the generation for the 2008 calendar year. Those numbers will be finalised later in the year, because we have to go through a very vigorous process to check those numbers. The power stations produced a total of just over 1.6 million renewable energy certificates in 2001, and 2001 was only nine months because we started on 1 April 2001. In the first complete year, 2002, we saw just over 2.7 million certificates.

CHAIR—So we started with 1.6 million in 2001. Can you take us all the way up to 2007, which is your last year?

Mr Singh—In 2007 the number of certificates created was just over 6.2 million. That is the equivalent of 6.2 million megawatt hours.

CHAIR—So it is a five time increase over that seven-year period?

Mr Singh—Yes.

CHAIR—And 2007 is the last year?

Mr Singh—It is the last year for which we have the data. For 2008 we are still collating those numbers.

CHAIR—Have you any expectation as to how it will track moving forward?

Mr Singh—We do. As Mr Livingston mentioned in his opening statement, we expect that the numbers will increase.

CHAIR—They will have to increase because there is a target looming, isn't there?

Mr Singh—That is right. The total capacity of the system is to produce nine million certificates as of now.

CHAIR—You are pretty close to that, aren't you?

Mr Singh—That is the additional generation over the baseline. We expect that, if all the hydros are created under the scheme and all the power stations produce at the level that they can produce—if there is enough storage in the dams—then the system has the capacity to produce just over nine million certificates.

CHAIR—So we started at 1.6 million and the most recent data shows there are 6.5 million. We are looking at the potential capacity of nine million. How high do we have to take it to get to the 20 per cent renewable energy target?

Mr Singh—This is the capacity of the power stations at this stage. We are seeing more renewable power stations coming on line. We have a couple of new wind farms coming on line. The one that is going to be operational very soon, in the first week of July, is the Capital Wind Farm, which is next to Lake George. That is the most recent power station.

Mr Comley—Perhaps it would be useful for the committee to look at the Renewable Energy (Electricity) Amendment Bill 2009. In that bill there is a schedule that lays out the required generation or RECs that have to be remitted running out to 2030. For the benefit of the committee, that is at clause 8 on page 5 of the amendment bill.

Senator CORMANN—Can you assist the committee by telling us what that will be in 2020?

Mr Comley—In 2020 the target is 45,000gigawatt hours.

Mr Singh—That is the equivalent of 45 million certificates.

Mr Livingston—To give an indication, in the last two or three weeks we have had about five new applications from accredited power stations of various kinds—wind farms, land filled gas and small hydro. They are coming in, but the biggest one is the one that Amarjot mentioned, the Capital Wind Farm.

CHAIR—Everything that is coming on stream now is under the policy and legislative settings that were put in place in 2001.

Mr Livingston—Correct.

Mr Comley—It is to a point, but obviously you build these power stations with quite a long time horizon. So you would have to expect that some of these have anticipated what the future regime will be and, therefore, the demand for certificates and the expected price over a longer period of time.

CHAIR—Are you saying that people are investing in anticipation of what the parliament may or may not do?

Mr Comley—I think that is actually a reasonable expectation of what people are doing. Now whether they are doing exactly what they would do if legislation were in is a separate question, but I think—

CHAIR—So how can the government then tell us that legislation needs to be passed to give certainty if you are saying that people are investing anyway?

Mr Comley—Because people in those circumstances must make a risk assessment, which is a different sort of risk assessment from what they would make if the legislation were actually passed.

CHAIR—Yes. Interesting. Have you got a handle on how the level of employment has developed from 2001 to 2007 in the renewable energy sector for those organisations?

Mr Livingston—We have not done that analysis.

CHAIR—Is that something that would take a lot of resources to get a handle on, or do you—

Mr Singh—What I can say is that our primary responsibility does not allow us to do it.

CHAIR—I understand that.

Mr Singh—I am aware that other Commonwealth departments have done some studies, and I think some data will be available from those.

