COMMONWEALTH OF AUSTRALIA

Official Committee Hansard

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON INDUSTRY AND RESOURCES

Reference: Development of the non-fossil fuel industry in Australia: case study into selected renewable energy sectors

THURSDAY, 31 MAY 2007

CANBERRA

BY AUTHORITY OF THE HOUSE OF REPRESENTATIVES

INTERNET

The Proof and Official Hansard transcripts of Senate committee hearings, some House of Representatives committee hearings and some joint committee hearings are available on the Internet. Some House of Representatives committees and some joint committees make available only Official Hansard transcripts.

The Internet address is: **http://www.aph.gov.au/hansard**

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

HOUSE OF REPRESENTATIVES

STANDING COMMITTEE ON INDUSTRY AND RESOURCES

Thursday, 31 May 2007

Members: Mr Prosser *(Chair)*, Mr Hatton *(Deputy Chair)*, Mr Adams, Mrs Bronwyn Bishop, Mr Cadman, Mr Martin Ferguson, Mr Haase, Mr Katter, Miss Jackie Kelly and Mr Tollner

Members in attendance: Mr Adams, Mr Cadman, Mr Haase, Mr Hatton and Mr Prosser

Terms of reference for the inquiry:

To inquire into and report on:

The development of the non-fossil fuel energy industry in Australia.

The Committee shall undertake a comparative study of the following renewable energy sectors: solar, wave, tidal, geothermal, wind and hydrogen. The case study will examine the relative state of development of these sectors and their prospects for economically viable electricity generation, storage and transmission.

WITNESSES

Committee met at 11.40 am

FITZPATRICK, Ms Catherine, Head of Energy Campaign, Greenpeace Australia

TESKE, Mr Sven, Director, Renewable Energy Campaign, Greenpeace International, Amsterdam

CHAIR (Mr Prosser)—I am pleased to declare open the first public hearing of the House of Representatives Standing Committee on Industry and Resources for its case study into selected renewable energy sectors in Australia. The case study was referred to the committee by the Minister for Industry, Tourism and Resources, the Hon. Ian Macfarlane, on 8 May 2007. The committee shall undertake a comprehensive study of the following renewable energy sectors: solar, wave, tidal, geothermal, wind and hydrogen. The case study will examine the relative state of the development of these sectors in Australia and their prospects for economically viable electricity generation, storage and transmission. The committee is pleased to be in the program of hearings with a representative of Greenpeace International Mr Sven Teske, who is able to be here with us today. I thank you for your submission to the inquiry and the associated reports and documents.

Although the committee does not require you to give evidence under oath, I should advise you that hearings are formal proceedings of the parliament and the giving of false or misleading evidence is a serious matter and may be regarded as contempt of parliament. I also remind you that the committee prefers all evidence be given in public; however, at any stage you may request that your evidence be given in private and the committee will consider your request. It is possible that the media may wish to broadcast these proceedings and I need to ask you now whether you have any objection to that.

Mr Teske—No.

CHAIR—I understand that, before the committee puts questions to you, you would like to make a short presentation. I ask you to proceed.

Ms Fitzpatrick—Thank you very much for bringing this hearing forward. Sven is only in Australia for a week and a half. He was at the APEC energy ministers' meeting where we released the global energy scenario. I would like to take a few moments to put it in perspective. It is obviously an interesting day in Australia. The Prime Minister has been given the report by the carbon trading task force. Your inquiry is an opportunity for parliament to really look into the potential for renewable energy in Australia. Sven's expertise is actually spread around the world. He has been involved in drafting the renewable energy legislation in China. He has been involved in a global energy scenario in 10 regions in the world and has worked individually in countries such as China, Germany, India, and a number of others that I am sure he will go into.

Greenpeace wants to be really clear that the cause of the problem is the coal, oil and gas industries putting vast amounts of carbon into the atmosphere. If we are to avoid climate change we need to look back on this inquiry as perhaps the lifeboat that turned many of the economies in Australia, but also elsewhere, around. We need a lifeboat of non-fossil fuel energy and parallel energy conservation measures to protect international security, economic growth and also the environment.

Your committee faces many difficult questions such as why Australia's greenhouse emissions are so high and why Australia signed Kyoto and is meeting the lax target but in fact has not ratified. Why is Australia missing out on the massive job opportunities, the regional development opportunities and the economic opportunities to come with the current global renewable energy boom? We think it is really appropriate that we have been given an opportunity to have Sven present to you. His presentation will talk about our global energy scenario, the position of renewables globally and then a little bit about Australia. Thank you for the opportunity.

Mr Teske—Thank you very much for the invitation. I will quickly run through the scenario and how it has been done. I am not going to go into every single detail of the results, as it is more important to understand how we actually did this. It is joint work of Greenpeace International, the German Space Agency—there is an institute within the German Space Agency specialising in renewable energy technology survey—the European Renewable Energy Council and the Global Wind Energy Council. We have a number of scientific buddies and we had, for each of the IEA region, one institute that actually checked the data and resources in terms of energy efficiency and renewable energy sources for this region, so we had lots of local partners. All together we had 50 scientists and engineers working on that paper. This is the summary. We have basically 15 detailed scenarios on top of that.

One thing that is very important to say was that we just relied on technology which is available. So for us it was very important to have technology in this scenario which is actually on the market. We do not include any renewable energy sources which are in the very early stages of development. We put in some wave and tidal power, but it was more because we wanted to highlight that there is a technology like that, but it does not play a role in the phase of our scenario.

Mr ADAMS—We have an expert on that.

Mr Teske—Also, in terms of the energy mix of the future, it was very important because we have a modelling system in place which was developed from the German Space Agency. It particularly focused on baseload-providing power because we do not want to come up with a concept which is just for households. We also wanted to avoid a vast amount of storage facilities because that is too expensive. We have a mix of different technologies which can provide baseloads. The good news is that most of the renewable energy sources are providing baseload already. Hydropower is providing baseload, duothermal can provide baseload, bioenergy can provide baseload and solar thermal power plants can also provide baseload. They actually do right now in some projects in Spain. Spain has just 500 megawatts of solar thermal power plants under construction. We are just ending up with two technologies which are not really baseloads providing power sources, which is solar photovoltaic and wind.

