Senate Select Committee on Fuel and Energy

ANSWERS TO QUESTIONS ON NOTICE

22 June 2009

Australian Bureau of Agricultural and Resource Economics

Question: 1

Agency: ABARE
Topic: Grain use for biofuels
Hansard Page: 9

Senator Hutchins asked:

Senator HUTCHINS—My question regards grain production. With the number of state governments mandating biofuels, do you know how much has shifted into that area? Is it 10 per cent? Presumably New South Wales says it has to be 10 per cent, so I am assuming that is 10 percent less corn or sugar or whatever it is.
Mr Glyde—I think there is a mandate in both New South Wales and Queensland, if I am not mistaken, or at least talk of it. I will have to take the specifics of that on notice; I do not have those figures—unless anyone else at the table has those figures in their heads. I cannot recall the specifics of the target for New South Wales or for Queensland, over what time frame it is and how binding that target is. We could probably come back to you on that.

Answer:

There is a mandate in place in New South Wales (NSW) that requires 2 per cent of total petrol sales to be ethanol. The NSW Government has indicated this mandate will be increased to 4 per cent from 1 January 2010 and later to 6 per cent, as a move towards requiring all regular grade unleaded ethanol to become a 10 per cent ethanol blend. The NSW Government also plans to introduce a 2 per cent biodiesel mandate on 1 January 2010, which will later be increased to 5 per cent.

There is currently no biofuels mandate in Queensland. The Queensland Government intends to introduce a 5 per cent ethanol mandate by 2010.

There is one major ethanol production plant in NSW (table 1). This plant uses waste wheat starch as its main feedstock to produce ethanol. It also uses some grain as feedstocks; however, the quantities of waste starch and grain used have not been disclosed.

There are two major ethanol producers in Queensland (table 1). The largest producer is the Dalby ethanol plant, which has a capacity of 90 million litres a year and uses sorghum as the main feedstock. Company media releases state that the Dalby plant will use around 200 000 tonnes of sorghum a year at full capacity.

Australia is estimated to have produced 112 million litres of ethanol in 2007 and 59 million litres of biodiesel. The combined ethanol and biodiesel production represented 0.5 per cent of Australia's petrol and diesel supply.

Question: 1 (continued)

Table 1: Liquid biofuels production facilities in Australia

Location	Capacity ML/yr	Feedstocks
Fuel ethanol		
Manildra Group, Nowra, NSW	150	Waste wheat starch, some low grade grain
CSR Distilleries, Sarina, Qld (North Queensland)	38	Molasses
Dalby Biorefinery, Dalby, Qld	90	Sorghum
Biodiesel		
Biodiesel Industries Australia, Maitland, NSW	20	Used cooking oil, vegetable oil
Eco-Tech Biodiesel, Narangba, Qld	30	Tallow, used cooking oil
Biodiesel Producers Limited, Wodonga, Vic	60	Tallow, used cooking oil
Smorgon Fuels, Melbourne, Vic	25	Tallow, used cooking oil, vegetable oil

Source: media releases, company websites and direct communication with companies.

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Question: 2

Agency: ABARE
Topic: Impact of biofuels mandates on grain prices
Hansard Page: 9

Senator Hutchins asked:

Senator HUTCHINS—Has any research been done by ABARE, or any other similar agencies in the world where there are these mandated targets, into the price of grain going up?
Say, biofuels are going for $1.39 a litre and you can probably get more money for them than for, say, corn or sugar. Has any research been done where you can track—because it has been mandated—that the price of that grain has gone up?
Mr Glyde—I would have to take that on notice. I am pretty sure that ABARE have not done any work on that. I am not aware there has been any work around the world on that, but I would need to check.

Answer:

ABARE has not estimated the impact of biofuels production on grain prices. However, some work has been done on this issue by organisations such as the International Food Policy Research Institute (IFPRI), the Organisation for Economic Cooperation and Development (OECD) and the International Sugar Organisation (ISO).

These organisations all agree that while biofuels have contributed to increases in agricultural commodity prices in the past, biofuels were only one of several factors that resulted in the price increases. The complexity involved in separating the effect of biofuels from other factors affecting the supply and demand for agricultural commodities has resulted in a range of different estimates.