CHAIR—That is okay. We will pursue that with other departments. If it were something that you could ease easily provide to us, I would ask you to assist the committee. I do not want to impose on your resources. We have the opportunity to ask others. And you would not have a

view—I guess this is where Mr Comley might come in—on how the increasing renewable energy target will impact on our energy security moving forward? Have you done any assessment? This morning the Department of Resources, Energy and Tourism told us that only now were they going through this process of assessing the impact of the renewable energy target on energy security moving forward. Has your department done any work in relation to that?

Mr Comley—Not particular work. They would have made reference to the ministerial council on energy process. The Australian Energy Market Commission is looking into this question.

CHAIR—It is going to release its report in September, apparently. The reason I am asking the question is that we are being asked to make decisions on things like CPRS and renewable energy targets, and it seems to me that not a lot of work has been done on their impact on energy security.

Mr Comley—I am not sure that I would say that not a lot of work has been done. There has been—

CHAIR—Not a lot of conclusions reached, anyway.

Mr Comley—There has been quite a lot of modelling done of how the energy market will adjust to those two policy instruments. The Australian Energy Market Commission is doing further analysis of things like intermittency. There has been modelling in terms of the RET specifically and also through the Treasury modelling process of how the energy market is expected to evolve over the next 40 years in that modelling exercise. So I think quite a lot of work has been done and the ministerial council has commissioned further work.

CHAIR—Quite a lot of work is always being done within government. I am very confident of that. But I guess the very specific question is: do we have a handle on how the increasing renewable energy target will impact on our energy security as a nation moving forward? So far I have been told that we have not finalised that work. If you are aware of a specific piece of work that you could refer to the committee, we would be very grateful.

Mr Comley—I think I am just supporting what my colleagues from the department of resources would have said, which is that this work is ongoing.

CHAIR—So we have not actually finalised an assessment yet as to how the increased renewable energy target is going to impact on our security moving forward?

Mr Comley—There have been assessments but there is more work to be done to refine those assessments.

CHAIR—'Refine those assessments'—that is interesting.

Senator McEWEN—It might be in your report, but I have not been able to find it so far—I presume most the $5.5 billion investment in renewables that you mentioned is from hydroelectric power stations.

Mr Livingston—No.

Senator McEWEN—Can you give us a breakdown of what that is made of?

Mr Livingston—I do not have it with me but we can.

Mr Singh—We can provide that to the committee. We do not have those figures split at that level.

Mr Livingston—Wind and solar are big but we have a breakdown, so it is best that we provide that separately.

Senator McEWEN—Similarly the $6.2 million RECs. Can you distribute them according to what kind of renewable energy they are generated by? That would be useful.

Mr Livingston—These are publicly available on the website. People can log on to the website and get this stuff off. We have a better summary perhaps. It is in the report I think.

Mr Singh—I have the cumulative numbers of RECs that have been created at the end of December 2008. Those figures have been published in our annual report which was tabled in the parliament very recently. I can read those numbers out. In the order of highest to lowest they are wind which produced just over 9.7 million RECs, that is a cumulative number from 2001 until December 2008. That was followed closely by two other sources, hydropower stations produced just over 8.6 million RECs and solar hot water deemed systems produced just over 8.4 million RECs, so these are the top three. The next one is landfill gas at just over 2.9 million RECs followed closely by biogas at just over 2.9 million RECs again. Then there are other sources. I will not go into those numbers. I am happy to give the report to you. There is wood waste and other small systems which produce RECs.

Senator McEWEN—I am not sure whether Senator Cormann already asked this question, but have you done any analysis of what impact the new RET target will have on relative increases in the numbers of RECs for each different kind of renewable?

Mr Comley—There was a report commissioned by the department from MMA, McLennan Magasanik Associates, which mapped the expected increase in RECs. It is publicly available. It has been on our website. Broadly speaking there is a large increase in wind, but there is also quite a lot of geothermal that comes through in the second half of the next decade. From memory around a quarter of the target is taken up by geothermal by the time you get to 2020. Wind is of a similar order of magnitude, a little higher, and then there is a range of these other technologies which pick up the rest of the expected increase in the target, but we can provide that reference to the committee.

Senator McEWEN—Okay. Thank you.

Senator BUSHBY—Mr Comley, you mentioned that there have been assessments of the impact of the renewable energy targets on energy security but they have been further refined. Have those assessments been made public?