Mr ADAMS—Can you give me the Spanish thing again. Did you say 500 megawatts?

Mr Teske—It is a concentrated solar thermal power.

Mr ADAMS—It is concentrated.

Mr Teske—Yes. Basically Australia is one of the leading nations in the development.

Mr ADAMS—They are doing a lot in Newcastle.

Mr CADMAN—It is based on work done by the Germans in Spain in 1982.

Mr Teske—Actually, just five nations are working on it. It is Germany, Spain, the US, Israel and Australia—that is basically it.

Ms Fitzpatrick—Are you ready?

Mr Teske—I am ready. First we will give a brief overview about the renewable energy industry globally.

A video was then shown—

In terms of wasted power capacity already, and new renewables—you see that the majority is in developing countries and in the EU, followed by China. Germany, the US, Spain, India and Japan are basically the leading countries in terms of new renewable solar photovoltaic and wind especially. Geothermal is picking up rapidly in the Philippines and also in the US, while biomass has experienced right now a boom across the world.

The annual investment, compared to fossil fuel, is still quite low, but it is growing rapidly. In 2004 the market volume was $US30 billion, in 2005 it was about $US38 billion and we expect 2006 to be roughly $US40 billion to $US45 billion, so it is booming. I think this is one of the most important parameters. The top five countries whose names you see over and over again are Germany, China, the US, Japan and Spain, depending on the technology. We see that this is just the beginning of a boom. It is certainly not too late to enter those production and research and development countries. It is right at the beginning.

We now have the first results of the global scenario. The approach was based on a 10-model region which is basically the same system as the International Energy Agency is using. I am not explaining that but just telling you that we were keen on providing an alternative scenario to the World Energy Outlook, so you can compare our scenarios one by one—in fact, the reference scenario for us—with the World Energy Outlook 2004 and 2006. We took on board GDP and population development. It is important to mention that we achieve all energy efficiency measures with the same economic growth rates. That is very important. The alternative scenario was done from a variety of different institutes, as I have already told you. With those other regions, again they are from the International Energy Agency. We were not in charge of putting them together. There is more or less meaning for the regions. We also took all the statistical input from IEA.

It was important for us to show that our political demand is that we have to stay plus two degrees. It is actually possible to make that in the energy sector. We have with this scenario, a clear energy related concept. We are not mixing deforestation and agriculture mechanisms with energy. It is very pure; it is just the energy sector. The go is to halve them by 2050 to roughly 11 gigatonnes. This means that this would be per capita emission in 2050 of just around one tonne. This is very ambitious. In fact, only one region is actually achieving this, and that is Africa. The task was to have the economic development plus new technology to come down to this level. The main driver is of course population and economic activity and, very importantly, energy

intensity. We came up with different energy intensities per region. We took into account that countries like Australia, which have a lot of energy in terms of industry, have other measures than those countries that have just a big service industry, for example, do not. So they are slightly different.

The first thing was that we try to bring down the demand by efficiency technologies. Again, we achieve that mainly with technical standards—not educational programs but technical standards. The discussion about banning the bulb is a very good example. We do not believe that we can save the planet by banning the bulb, but it is a very good example for a first product standard, an energy standard for a specific product. That is a very good start, so that is why we support that idea.

Then we tried to phase out nuclear energy for many reasons. Firstly, we think it is dangerous, polluting and cannot provide the amount of power actually needed to save the climate. We have seen the project in Finland. One and half years construction means one and half years delay, and in the timescale they will blow the budget. Besides all the environmental arguments against it, nuclear power is simply too slow to bring up the capacity.

It is also no problem to replace it because it plays a minor role in the energy sector globally—it is just six per cent of the primary energy. If electricity is 16 per cent, primary energy is six. You then have the uptake on renewables. Again, we took into account that the renewable energy industry needs some time to build up; it take some time to build up the infrastructure for the industry. We did not take into account growth rates higher than 30 or 35 per cent a year, because it is just a matter of getting the staff educated and trained and getting the equipment in place. So that was a limiting factor. Basically, the area in between is still the fossil fuel sector. We tried to push fossil fuels first out of the electricity sector, then heating and cooling and last in transport.

The logic, in a nutshell, was basically efficiency and structural changes. We need a lot of decentralised energy and also co-generation, which needs a little bit of infrastructure and the energy production will move a bit closer to the consumer. In terms of the price, this is a price projection on the global scale. It looks a bit different from country to country, but the main message is still right. Most of the renewable energy sources in the power sector are getting competitive between 2010 and 2020, so around 2015. Most of the power generation for renewables is competitive with fossil fuels. We already have examples that wind farms are already cheaper than coal power plants in the regions. This will accelerate in the future and the price will go down on different levels. Wind energy has the potential to come down and solar has a huge potential to come down.

So how do we achieve our energy supply? We have the reference scenario and then we have efficient passenger cars, which basically saves us 24 per cent of the primary energy. Then we have improved heat/cooling insulation as well to reduce the cooling demand. We have improved energy efficiency in other sectors, which basically means all electrical appliances such as pumps and electrical drives—IT. We need efficient lighting, not ‘lightning’—this slide was done by a designer and I have no clue how to change it, so sorry for that!

Mr HATTON—It is an energy source!

Mr Teske—Yes, right! These transparencies are a joint Dutch and German project and our English was not too good, so sorry for that. We then have a number of other measures that I am not going to go into in detail. I think the only message from that transparency is that there are a number of different mechanisms. There is no silver bullet for energy efficiency as there are so many different technologies, but we need to develop them all at the same time.

Then we have the rest with the demand and supply side. The development of the global primary energy consumption under the reference scenario will basically mean almost double the primary energy consumption on a global scale. The key facts here are that the reference scenario relies to 80 per cent on only three fuels—coal, gas and oil. This is extremely dangerous for economic reasons because you are vulnerable to world market fuel prices. Our scenario has a diversified mix. It relies on 10 technologies: seven different renewable energy technologies, two fossil fuels—coal and gas will play a role in the future of this scenario, but mainly within co-generation power plants—and of course energy efficiency.