The International Food Policy Research Institute (IFPRI 2008) estimated that increases in biofuels production between 2000 and 2007 contributed to 30 per cent of the increase in cereal prices over that period. The OECD (2008) estimated that the removal of all biofuels support policies globally would result in a decrease in world vegetable oil prices of 16 per cent and a decrease in wheat and coarse grain prices of 5 and 7 per cent, respectively. The ISO (2009) estimates the direct association between sugarcane production for ethanol and food prices to have been negligible. However, the ISO considers that expanding areas of land for sugarcane production in Brazil could have an indirect effect on the price of coarse grains in the future.

References:
IFPRI (International Food Policy Research Institute) 2008, *High Food Prices and the Impacts on the Poor in Latin America*,

Question: 2 (continued)

http://www.ifpri.org/presentations/20080721jvbLAfoodprices.pdf, accessed 27 August 2008.

ISA (International Sugar Organisation) 2009, *Sugarcane Ethanol and Food Security*, MECAS (09)07, April.

OECD 2008, *Biofuels support policies: an economic assessment*, Trade and Agriculture Directorate, Committee for Agriculture, Paris, May.

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Question: 3

Agency: ABARE
Topic: Grain and water use for biofuels and impact on grain prices
Hansard Page: 9-10

Senator Hutchins asked:

1. **Senator HUTCHINS**—It would be helpful if you could find out how much grain production might be shifting now from food to energy and also whether there has been any effect on the price. I assume you could get more money for fuel than food. There is 90 per cent or 80 per cent less, so demand and supply are inevitably going to push the price up.
   Mr Glyde—Certainly. There was the earlier work I referred to that had been done around the world. There is debate about what the impact of biofuels policies more broadly in the global community is on world grain prices. There is quite a debate about that and different views. It is a very hard thing to nail with any certainty. I am not aware that any stuff has been done in Australia, but we will get back to you on that.

2. **Senator HUTCHINS**—In particular in relation to Senator McEwen's question, can you relate it to water consumption as well.
   Mr Glyde—I understand.

Answer:

1. Please refer to the answers provided for questions 1 and 2.

2. ABARE has not undertaken any research on the impact of biofuels production on water consumption.

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Question: 4

Agency: ABARE
Topic: Grain use for biofuels
Hansard Page: 10

Senator Cormann (Chair) asked:

CHAIR—Is there anything that you could share with the committee in that context that would provide us with a similar factual background so that we can be as well informed as possible on the detail of this factual background?
Mr Glyde—That would be something I would have to take up with the Department of Resources, Energy and Tourism.
CHAIR—But I am asking in relation to the ABARE factual information.
Mr Glyde—Yes, that is what I am saying. I would have to refresh my memory as to what sort of information we have provided and what part of it falls in the scope of what you are talking about in terms of the basic factual information. In order to produce that I would need to take that on notice to determine exactly what it is that we can split out and provide to you. I take it you are asking for basic factual information and descriptive information in relation to the biofuels industry.

Answer:

The Department of Resources, Energy and Tourism has lead portfolio responsibility for biofuels. The internal government review of biofuels policy was undertaken by the Departments of Resources, Energy and Tourism and Agriculture, Fisheries and Forestry, as requested by the Prime Minister on 27 February 2008. The review is subject to Cabinet consideration; therefore, ABARE is not at liberty to release analysis that was provided for the review until after government processes are completed.

ABARE has compiled some factual information on the Australian biofuels industry while undertaking research. The most current factual information is provided in the answer to question 1, above.

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Question: 5

Agency: ABARE
Topic: Security of supply of energy in an environmentally friendly fashion
Hansard Page: 12-13

Senator Cormann (Chair) asked:

CHAIR— The committee right now is in a broader sense interested in what needs to be done to ensure that we have an affordable, reliable, secure supply of energy in an environmentally friendly fashion. I am going to: how is it going to impact on the security of supply, how is it going to impact on affordability and how is it going to impact on the environment?
Mr Glyde— Prior to the work that the Treasury has done, over the last half a dozen years we have modelled a number of different global climate change scenarios and global action in relation to climate change—this certainly precedes the work that the Australian government has done on the ETS—and looked at what happens to the relative shares of energy under those different scenarios. I am more than happy to provide you with that information, but I do not have that in my head and there are a large amount of different outcomes that flow from the different assumptions you make about what is going to be the impact of climate change and also the variety of global responses that might be made to climate change.
CHAIR— I was not asking you about the impact of climate change. We were talking very specifically about two policy changes that are being pursued by the current government and their impact on a reliable, affordable, secure supply of energy. You said your published work does not include the impact of any of that, so whatever you are currently publicly releasing is based on the previous policy settings because the legislation has not been passed by parliament yet. You have said that you have done some work internally. I am interested in the work that you have done internally. The share of energy is one thing but I am looking at cost and security of supply.
Mr Glyde— I will distinguish the nature of the work we have done. Some of the work we do is energy projections out 20 or 30 years. That is one part of the work which Ms Melanie's branch deals with. Another piece of work that we do is related to looking at the question of climate change and it relies on the global general equilibrium model, which is what I was referring to when I said I could give you some information about how the shares of oil, gas, nuclear and renewables et cetera change with different scenarios about climate change. So if you are talking about long-run energy security issues, that work is also relevant and I am saying that I have not brought any of that with me and would need to provide you with the references on that so you could be across that work. That would still give you some useful information on energy shares and how they might change under different policy responses.
CHAIR— That would very good information indeed. Shares are one thing, but as a committee we are particularly interested in whether there is going to be enough energy to go around to ensure that we have competitive Australian agriculture, fishing, forestry, energy and minerals industries.

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Answer:

Prior to the announcement of Australia's Carbon Pollution Reduction Scheme (CPRS) ABARE analysed the impacts of a number of hypothetical and illustrative responses to climate change on Australia's energy consumption.

In ABARE research report 07.16 "Technology: Toward a Low Emissions Future" (available at http://www.abare.gov.au/publications_html/climate/climate_07/technology.pdf), the potential impacts of a global effort to develop and widely deploy energy efficient and low emissions technologies were examined. In table 1 the primary energy consumption profile in Australia in the reference case and enhanced technology scenario is presented.

Table 1. Australia's primary energy consumption in the reference case and enhanced technology scenario

Primary energy consumption in Australia, Mtoe								**Change from reference case in the enhanced technology scenario**	
reference case				enhanced technology scenario				%	%
	2004	2030	2050		2004	2030	2050	2030	2050
coal	52	63	69	coal	52	38	23	-40	-67
oil	28	44	55	oil	28	35	36	-20	-35
gas	27	48	59	gas	27	35	31	-27	-47
nuclear	n.a	n.a	n.a	nuclear	0	2	16	n.a	n.a
biomass	0	4	7	biomass	0	15	24	275	243
other renewables	2	3	5	other renewables	2	6	10	100	100
total	109	162	195	total	109	131	140	-19	-28

In table 2 the shares of Australia's primary energy consumption in the reference case and enhanced technology scenario is presented.

Table 2. Australia's primary energy consumption shares in the reference case and enhanced technology scenario, percentage

reference case				enhanced technology scenario			
	2004	2030	2050		2004	2030	2050
coal	48	39	35	coal	48	29	16
oil	26	27	28	oil	26	27	26
gas	25	30	30	gas	25	27	22
nuclear	0	0	0	nuclear	0	2	11
biomass	0	2	4	biomass	0	11	17
other renewables	2	2	3	other renewables	2	5	7

The widespread uptake of energy efficient and low emissions technologies throughout the Australian economy is expected to lead to a significant decline in Australia's energy consumption, relative to the reference case, in the longer term. The share of non-fossil fuel energy in Australia's energy mix is also expected to increase.

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In ABARE research report 06.7 “Economic Impact of Climate Change Policy: The Role of Technology and Economic Instruments” (available at http://www.abare.gov.au/publications_html/climate/climate_06/cc_policy_nu.pdf), the potential impacts of a range of illustrative scenarios (developed by the Energy Futures Forum with an additional ABARE scenario) with a particular focus on technology options and carbon taxes were examined. Results for two of these scenarios are presented here.

Scenario 2a

In this scenario it is assumed that the world and Australia achieves a 40 per cent reduction in CO_2 emissions at 2050, relative to the reference case. A globally harmonised carbon price is assumed from 2010.

In table 3 the primary energy consumption profile in Australia in the reference case and scenario 2a is presented.