Mr Comley—In a sense a part of the assessments in the Treasury modelling report was how the energy market would respond to those things. I could take on notice any other publicly available assessments. I am just being cautious because it is another department that handles this.

Senator BUSHBY—I understand. But you mentioned that there were assessments that looked at the issue of energy security and the impact of the RET. Is that different to the modelling? I see you nodding. It is different to the modelling itself, so there are separate assessments that have been conducted as well. Have they been made public?

Mr Comley—I would have to take that on notice.

Senator BUSHBY—Are you aware of whether they have been provided to the minister?

Mr Comley—I would have to take that on notice.

Senator BUSHBY—You are not aware?

Mr Comley—I am just trying to remember the time period we are talking about. There is a national security assessment and I am trying to recall where that was up to.

Senator BUSHBY—Can I indicate as well that I would like those to be tabled for this committee's assessment as well. I imagine you will take that on notice, but we would like to see that.

Mr Comley—I will take that on notice.

Senator BUSHBY—I have another question, and I am being parochial again. My home state of Tasmania is primarily powered by renewable energy in the form of hydro power. To what extent are existing power stations part of the RET process? How does that fit in?

Mr Livingston—When the MRET started, hydro were given baselines. They used the 10 years up to 1997 to establish the generation they had been doing till that date and they could MRET the increment above that baseline. So they used the hydrology to derive the output from 1987 to 1997, which gave a baseline figure, and for additional energy above that baseline they get MRET. Hydro Tasmania have done work to improve the efficiency of Trevallyn Dam, for example, which gets more MRETs out of the Trevallyn power station. In the early years of MRET, of course, they were the major contributor, but in recent times, with the drought, their REC output has declined a lot.

Senator BUSHBY—Forgive me if I am getting this wrong, but effectively they are not getting credit for what was the baseline prior to that, even thought it is entirely renewable.

Mr Livingston—The intent of the act was to encourage additional renewable energy.

Senator BUSHBY—So the fact that—certainly before the Bass Strait cable but even currently—basically all energy produced in Tasmania is produced from renewable means is not necessarily taken into account?

Mr Livingston—No, it is not.

Senator BUSHBY—That may have impact on Tasmanian industries that are almost entirely using renewable energy; nonetheless that will not be acknowledged in terms of the potential cost impacts that might flow from the targets?

Mr Livingston—No. As I said, the fact that Hydro Tasmania, Snowy Hydro and Kiewa necessarily had—

Senator BUSHBY—I understand that it applies elsewhere as well, but Tasmania is unique in a sense because almost all of its energy comes from renewable energy.

Mr Livingston—That is correct.

CHAIR—In the work you do, do you get feedback from people in the industry on issues with the current regulations?

Mr Livingston—We do get feedback, yes.

CHAIR—What sorts of issues get raised with you?

Mr Livingston—It varies between the various sectors. The wind guys get feedback on issues, the solar water heating people give feedback, the PV people give feedback, the hydro give feedback, and it varies depending on what the company is and where it sits in the market—whether it is a long-established or a start-up.

CHAIR—Are there some themes coming through? You have now been going for seven or eight years. Have you been there for the whole period?

Mr Livingston—Amarjot has been.

Mr Singh—I have been in the office since December 2001.

CHAIR—So you would have a handle on some of the themes that are coming through in terms of issues with the regulations and perhaps where they could be improved?

Mr Livingston—There have been changes through time. Early on there were issues with baselines and creation dates. They were fixed with amendments through time. The main theme right now of course is what is going to happen with the expanded RET scheme.

CHAIR—So, other than transitioning into the RET scheme, everything else is perfect.

Mr Livingston—The industry is very happy with the MRET scheme. Industry—both the liable parties and the generators—virtually since day one have been very, very happy with the MRET scheme and with ORER, and that continues. That is our feedback.

CHAIR—So since 2001 it has been a great success?

Mr Livingston—Largely, yes. There have been a few issues along the way. Baselines were an issue at one stage but that has been resolved. What gets accredited and what does not is an issue and obviously there are some issues around time, but MRET has been efficiently run and well-organised by the regulator for a long time, and the industry feedback has been that it does a good job.