The electrical sector looks a bit different, and the reference scenario is even worse. Seventy-five per cent of the power generation relies on two sources, coal and gas, and our scenario again relies on 10 technologies. But with our modest growth rate it was very important for us to work together for renewable industry and we were always asking, 'Can you actually deliver the equipment?' It was very important for our concept to make sure that the industry can deliver the equipment.

We were able to have 70 per cent renewable energy electricity generated by 2015, so we had 30 per cent still fossil. In other sectors it looked different. For primary energy we have 50 per cent renewables by 2015 and 50 per cent conventional. The CO_2 emissions could go down by 50 per cent on a global scale. The transport sector does play a role in that and so does the consumer. Public electricity is one of the main sources. We took a look at the total global electricity generation costs. The break-even with our energy mix was 2015, which is quite an interesting result, because after 2015 electricity generation was more expensive on the conventional side. This means that power plants constructed today could come on line in five years, say 2012. They will produce just a few years electricity at a competitive price, and then other renewables could actually generate electricity more cheaply, then you have a lot of stranded investments.

The basic concept is that all the red areas have to reduce energy demand mainly via technical standards while the blue areas double, or even triple, the energy demand. Africa will triple the energy demand but still on a very low level. My home country of Germany right now consumes more electricity than the whole continent of Africa and Germany is emitting more CO_2 than Africa, so it has a long way to go. The yellow and green areas have to stabilise. Basically, five policy mechanisms are needed. One is that we need to phase out subsidies for fossil fuels and nuclear. The main problem we have is that whenever we come up with a renewable energy scheme we are forced to demand subsidies or other money for renewable energy in order to compete with subsidised sources. The government is ending up subsidising both sides, which does not make sense.

Legally binding targets for renewable energy are very, very important, and must define a stable return for investors. The scheme must accelerate the market. A very important thing is that those energy sources must have priority access to the grid. France is a very good example. They have a feed-in law, which means they have a guaranteed price per kilowatt hour. There is nothing

happening because EDF simply refuses to connect wind farms to the grid. We need strict efficiency standards again. We see that there is a technical solution, we see the Japanese model of a top runner, which means the best companies with the best energy efficient product define the technical standard for that product and kick out inefficient equipment from the market is a very smart mechanism.

I do have some specific policy examples for some regions. This is quite interesting, so we should at least keep that one. This is actually from a report we did not publish. I thought it would be important when we have the opportunity to speak here that we actually show you that. We will publish that in about four to five weeks. This is just a future investment plan for power generation in our reference scenario and in the alternative scenario. It shows that the reference scenario requires an investment in power generation globally in a range of about $6.3 trillion—quite a bit of money.

The alternative scenario requires slightly more—$6.9 trillion. If we compare this with the fuel costs on the next slide, we see the difference between the reference and the alternative scenario is about $200 billion more in fuel costs each year than for our alternative scenario, which basically means that the saved money for fuel costs can actually cover the extra investment almost 10 times over. That is actually a very good message.

Mr ADAMS—You didn't mean the cost of the actual coal merely over the gas.

Mr Teske—Yes, because once you have that installed you do not need any fuel. The only exception is biomass; none of the other renewable energy sources need any fuel. I think that is very interesting. We can give you that presentation, so I am not going to go very deeply into that. This is an example of the German feed-in law and what the effect is. Maybe the last column is quite interesting. In the German renewable energy industry sector there are currently 214,000 employees, which is a lot more than the coal and nuclear industry are providing. The coal industry in Germany provides around 35,000 jobs, nuclear provides around 20,000 jobs and renewables provide 214,000 jobs. This is why the renewable industry gets more and more support from all parties within the government. One of the successes of the feed-in law, which is basically a guaranteed price for a kilowatt hour, was that farmers and small and medium sized companies can actually take part in this scheme. Farmers invest heavily in wind, bioenergy and solar, and basically have another income with this. In Australia you do have the mandatory renewable energy target, which is very successful and should be expanded, plus a feed-in law for solar, and then it would accelerate lots of small businesses as well. The problem with emission trading is that it could put up the price for fossil fuels, but it will not bring benefit for renewables in the first phase. Emission trading must be a very long lasting thing. Emission trading will affect the investment decisions of fossil fuel power plants, but the renewable industry will not benefit from it in the first phase because it is just too short term and they need long-term investments.

Mr ADAMS—They won't start buying until they go over their cap and then they need to buy.

Mr Teske—A farmer will not buy emission certificates, and that is the problem. So you will just have big players. If there is a feed-in law and a mandatory renewable energy target, there is a guaranteed price per kilowatt hour.

Mr ADAMS—A forest company might buy some, if that is the way it works, and put in some trees.

Ms Fitzpatrick—It can happen in fact on reducing emissions, but what we found around the world with emission trading schemes is that they do not benefit the renewable energy sectors, so you actually need other mechanisms to get the renewable energy sector really booming. If you look at Germany, it was not an emissions trading scheme that got their renewable energy sector growing.

Mr ADAMS—What was it?

Mr Teske—It was a feed-in law. It was the law that you get a guaranteed price per kilowatt hour for 20 years.

Mr ADAMS—And that was carried off budget. They took that out of budget and paid—

Mr Teske—The good point about that is that the government is not involved. They do not invest a single cent. They just share the cost through all the customers, which means that the average household in Germany has to pay €1 a month more, which basically means that you have to pay €12 a year more, which is three beers. It is a good investment.

CHAIR—You are effectively talking about a tax, not a trading scheme.

Mr Teske—It is not a tax. The way it works is that the extra cost is divided—

CHAIR—It is the argument between a tax and a levy nearly.

Mr Teske—It is not a tax.

CHAIR—It wouldn't work without the government.

Mr Teske—Legally it is not a tax.

CHAIR—Legally.