Table 3. Australia’s primary energy consumption in the reference case and scenario 2a

Total primary energy consumption in Australia, Mtoe						Change from reference case in scenario 2a	
reference case				scenario 2a		%	%
	2001	2030	2050	2030	2050	2030	2050
coal	48	61	70	42	48	-31	-31
oil	33	53	63	51	57	-3	-10
gas	20	35	43	33	36	-5	-15
nuclear	n.a	n.a	n.a	n.a	n.a	n.a	n.a
hydro	1	2	2	2	2	27	28
nonhydro renewables	1	7	19	14	38	107	104
Total	104	157	197	141	181	-10	-7

In table 4 the shares of Australia’s primary energy consumption in the reference case and scenario 2a is presented.

Table 4. Australia’s primary energy consumption shares in the reference case and scenario 2a, percentage

reference case				scenario 2a	
	2001	2030	2050	2030	2050
coal	46	39	35	30	27
oil	32	34	32	36	31
gas	19	22	22	23	20
nuclear	n.a	n.a	n.a	n.a	n.a
hydro	1	1	1	1	1
nonhydro renewables	1	4	9	10	21

Scenario 2d

In this scenario it is assumed that the world achieves a 40 percent reduction in CO_2 emissions at 2050, relative to the reference case. Australia is assumed to achieve a

reduction in CO_2 emissions such that they are 50 per cent below 1990 levels by 2050. Carbon prices are assumed to be imposed around the world from 2010.

In table 5 the primary energy consumption profile in Australia in the reference case and scenario 2d is presented.

Table 5. Australia's primary energy consumption in the reference case and scenario 2d

Total primary energy consumption in Australia, Mtoe						Change from reference case in scenario 2d	
reference case				scenario 2d		%	%
	2001	2030	2050	2030	2050	2030	2050
coal	48	61	70	36	29	-41	-58
oil	33	53	63	47	43	-11	-32
gas	20	35	43	29	20	-17	-53
nuclear	n.a	n.a	n.a	2	3	n.a	n.a
hydro	1	2	2	2	2	27	28
nonhydro renewables	1	7	19	18	61	167	228
total	104	157	197	133	158	-15	-20

In table 6 the shares of Australia's primary energy consumption in the reference case and scenario 2d is presented.

Table 6. Australia's primary energy consumption shares in the reference case and scenario 2d, percentage

reference case				scenario 2d	
	2001	2030	2050	2030	2050
coal	46	39	35	27	18
oil	32	34	32	35	27
gas	19	22	22	22	13
nuclear	0	0	0	2	2
hydro	1	1	1	2	1
nonhydro renewables	1	4	9	14	39

The results of these scenarios indicate that the implementation of a carbon price in Australia will lead to a reduction in Australia's energy consumption, relative to the reference case, as the economy contracts. The carbon price will also increase the relative competiveness (and contribution) of lower emissions energy sources in Australia. The larger impacts in scenario 2d, relative to scenario 2a, are driven by the tighter abatement target in scenario 2d in Australia.

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Question: 6

Agency: ABARE
Topic: Security of supply of energy in an environmentally friendly fashion
Hansard Page: 13-14

Senator Cormann (Chair) asked:

CHAIR— I think that everybody agrees that, while it is desirable from an environmental point of view, renewable energy can be less cost-efficient compared to, say, gas or coal, so presumably somebody has to carry that cost. If you carry a cost, it makes you less competitive than if you had a more cost-efficient energy source. Are they the sorts of dynamics that you have researched and analysed?
Mr Glyde — I might ask Ms Melanie to run us through exactly what it is we have done on that front. One of the complexities of doing this work and in making judgments about what is going to happen to energy supply and demand over the course of the next 30 years is the assessments you make about the changes and the improvements in technology, and so judgments have to be made about the extent to which we will be able to cost-competitively obtain oil and gas from resources which are deeper and further afield and also whether there are going to be any technological changes for renewables as those industries expand and we research them.
CHAIR— And you have made those judgements?
Mr Glyde — We do not make those judgements as ABARE; we tend to look to the literature and find out what the judgements are that are coming out from the scientific community and the business community about those sorts of costs.
CHAIR— But any forecaster at the end of the day has to make a judgement. You have to make some judgements as forecasters.
Mr Glyde — Yes, that is right. It is easy to make those judgements in some of this general equilibrium modelling where you can make some assumptions, but I might ask Jane or Alan—
CHAIR— Maybe you could take it on notice because we are running out of time.