CHAIR—And from your own point of view there are no areas where you think it could be improved a bit further?

Mr Livingston—It goes well. There are issues facing us, particularly with the PV panel change, RET and the CPRS, but when we find out what they are we will address them as they occur. We have improved our software. The original software was a certain standard. The current software does a good job but we have plans in place to improve even that software. ORER is a well-established regulator, and the industry are quite pleased with the way it works.

CHAIR—How many people work in the Office of the Renewable Energy Regulator?

Mr Singh—Twenty-one people work in the office.

CHAIR—Thank you very much, Mr Livingston, Mr Singh and Mr Comley for your contribution to the committee. I suspect that we might hear from the department separately at some point as well.

Mr Comley—I think that we have already appeared before this committee—

CHAIR—In relation to a previous matter—

Mr Comley—It is hard to keep track of all—

CHAIR—You have appeared on a number of occasions in relation to the Carbon Pollution Reduction Scheme but we are now focusing on our next phase. Thank you.

[12.20 pm]

GORDON, Mr Robert (Bob), Executive Director, Renewable Fuels Australia

CHAIR—Welcome, Mr Gordon. I invite you to make a brief opening statement and then the committee will ask you some questions.

Mr Gordon—First, Mr Chairman, on behalf of RFA, Renewable Fuels Australia, I would like to express our appreciation for the invitation to give evidence before your committee today. Second, I have a brief word about RFA itself.

Until July 2007 RFA was the peak national industry body for the biofuels sector in Australia. One of its major achievements was the eventual bringing together of all sectors of the biofuels industry under a new association called the Biofuels Association of Australia. In achieving this goal, it was determined that RFA should not be dismantled and its established reputation and knowledge base should be transformed into a national research and industry development organisation dedicated to supporting the development of a sustainable biofuels industry in Australia.

This was timely, as 2007 also witnessed a major assault on the credibility of biofuels by the Organisation of the Petroleum Exporting Countries, OPEC, and from major foreign oil companies over highly emotive claims of food versus fuel and that biofuels were taking food from the mouths of the poor. Fortunately Australian science in the form of CSIRO's Sustainable Ecosystems and the RIRDC, the Rural Industries Research and Development Corporation, found that this issue had no present relevance in Australia. But unfortunately the Australian media ignored this.

The purpose of RFA today is to draw attention to the fact that Australia and the world at large are fast approaching a once-in-a-century global risk to national energy security due to the inevitable transition from oil dependence over the next 25 to 30 years. Outside Australia there is worldwide acceptance that renewable fuels, along with other transition-from-oil technologies, will play a significant role in future national energy security and in reducing carbon and other toxic emissions in the global transport sector.

To this end we see countries such as the US, the European Community, China, Canada, Japan, India and others including New Zealand, introducing major policy changes to cut their dependence on and addiction to oil. Oil and coal are the largest energy sources that Australia draws upon every day, yet successive governments in Australia continue to deny that the progressive depletion of Australian and global oil reserves represent both a direct threat to Australia and to the global economy and climate change. By deliberate design Australia is predominantly reliant on road transport and oil based petrol and diesel for vehicle propulsion.

We have not come before you today to debate when peak oil will occur or to say that we will find adequate oil use for another century. Both the International Energy Agency and Shell—and I provided a reference to a quote from the CEO of Shell yesterday on this issue—are predicting oil supply crises between 2000 and 2015 due to the freezing and withdrawal of investment in new

oil production and exploration caused by the current global financial crisis. The unavoidable fact is that oil is finite and we are close to running out of recoverable oil. The scary thing is that we do not know when that will happen. We are here to highlight that doing nothing to prepare for oil transition will place our lifestyle—that is Australians' lifestyle—our economy and our nation at unacceptable risk. Time is not on our side when infrastructure development associated with these challenges could range from 15 to 25 years.