Mr Teske—It is shared with all the customers who consume electricity. The only exclusion is the steel industry and the aluminium industry. They do not have to pay because they traditionally get electricity anyway for free.

Mr ADAMS—So the big consumers pay as well.

Mr Teske—Yes, everybody pays.

Mr ADAMS—And that money was guaranteed for 20 years.

Mr Teske—Yes. It put up the price a tenth of a cent.

CHAIR—Did you say the steel and aluminium industries were excluded?

Mr Teske—Yes. They are excluded, for a few years now.

Ms Fitzpatrick—From the feed-in law.

Mr Teske—They already get subsidised electricity as in most countries around the world, so they are not part of that scheme. The next slide is about installed capacity; we can skip that. Another example is the renewable portfolio standard in the US. It is a different mechanism to provide basically a reliable income for investors in renewables. Texas is one of the biggest wind markets in the world right now. It overtook Germany two years ago. The US is now the main market for wind turbines. Right now they are building up to their own production. It is important that the schemes are long-lasting. It is better to have a lower feed-in tariff which lasts longer than the high one, which lasts a very short time. This long-time incentive means that the industry is able to invest in production facilities. A short subsidy will just accelerate the market a few months. You will probably import all the solar panels or whatever you have, and then it is over again. But for a long-lasting commitment you will get also production capacity in the country, and there is a huge opportunity. Australia has one of the best scientists for solar and they are ending up in East Germany and producing solar panels there.

We have lots of targets. We put together a report to give an overview of how Australia is actually positioned right now in terms of targets and what is possible. The EU is currently talking about another renewable energy target of 20 per cent by 2020. This is mainly agreed, but now they are arguing about details and how to share that because there are 27 countries. We suggest a 25 per cent target for Australia by 2020, or something like that.

Mr HATTON—The EU has also said that they would go to 30 if everyone else got on board.

Ms Fitzpatrick—That was for greenhouse gas emissions in total, so the renewable energy target sits under that target.

Mr Teske—Basically the structure is first a CO_2 reduction target and then a target for renewables, which is just a charge for a part of that CO_2 reduction. Then there is a target for renewables in the transport sector and a target for efficiency. Emission trading is a mechanism to achieve one of those targets. The European Union Emissions Trading Scheme is not in charge of implementing the renewable energy target; this is completely separate.

Mr HATTON—We have just added the bioenergy sector in terms of what we are looking at. That has become part of it.

Mr ADAMS—You need some local politics in Australia on that.

Mr Teske—Bioenergy is a huge debate in Europe right now, also in terms of the certification system, because it does not make sense to chop down a tropical rainforest to produce biodiesel and use it for a renewable energy target in Europe.

Mr ADAMS—With potassic, non-forest vegetation and scrub and stuff, it probably does. We have a lot of waste in the forest industry. The debate is that you cannot use it because of different arguments.

CHAIR—The problem we now have is that we are debating the matter, rather than finishing the presentation and going to questions, so if you finish your presentation.

Mr Teske—We will finish on this light. The 25 per cent renewable energy target for Australia would at least create 16,000 or 17,000 jobs, which I think is a more conservative estimation. The investment of $33 billion and 15,000 megawatts of renewable energy capacity means 15,000 megawatts without fuel, and that is quite an argument. Almost 70 million tonnes less greenhouse gases and renewable energy can provide enough power for every home in Australia. We are actually working on a very specific scenario for Australia. Australia is blessed with so many resources like sun, wind and geothermal. As Europeans we always get jealous because there is a lot of space as well. It should not be a problem to provide 100 per cent renewables to Australia; it is a matter of the time frame. Engineers and experts will not argue that it is possible; the argument is how we get there and in what time frame. I believe that is more the question.

Mr ADAMS—They will not let you put up wind farms where one bird in 1,000 crashes into them.

Mr Teske—Regarding birds, I have to say that the bird issue is pretty much over in Europe. There was a debate about birds being harmed by wind farms. There are so many surveys now that good siting, good placement and good planning can avoid that. If the worst forecast had come true there would not be a single bird left in Germany.

Mr ADAMS—I have seen Friesland with 150 windmills operating.

Mr Teske—I am living right in the middle because I am from Friesland.

CHAIR—Mr Adams, you are back to debating the matter. Thank you, Sven, for that presentation. We will go to questions now. You made mention, particularly in your submission, to the existing energy sector being subsidised to the tune of $9.3 billion to $10.1 billion in subsidies. This work appears to have been carried out by the University of Technology, Sydney. Can you identify the areas that these subsidies are being paid to and the levels of government from which they are coming?

Mr Teske—Catherine would be best to discuss that.

Ms Fitzpatrick—I will find the report.

Mr Teske—In terms of global subsidies, there was an OECD study published a few years ago that found that the fossil fuel industry gets about 250—

CHAIR—We are obviously interested in Australia specifically.

Mr Teske—I cannot fill the gap, so I will wait for Catherine!

Ms Fitzpatrick—Regarding where they come from, I will just have to find the chart.

Mr HATTON—Biodiesel is an interesting area. I was recently with the parliamentary delegation to Germany. We went to Wetterau in the south and met with farmers in the south, and met with farmers who are making and using biodiesel from canola. The cooperative has done it and done it extremely well over a long period of time, but they cannot get certification to use it more widely, even though they have proven it with their own vehicles without having to change any of the operation of the vehicles. They have used it and it has worked well. How much of a problem is there in Germany in terms of certification in the biodiesel area?

Mr Teske—The debate is just starting. Because of the very ambitious target of the EU it was decided that 5.6 per cent of fuel EU wide should be from biodiesel. They put up their very high target for a very short time frame—less than 10 years. The starting percentage was about one per cent or something, so it was enormous. The result was that everybody tried to get biodiesel from all sources, including outside, without having a proper mechanism to control it. There is now discussion about how to certify that. We recommend that it should be done in a way like the Forest Stewardship Council—the FSC—for example, and this kind of structure should be developed on a global scale. I do not think it makes sense to make lots of regional certification, because at the end of the day we will end up with some sort of global market. There are so many refineries now under in construction in Europe for biodiesel and bioethanol and biofuels that we do need a global certificate system.