Answer:

The dynamics mentioned above are integral to the energy modelling work carried out in ABARE. In undertaking long term energy projections, ABARE projects renewable energy consumption to reflect the cost profiles of the various renewable energy technologies, the incentives provided by various government policies and the capacity constraints of these renewable technologies. The table below shows the resulting projections of primary energy consumption in Australia, by fuel, over the period 2005-06 to 2029-30, with projected growth in renewables driven mostly by biogas and wind. These projections were undertaken in 2007 in ABARE research report 07.24 “Australian Energy: National and State Projections to 2029-30” (available at http://www.abare.gov.au/publications_html/energy/energy_07/auEnergy_proj07.pdf), and do not incorporate the potential impacts of the proposed Carbon Pollution Reduction Scheme (CPRS) and the new Renewable Energy Target (RET).

ABARE is currently updating this research, incorporating the impacts of the proposed CPRS and other changes to government policies since the previous research was conducted. ABARE expects to publish this research in the last quarter of 2009.

Primary energy consumption in Australia, by fuel

	consumption				average annual growth	
	2005-06	**2011-12**	**2019-20**	**2029-30**	**2005-06 to 2011-12**	**2005-06 to 2029-30**
	PJ	PJ	PJ	PJ	%	%
black coal	1 634	1 734	1 848	2 105	1.0	1.1
brown coal	706	757	819	803	1.2	0.5
oil	2 022	2 274	2 528	2 944	2.0	1.6
natural gas	1 064	1 342	1 691	1 982	4.0	2.6
renewables	262	372	445	465	6.0	2.4
biomass	186	245	315	327	4.7	2.4
biogas	7	41	40	38	33.4	7.1
hydroelectricity	59	64	68	73	1.3	0.9
solar a	3	3	4	4	2.3	1.9
wind	7	18	19	23	18.5	5.4
total	5 688	6 479	7 332	8 298	2.2	1.6

a The actual numbers for solar are rounded off in the table.

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Question: 7

Agency: ABARE
Topic: Security of supply of energy in an environmentally friendly fashion
Hansard Page: 14

Senator Cormann (Chair) asked:

CHAIR— Maybe you could take it on notice because we are running out of time. What sorts of assessments have you done around uranium mining and the potential of uranium and nuclear?
Mr Glyde— We did some work for the Howard government's uranium mining, processing and nuclear energy review in I think 2006. We provided some factual information on what the potential was there. I do not have that with me, but I am more than happy to provide that.
CHAIR— Would you say that that information is still by and large current?
Mr Glyde— I would have to test my memory on that one because it was a couple of years ago.
CHAIR— Could you provide us with a copy of that and on notice could you give us an assessment as to whether the information is still current and, if not, where there have been some changes?
Mr Glyde— Yes.

Answer:

The ABARE research report 06.21 "Uranium: Global Market Developments and Prospects for Australian Exports" (available at http://www.abare.gov.au/publications_html/energy/energy_06/uranium.pdf and at Attachment A), provides an assessment of the prospects for Australian uranium production and exports. The report identifies that Australia has the world's largest resources of low cost uranium, accounting for around 36 per cent of total world resources and that approximately 96 per cent of these resources are in seven deposits. Existing government policy in South Australia, Queensland and Western Australia, rather than resource availability, will be the major factor in determining growth in Australia's uranium production and exports.

The report examines two scenarios – a 'no new mines' scenario and a 'new mines' scenario. Under the 'no new mines' scenario, Australia's share of global uranium mine production is projected to decline from 23 per cent in 2005 to 19 per cent in 2015. Under the 'new mines scenario' Australia's uranium production begins to increase from 2011 as a number of mines in Queensland, South Australia and Western Australia commence production. Under this scenario, Australia's share of global mine production increases by four per cent over the period to 2015, to reach 26 per cent.

Since the report was published in 2006, the Australian Government has abandoned its 'three mines policy', the state ban on uranium mining was removed in Western

Australia in 2008 and, in July 2009, the Australian Government granted approval for the Four Mile uranium mine in South Australia.

ABARE's latest medium term outlook for uranium (Attachment B), published in *Australian Commodities*, in March 2009 provides updated projections for uranium production and exports to 2013-14. Australian mine production is projected to increase by around 6 per cent a year reaching 14 000 tonnes of U_3O_8 by the end of the outlook period, with South Australia and Western Australia accounting for most of this growth.