Australia has abundant biomass and gaseous fuel resources that could be used to provide significantly cleaner and cheaper fuels than oil based transport fuels that are capable of significant transport carbon reduction. In the case of ethanol, for example, we have next generation biofuels technology close at hand that poses no risk to food and will provide major new renewable job opportunities. Advanced engine technologies are also close at hand that will allow vehicles to run on multiple cleaner burning transition fuels such as ethanol, hybrids, LPG, CNG and LNG.

A 2008 study of green-collar jobs in America found that these industries generated US$1 trillion in sales and more than nine million green jobs. Ninety-five per cent of these jobs are in private industry and 70 per cent of these jobs are in the biofuels-biomass sector, primarily ethanol. The second largest green job source was the wind sector, followed by geothermal and photovoltaics.

A major part of the problem in Australia is that it is a country with a relatively small national economic and industry base with an almost total focus on developing its fossil energy resources for export and domestic use. Certainly every effort should be made to reduce the emissions profile of fossil energy resources, including coal, but they will never be clean. The wide use of the words 'clean coal' rather than 'possibly cleaner burning coal' by government and industry is totally misleading. This is a situation that provides little room for the renewable energy sector to breed and grow in Australia or play a prominent role in climate change or in Australia's future energy security.

Ethanol was deemed an untaxed fuel in 1921. The alternative fuel sector agreed accordingly in 2003 and 2004 to enter an excise tax regime between 2011 and 2015. This underpinned the ability for our industry to secure financial support for industry growth. Treasury, however, has raised possible changes to this agreement that could undermine future growth in oil transition for renewable and alternative fuels in Australia. The challenge before us all is to construct a sustainable oil-depleted future Australia, one that reflects a realistic balance between a relatively small number of large corporations in Australia that are large energy polluters and exercise strong influence and the development and deployment of a significant alternative fuel sector that can play an active lead role in cutting and reducing carbon pollution and securing an interest in the national strategy of planning for an oil-fuel-declining future for our nation. Thank you.

CHAIR—Thank you for your opening statement. Do you have a view on what the major issues are for Australia in terms of fuel security? You have given us a general outline in your opening statement.

Mr Gordon—The major issue for us, we believe, is accepting awareness that we are confronting a major issue. I noticed, for example, that Geoscience Australia was here this morning and I am presuming that their message was that there is a genuine threat in terms of

energy security in future oil supply. We know there is a very active debate by peak oil and within the oil sector, but the reality and the big challenge is that we do not know and we cannot know with certainty when such a crisis is going to befall. We know that it could be in 10 years, or it may be in 20 years. As I mentioned in the opening statement, and it is recognised by Shell in their president's and CEO's comments to the media over this week, that it can take up to 25 years to actually get the infrastructure in place for these sorts of responses to depleted oil. In our industry, we think we could probably do it in 15 years because we have a first generation biofuels infrastructure in Australia—though it is small—in both ethanol and biodiesel production. Ethanol production capacity in Australia would be in the order of 460 million litres per year and biodiesel would range from anywhere between 600 million litres and 700 million litres. The majority of the biofuels sector is in mothball condition for two reasons: (1) Treasury changed some of the determinations towards excise in on- and off-road conditions, and (2) the cost of feedstocks. In terms of production capacity, this comes close to around three per cent of Australia's 36 billion litre usage of petrol and diesel a year.

CHAIR—In your view, what would the government have to do to address that?

Mr Gordon—We certainly have to look hard at what resources we are going to have that are proven, demonstrated and work. We are not just talking about ethanol. Ethanol has been around for 30 years now and it is a well developed and proven fuel. We know as well that biodiesel is a much newer fuel, but it is similarly capable of operating efficiently in diesel fuel engines. We need to identify the issue and deploy as quickly as possible those technologies that are available today, and are available to become a substantial sector in meeting this challenge.

The reality is that there is no single fuel response or answer to global oil. It will be seen historically as one of the most critical and historic events in mankind's presence on this earth. There has been nothing else that has been so dominant in providing cheap fuel for transport. It is also pervasive throughout almost every sector in the economy. We are confronted with a major historic change here. Biofuels are not the answer alone. With LPG, gaseous fuels, that burn cleaner than oil-based fuels—diesel and petrol—we could make up 30 per cent of Australia's domestic fuel demand and use within a period of 15 to 20 years.