Mr HATTON—There is an associated problem with both Europe and the US. It is the whole problem of our agricultural trade. They are so heavily subsidised now. As some of those subsidies have come off, in an area like biodiesel local farmers can see they can actually make something out of it. But again the subsidies are so heavy that there is no level playing field in any of that. There is a great opportunity in terms of what they can do, but it is a question of how they are going about that.

Mr Teske—Agricultural subsidies are a big issue in the EU—not just in the EU but everywhere. That is another point. We need to avoid double subsidy, where both sides are subsidised and it is a waste of money. That is why we included biodiesel or biofuels in our scenario in a pretty limited way. We see that in the power and heating sector the technology development is pretty clear. It is pretty clear what kind of technologies are actually going to make it in the next 20 to 30 years.

The transport sector is pretty open. There are a few hybrid cars—I personally do not believe in hydrogen cars at all; maybe there will be a few on the road, but they probably will not play a big role—some biodiesel and some others. That is why we think in the first phase in the transport sector we should look at efficient cars. On the stationary side it is no problem to supply the energy needed without any cuts in the lifestyle. In terms of transport it is, because we cannot just replace a four-wheel-drive diesel with a four-wheel-drive biodiesel. That does not make sense; we need smaller, efficient cars.

CHAIR—For the benefit of Hansard, Catherine Fitzpatrick is about to answer the question asked by Mr Prosser in regard to subsidies for the existing energy and transport subsidies in Australia.

Ms Fitzpatrick—According to the Institute for Sustainable Futures report, half of the subsidies—as much as $10 billion—are for transport. I will just focus down on the electricity sector and support for renewables. Their summary is that total electricity subsidies are as much as $1.9 billion for fossil fuels in 2005-2006 and support for renewables in the same time period was as much as $119 million, so a bit more than 10 times the amount. What they are talking about in terms of subsidies is subsidised supply of electricity to aluminium smelters and subsidisation of fuel costs—for example in mine sites that is actually as much as $1.1 billion.

CHAIR—Those costs are subsidised to farmers as well.

Ms Fitzpatrick—That is right. All I am doing is talking about the electricity sector. It is quite a substantial report, so I thought I would use that as an example. In terms of the renewables, the types of subsidies they are getting is $10.2 million in state energy concessions. The mandatory renewable energy target, where most of the costs are passed onto the consumer, is only $31.3 million, and there are other electrical support programs for renewables. The vast majority of subsidies in Australia at the moment are to the fossil fuel sector.

CHAIR—Will you be tabling that document?

Ms Fitzpatrick—It was actually in our submission, but I can also give you this copy.

CHAIR—Thank you.

Mr ADAMS—We have that document. That is a report, isn't it?

Ms Fitzpatrick—Yes.

Mr ADAMS—You made two points: one was closer to the consumer from household energy use and energy generation. Do you want to elaborate on that?

Mr Teske—We have a graph in there. Basically, people who live in cities will not have their own roof for solar water heating or for solar PV, so there is a need to have some sort of establishment of a heating and cooling grid infrastructure. Some office buildings or shopping malls and so on can put up solar collectors on their roofs, and PV can also be used by placing some facades and supplying the surrounding applications. Also, regarding cogeneration, larger, taller buildings could do their own electricity and cooling supply by cogeneration and supply other buildings. It is more a decentralised structure. However, we will have some centralised generation for some industries. We do not recommend solar photovoltaic to supply aluminium smelters—certainly not. So we will have other technologies, centralised technologies like solar thermal power plants or offshore wind, depending on the region, to supply this industry with electricity. But we will have more power generation. If you look at our table with all the installed capacity, the installed capacity is higher than in the reference scenario.

Mr ADAMS—I saw that. The issue of wind becoming cheaper and solar becoming cheaper is one of your thrusts.

Mr Teske—We have not done a sort of blue-eyed analysis of everything that would be cheaper. We expect that wind could be cheaper—say 20 per cent, not more.

Mr ADAMS—I argue why solar is not cheaper in Australia. We have subsidised solar in Australia for a long time and it has been encouraged, but it is still too dear. It is still too expensive for the average person to get—

Mr Teske—That is an interesting point on research and development. If there is a long-lasting support mechanism, like a mandatory renewable energy target, and the industry is able to build up big production capacities, it will do its own research and development. Of course it is competing with other sources, so there is a pressure on the price. A very specific example from my own country is that the photovoltaic industry is under pressure right now to put down the prices quite significantly. You see already that the price is coming down. The industry now says that in southern Europe, with this regime of sunlight, solar photovoltaics will be competitive to utility prices.

Ms Fitzpatrick—There has been some funding support in Australia for renewable energy commercialisation and deployment, but it has never been big enough to actually have a thriving solar market in Australia. For example, in 2002 the renewable energy CRC was defunded. The energy R&D corporation was closed in 1996. There have been small amounts, but not enough for the industry to actually stay in Australia. The crystalline silicon on glass technologies have gone to Spain and Germany. We have lost that opportunity in Australia. The ANU has lost the development of their solar concentrated technology. The most effective way for us to have a thriving market and support domestic manufacturing in Australia is actually to have a large enough renewable energy target that it makes that effective. You are right: you do not want to actually be continually subsidising renewable energy; you want a market to be created.

Mr ADAMS—Or that people have looked at it and said that this is not going to make it in the long term, or that it is going to be too expensive or whatever. There are those sorts of arguments that come into the commercialisation of things as well.

Mr Teske—I think the benefit for Australia is that a lot of countries have already invested quite a bit in research and development and the majority of those technologies are now off-the-shelf technologies. We are now talking about getting them a bit cheaper in the market. They are really reliable. I am a trained engineer myself. Fifteen years ago I did my diploma and masters degree at the German Wind Energy Institute. We had big problems with the generators and inverters but they have gone. It is now reliable. Now it is just a matter of mass production and getting the prices down. That is the thing right now—and upscaling production facilities so you do not have to start from scratch.