CHAIR—Can you describe for us the extent of biofuel use in countries like Brazil and the US, and then perhaps draw a parallel in terms of what is or is not happening in Australia?

Mr Gordon—In the United States they have a legal ruling on renewable fuels. They have set mandatory targets of nine billion gallons, which is around 36 billion litres, of ethanol.

CHAIR—What percentage would that be of the overall market?

Mr Gordon—Of the US market?

CHAIR—Yes.

Mr Gordon—That would be probably one per cent.

CHAIR—It is less than we have in Australia?

Mr Gordon—Yes it is, but you are talking about one of the largest transport fuel markets in the world.

CHAIR—As I understood, Brazil and the US were really the countries where the use of ethanol, of biofuel, was most prevalent. That is right isn't it?

Mr Gordon—That is right. You will note that in that message by the CEO of Shell—I think you have copies today—it is predicted that US usage of ethanol, for example, could be about 10 per cent, if I remember, in about 10 to 15 years. So, yes, it is a big measure. The answer is that we have to look at a whole range of things, and we have to look at how our future vehicle industry is structured. We are going to, and we have the capacity technically to, run cars off the assembly lines in Australia—GM is planning to do this, as is Ford in the United States—which will be able to run on petrol, which will have hybrid capacity and which could also run on ethanol, for example. That same vehicle could also run on a gaseous fuel. We are looking also at vehicle technologies as well as transition fuel technologies that would give the consumer something they do not have today, which is consumer choice. Gaseous fuels and ethanol are competitive with petrol and diesel fuels. They will offer consumers the option of going to a service station and deciding, on the moment, 'What is the best fuel option for me? Will I put in petrol or will I put in LPG or LNG? Will I use biodiesel in my vehicle? And I also know that I have hybrid electric capacity in that vehicle.'

We are looking at an industry—if we structure it and support it that way—that can provide the diversity of fuel use and demand to get around this process over the next 30 years, where progressively, like rolling waves, we are going to have less access to oil. We do not see any grand collapse coming, but we will see and feel the impacts of depletion in oil supply earlier and we will see significantly higher costs to the consumer.

We will also see risk to major industries in Australia. If we do not have oil and lubricants, the tractor stays in the shed—you cannot get it out; it cannot plough the ground; it cannot sow the seed; it cannot harvest the grain; it cannot take it to the storage site; and it cannot take it to the processing site. Then the food cannot be delivered to Coles or Woolworths for the public. This is an enormous challenge that we are confronting, but we have the capacity and we have the resources—if we can get rid of this dependence we have on fossil fuels. We are not saying we should not take advantage of our fossil fuel resources; certainly we should use that to the extreme extent we are able to. But we also have the capacity to fill in the gaps and, hopefully, avoid major fuel and economic crises on the pathway of the future.

Senator HUTCHINS—Mr Gordon, in your opening statement you say:

> Treasury, however, has raised possible changes to this agreement that could undermine future growth in oil transition for renewable and alternative fuels in Australia.

Do you want to expand on that statement for us, please?

Mr Gordon—In 2003-04, regarding previously untaxed fuels such as ethanol, we were told that, due to the energy white paper of 2004, changes would have to take place in the transport sector and the fuel sector. We accepted that, as biofuels become more established in Australia and more cost efficient, we should be ready to assume that we will pay some sort of taxation, or

excise, into the fuel market. It was agreed at that time that the theoretical energy content of the fuel would be determined and that would set the measuring point for what future tax we would pay. On ethanol, for example, the theoretical energy point was 25 cents per litre. The government of the day determined that due to the benefits of these alternative fuels—including LPG and natural gas—there would be a 50 per cent discount for the benefits that they bring Australia which imported fuels would not bring to Australia. That brought us the target of an eventual tax of 12.5 cents per litre by 2015. We would reach that target through a determination of, or applying a taxation of, 2.5 cents per litre from 2011 and an extra 2.5 cents for each year until we reach that final 12.5 cents tax. If that is changed, it puts our industry in a difficult situation.