Mr ADAMS—In other places like Germany, when you talk about baseload, how does wind come into baseload unless it is a part of a mix?

Mr Teske—It is a mix of other renewables. Then, depending on the wind scheme, like the offshore wind projects in Denmark and Sweden that already have a baseload of almost 5,000 hours a year, it is a matter of good planning. Right now the wind forecasts are so good that 48 hours ahead you know, plus or minus five per cent, how much wind electricity you will have on the grid—and it is actually good business for some people to forecast that—and then you do the planning. This is what we mean by structural changes—the electricity supply will be different in the future in terms of a combination of different sources.

Mr HATTON—That has answered my second question. When you said that baseload is already being provided out of renewables, is that on that mix basis in those certain circumstances?

Mr Teske—Geothermal you can switch on and off; bioenergy you can switch on and off. It is just a matter of how much fuel you have. You can run it 8,760 hours per year. Hydropower is dependent on the region baseload. For instance, in South-East Asia it is just peak power sometimes because it has dried out. Solar thermal power plants are under development. There are some baseload power plants, but this more in the future. All those power plants can be switched on and off. The only two technologies left which are not baseload are photovoltaic and wind in some regions.

Mr HATTON—I will go to the first question which was a trick question about the future and not about the report you have done because that has been based on existing technologies. Part of cracking the problem in the future is a combination of existing technologies such as in solar thermal, which is very exciting because there is a possibility of being able to store the energy and then use it at other times. The second is in terms of a report in regard to wind. A number of scientists argued that if you used the jet stream you could have a very high efficiency in providing wind power. Because it is 100 kilometres an hour all the time, you do not have any slackening. You do not have the problem that there are lulls and so on and the jet stream is available virtually anywhere, whereas a big problem in Australia is the distance between the very windy areas and then getting the electricity that is produced from those areas to the others with attenuation and so on.

Mr Teske—I think it is easier to have a 100-kilometre long vertical grid than to put a grid 10 kilometres up there. Just the weight of the cable from here to 11 kilometres up is enormous.

CHAIR—You mean a horizontal grid.

Mr Teske—It is a nice idea, but pretty far away from practical things. In terms of wind development, it is possible to store it as is done with hydrogen. It is possible, but right now a cable up to 700 kilometres is cheaper than hydrogen generation. Long distance transmission is business as usual. If you have a look at the power supply in Sweden, the majority of the Swedish hydropower plants are north of the Arctic Circle and they are providing the centres. The population is mainly down south, which means they have to transport the electricity roughly 1,500 kilometres, so it is possible. In some places, such as around Perth and the south, the wind regime and the Roaring Forties is just great. There is almost baseload.

Mr HATTON—Can you give us a broader view of where we are at with solar thermal. We know it is early days yet and we have seen some of what is happening here in Australia.

Mr Teske—Solar thermal power plants?

Mr HATTON—Yes, solar thermal power plants—such as the work done in Spain from 1982 until 1992. There has been a lot of work done here since then. It is quite exciting because of the direct baseload implications. If they can provide that, it changes the equation. What is happening in Israel and the other countries?

Mr Teske—Israel is just working on a renewable energy law and a feed-in law for solar PV and solar thermal power plants. For them it is also a matter of security of supply because they have their own resources and they mostly get coal from outside. They agreed in the Knesset just a few weeks ago to build to 150 megawatt power plant. They are now investigating where exactly to build it. The main problem is that the huge areas from the desert are actually military areas, so they are basically finding the right spot right now. It is agreed that they will build 150 megawatts. In Spain there are six projects under development, all in the range of 50 to 100 megawatts. There is another project under development in Egypt. I do not know its status right now. They keep saying that they will start construction in a year, but they have been saying that for a few years now, but it is under development. I have seen the development in California where SolarOne has expanded, but this is already finished. There are several projects. The race for kinds of technologies is still open. You have three very different technologies in solar thermal, but we try to stay out of that debate depending on the region and the company that is implementing the whole thing.

Mr HAASE—That was a very interesting presentation. My immediate question is that, although your slides show a great deal of projection, especially through to 2050, I would really like to know the basis of some of your projections because they are very complementary to your argument and 2050 is a long way off. For instance, you suggest that at a point in time there will be an equalisation of renewable price for a unit of electricity equal to that of a hydrocarbon generated unit of electricity. Can you give me any detail on the basis of that assertion? It was about halfway, was it not?

Mr Teske—We have a different assumption of fossil fuel prices. That is for coal, gas and oil in the report and then we calculated the generation costs.

Mr HAASE—Do you base it on an assumption of the price of fuel.

Mr Teske—We base it on the IEA projection and we have an alternative scenario of a slightly higher price for coal, gas and oil. But right now the status quo is that a new coal powered plant in Europe or in the United States generates the current coal price. New established coal powered plants generate electricity in a range of 4½c to 5½c per kilowatt hour—not the written-off Alcoa power plant; they do it with 1½c or 2c. A wind farm in a good windy area, such as some places in Denmark, Texas or the UK—some places in Germany as well—with seven metres per second wind, generate wind electricity of roughly 6.5c, so we are just 1c or 2c away from that. We assume that when we have more wind capacity and more manufacturing that the price will drop by a maximum of 20 per cent. Also, we assume that the fossil fuel prices will go up. Of course, you can argue that if fossil fuel prices will not go up, then renewables might have a problem to compete. We do not believe that renewables prices will not come down. We can prove that in the last—

Mr HAASE—Simply on the mass of production.

Mr Teske—Yes. In the last 10 years the wind production price is almost half what it was 10 years ago, and the price went down quite significantly with solar as well. You can also see on our maps that the coal, gas and oil prices are mainly going this way. So, even if they are stable, they can compete. Of course, we can argue that this certainly will go up. We can argue when the

break even point will be. Will it be 2015 or 2020? That is the question. But it will certainly not be far beyond that.

Mr ADAMS—That is a European coal price not Australian.

Mr Teske—Yes. But Australia also needs to build new power plants. Hazelwood is quite old. It is a matter of new investments and then you will have higher generation costs anyway.

Mr HAASE—That is right. If Tasmania would stay in Tasmania, we would be very clean. You also make a comment about reducing usage by efficiency. By 2050 you assert that you will achieve through efficiencies a reduction in usage equal almost to the total usage you show for 2007. It is a fairly substantial claim and I wonder how that would impact on the standard of living.

Mr Teske—It will not impact on the standard of living for stationer applications. The good example is this light bulb thing wasting 80 per cent of the electricity.

Mr HAASE—Which we have addressed.

Mr Teske—Yes, but there are other things like IT equipment and heating. In Europe, 50 per cent of the heating energy is wasted, so good insulation will bring down this energy substantially. We are basically left with transport. There we have to say that, yes, we do have to have a different lifestyle in terms of transport. We cannot do the same amount of mileage in flying around like we have done in the past. We do have quite a bit on aviation in our scenario, but we distribute it more equally from region to region, because right now some regions have almost no aviation per person whereas other have a lot.

Mr ADAMS—Australia is a bit different.

Mr Teske—Sure.

Mr HAASE—Size does not indicate interference ability, does it? It ought not to anyhow. What would you assert were the savings achieved by the new innovations in appliances? Do you have any evidence of on your track record in that regard? How do you justify an assertion that these savings will be found in the future? Do you have any evidence on that? I apologise for not understanding all of the detail.

Mr Teske—No worries. That is quite a substantial piece, and it would be depressing if you understood in five minutes what I have worked on for 1½ years. We did an investigation with an institute where we did an analysis of the structure of the demand in each region and average in the market of efficient technologies. We then developed three scenarios: one is the business as usual scenario, one is the extreme techno scenario where you use everything, and then we have a scenario in-between where we have said that not everything available on the market will actually make it. This scenario is basically what we took.

Mr HAASE—So you have not looked at historical evidence that an appliance in this area had a usage of X and today it has a usage of X and you equate the percentage reduction? Have you done any work like that?

Mr Teske—No. We looked at products like IT equipment, for example, and asked: is it possible to run a server with a more efficient service with what amount of electricity? That is what we investigated.

Mr HAASE—So you did consider historical evidence?

Mr Teske—Yes, sure.

Mr HAASE—I have a lot of questions and I do not expect to get them all in. One is on public resistance to wind turbines; I know that Germany has been rather successful because of the clean air to reduce climate change et cetera point of view of the public.

Mr Teske—That was not the reason.

Mr HAASE—So you believe it was simply the Emirates.

Mr Teske—The reason Germany, Denmark and Spain were quite successful was because the scheme allowed farmers and other small businesses to contribute. The regulation was that each community needed to come up with a specific area for wind generation. The mayor and the people in the region agreed where they would put the wind farms. That was the first thing. It is very important in the planning that local people are included. They need to know where you want to put up the wind farm. There are some examples of where there were big arguments. Whenever you come into an area where there is a wind farm there is a lot of debate. For example, my home town is Friesland with Bavaria in the south. In almost every country around the world the northern people do not like the southern people and make jokes about each other. If there are southern people coming into our village who try to put up wind turbines to earn money, of course the local people do not like that. It is a matter of planning.

Mr HAASE—You mentioned in your briefing that Perth and the south-west of Western Australia is an ideal location. There has been huge public resistance, especially along the coastal strip, because that is some of the most highly valued real estate and some of the most pristine with some pockets of the most resistant peoples. I just believe it would be a major problem.

Mr Teske—I have to say that maybe it wasn't very smart to say Perth. It is just that the wind regime in Australia in general in this whole southern part is pretty good. I am sure that for the amount of wind power needed for Australia there are some locations which are not in the pristine and national park areas. It is a matter of good planning. I am not suggesting that the wind park should be right there.

Ms Fitzpatrick—The first wind farm put up in WA near Albany had a great process because the government and the company working with the community did a very good job of community consultation. When I went to visit it, it is in a remarkable location. In fact, my first thought was, 'Wow, how did they permission?' They worked really closely with the local community and talked about the benefits of clean energy, and in fact they have become very proud of the fact that they have one of the first wind farms in Australia. It does get back to the process of consultation.

CHAIR—When did that go in?

Ms Fitzpatrick—It was at least 10 or 15 years ago. It is quite old.

CHAIR—That area had a fantastic federal member then—and modest.

Mr HAASE—I have in fact visited Denham, Albany and Esperance. I suggest that the reason we had so much resistance in Denmark was because people now have the evidence. They have the visual—and may I say pollution—as evidence that they do not want any of their own. I just see it as an ongoing problem. You made the comment about the building of modern generation power plants. We have talked about your assertion of the rising cost of coal. You are well aware, I am sure, that Australia has estimates of 400 years of coal based energy. You know that we are putting substantial investment into the study of the technology of scrubbing and geosequestration of CO_2. I would like you to comment on that because I personally, and I know a number of my colleagues and certainly cabinet, believe that that is a very important strategy for Australia to adopt because it will make our product saleable overseas in league with the newly developed technology. Would you comment on that and perhaps place it into your opinion of what this current government is doing in relation to improving the reduction of our greenhouse gases.

Mr Teske—The carbon sequestration took off also with the public because it sounds good. It sounds like okay, we don't have to change anything, we just get the CO_2 out of that and then it is fine. The problem is that it will make coal significantly more expensive from the economic side. We see in the survey—and that is not just an estimation from our study but we have evidence for a number of different regions where it is already happening—that renewables are almost competitive right now with coal. If we have a normal coal power plant and we add another part of equipment which will cost some money and which will consume a bit more coal because it will lose efficiency, then this equipment will be more expensive than renewables. On the economic side, the big question mark is whether this will take off. Also, if you want to export this technology the problem is that, especially in highly populated areas like in Europe or the US, there is hardly any space and you need quite a bit of infrastructure for that. It is a matter of principle that nuclear has the problem that they store waste somewhere and just hand over the problem for the next 100 generations. We are doing the same with CO_2.