Investment has been slow in our industry because we have had a great problem getting our fuels out into the market. The market is jealously guarded by the major oil companies and it has been a constant battle to get our fuels in. That has determined, in a significant way, our capacity for industry growth and expansion. Part of the industry's agreement to the new tax regime posed by the previous government was that it seemed to be reasonable. It gave us time to establish our roots and we accepted that it was inevitable we would have to make some taxation contribution. So that is the system. The suggestion has been put to us that there are some loose strings that were not put into the legislation covering this change and they may have to adapt alterations to the existing arrangements. That would be catastrophic for us because we have been going to the banks—we have been using this as credible justification and credible support for our industry's growth.

Senator HUTCHINS—Have you had discussions with the government? Is the government aware of that?

Mr Gordon—Yes we have.

Senator HUTCHINS—Thank you.

Senator McEWEN—We understand that there are finite oil resources and that there is the potential for biofuels, including ethanol, to replace or substitute for that. But where in Australia are we going to grow the stuff that we need to provide the material matter for this?

Mr Gordon—The feed stock?

Senator McEWEN—Yes.

Mr Gordon—Currently, ethanol is produced from by-products of the industrial process that turns wheat into flours and proteins. There are a myriad of by-products that are made from wheat. There is a leftover as well of waste starch. That is being used. It used to be put into the Shoalhaven river, which became one of the most attractive places to fish—fish loved it—in the country. But the EPA deemed that that needed to be stopped and Manildra, very innovatively, decided to mix it with sugars and make a fuel out of it. That is where the ethanol industry in the southern part of Australia started back in 1992. The sugarcane sector in northern New South Wales and Queensland have been producing ethanol in one form or another or alcohol, as well as crystal sugar, for over a century. It is currently produced in the sugarcane industry from the low-cost molasses—c-molasses.

If we are talking about a genuine contribution to future energy security, we will move into feed crops for cattle, such as sorghum. We could see the transfer of sugar juices, with half of that going from crystal sugar into ethanol production, which is what they do in Brazil. We may see with the new technologies going on that we will be able to extract the sugars from the cell walls of the bagasse, the stalk of the sugarcane. We may be able to extract the sugars in crop stubble. When we go to buy sorghum, for example, we will be looking not only at the grain on the stalk but also at extracting the sugars for the stubble for ethanol. In no case do we take the wholegrain and deny it to the food chain. Between 30 per cent and 40 per cent goes back into the feedlot industry in the form of slurry protein or dry distiller grain. A similar situation exists in the sugar sector. We can use the stubble. When they harvest the crop, they leave a certain amount of stubble to go back into the soil for humus and the conditioning of the agricultural soils. But we will buy both the grain and the stalk—the stubble—that is left over.

We will also be able to produce ethanol from forest industry plantation waste—sawdust—and biomass clippings. In the United States, they are looking at switch grasses that can grow rapidly and in low quality soils. We are looking at an era during which we will be extracting sugars for ethanol from not only feed grains but also a wide range of non-food by-products and seed stocks with no risk to any food sources. It will also dramatically increase our production capacity.

About three years ago we had scientists from the US Renewable Energy Laboratory come to a conference. They estimated that they could extract at least four billion litres of ethanol from the bagasse from the sugar industry—which is burnt today for cogeneration combustion—and still have a solid for cogeneration. We are looking at quite an exciting era of change. The important thing is that we take the time to prepare ourselves before the crisis arrives. The worst thing that could happen in Australia would be for us to not be ready and be forced to start turning coal into liquid fuels, very dirty fuels, for transport. We would be putting at risk not only energy security but climate change.

Senator McEWEN—Is the production of biofuels reliant on access to another scarce resource in Australia—water?

Mr Gordon—All industries use some source of water. Over the last 10 years Australia and the United States have managed to reduce their water use, or water footprint, by around 30 to 35 per cent, and there are significant reductions in overall energy use these days in current cutting-edge technology. With the cellulose-to-ethanol technologies, there will be even less demand in those areas.

CHAIR—Thank you very much, Mr Gordon, for your contribution to the committee. The committee stands adjourned until Monday, when we meet in Perth, in the great state of Western Australia.

Committee adjourned at 12.51 pm