Mr HAASE—It is a bit under two per cent of mass these days with G4.

Ms Fitzpatrick—The other part of CCS is that the time frames the scientists are telling us where we need to have our emission reductions are the time frames where the industry itself is saying that it is going to take them that long to actually get this technology, if it works, up to speed, so we have 10 to 15 years. If we spend 10 to 15 years seeing if this technology works—if industry wants to do that they can go ahead and do it. But really the focus, as the global energy scenario says, should be on energy efficiency, proven renewables, proven efficient use of fossil fuels, which is really where the focus needs to be if we are actually going to avoid the climate impacts that are projected for Australia and other parts of the world.

Mr Teske—Even if it is possible to build one or two or let us say 10 projects, there are so many new coal powered plants under construction or in planning that it will make just a very small percentage of the overall thing. China has built 170,000 megawatts of new coal just in the last two years. Even if there are one or two successful projects, it will not make anything in terms of climate protection, and that is the problem. Firstly, it is probably too expensive. It is certainly too slow because they cannot come up to speed. I just heard that there was a project in

Queensland and it was cancelled. We have the same in Europe, that there are projects first announced and then nothing.

Ms Fitzpatrick—It would be nice to believe that we could keep burning coal, the primary cause of climate change, and stop climate change, but the evidence is really against us. The challenge for governments is to ask how we do move away from coal in a way that protects Australia's economy, in a way that protects livelihoods and in a way that has just transitions for coal communities. We are fooling ourselves if we think that we can continue.

Mr ADAMS—But we have to have baseload and we just do not have baseload alternatives at this stage. I have seen the scenarios, but we still do not have baseload. There is no baseload outside what we have. How fast can you get wind power? Wind power is never going to be baseload; it will have to be mixed with other things. We cannot get biomass in Australia. We are doing a lot with solar. There is a major plan in Victoria which is about 120 megawatts, I think, but that is the biggest. There are the rocks out in the Cooper Basin in South Australia, but it is all about baseload.

Mr Teske—No, it is not. We see that this baseload problem sometimes appeared because of the structure of the generation. I will give you a specific example. When the nuclear industry introduced nuclear power plants in Europe they introduced an electrical heating system because they could not get rid of the electricity at night, so they created artificially a higher demand on baseload because that was their kind of technology. Again, when we have efficient energy use, the structure of the energy use will be different as well. It is about standby, it is about servers, it is about a lot of applications where you can reduce baseload. The combination of different renewables can provide baseload. I just have to say again that geothermal and others can already provide baseload. I think it is a two-step approach. One is to try to bring down the baseload demand with energy efficiency, which is possible;, and, secondly, to combine different renewable energy sources in a way that it could provide baseload. And baseload renewables itself can be accelerated also in Australia.

Mr HAASE—You showed a slide that talked about the necessity for US and Australia and Europe to substantially reduce their per capita consumption. On the same slide you showed the fact that China, India and Africa have very low per capita consumption at this stage. If you are looking for an overall global reduction, and the fact is that those areas that are underdeveloped now have the greatest slice of the world's population, how do you equate that reality and the sophistication in years to come with your projections about overall reduction?

Mr Teske—If we take a closer look at the per capita emission, we actually try to get equity globally for each person. We did not achieve that. We still have, in 2050, the emission of a US citizen still four to five times higher than per capital emission of a Chinese in 2050.

Mr HAASE—But how about in 2100, when all of the Indian, all of the Chinese and all of the African population are achieving the living standard that they aspire to, and our Western world per capita consumption.

Mr Teske—We ended research in 2050 because we know that 2050 is already quite a long time frame, and 2100, who knows, but probably we will then have more renewables. I do not know. I cannot comment on 2100. But what is clear is that we need to realise that, for the

developing countries and developed countries, the per capita emission should come at least close to each other, and we did not achieve that with this scenario. We still have a higher emission per person in OECD countries than in developing countries. What can I say; 2100 was not part of the survey.

Mr HAASE—I am simply projecting a figure. By the time Asia, India and Africa have achieved the standard of living that we enjoy and they quite naturally aspire to. I can see that on a graph tending to destroy the assertions about the ability to—

Mr ADAMS—They will live more simply; they will not exploit the planet as the West has.

Mr HAASE—I think that is almost a racist comment.

Ms Fitzpatrick—I think the point is that we realise it is challenging. There are a lot of challenges ahead if we are to significantly reduce greenhouse gas emissions by 2050. But what we found heartening from the scenario using the German Aerospace Institute, their understanding of economies, their understanding of energy, is that it looks like it is possible. What is missing in Australia and some other parts of the world is the policy framework that can move us to the deep cuts in energy efficiency and the transition to renewables. This scenario really just says that it is actually possible, and now it is really how it gets implemented on the ground: what does it look like and what policy frameworks do you need to actually make that happen?

Mr Teske—Also, we did not say that you have to switch off all coal power plants next month. It is a development pathway, and that is a very important thing. We can argue if the share of solar in 2050 will be five or seven per cent or 10 per cent. That is not the point. The point is how can we actually accelerate that industry and get into this pathway, because it takes a while to implement technology. My experience is that it takes about one generation to implement it. That is basically the message. The message is that we have to start now in order to have a substantial share in 30 to 40 years. Every decision we take right now will affect our kids until they get to the age of 50 or 60. I have just a very specific example: my son is eight years old. If a coal powered plant decision is taken now, the coal powered plant will be on the grid when he is 12 to 13, and it will run 40 years. He will be 53 when it goes off the grid. So this is the decision, and this is our message.

CHAIR—We are just about out of time. I want to thank you for appearing. If the committee has any further questions we will get back to Catherine at Greenpeace Asia Pacific. Thank you.

Ms Fitzpatrick—Thank you for the robust discussion.

Mr Teske—I just want to point out that in these maps we basically showed the area needed; for example, if we do all this solar stuff, in our scenario we need this amount of area globally. This is very important because what I wanted to show with this map is that we are not going to cover the planet with solar panels in order to achieve that.

Mr HAASE—That was my next question.

Mr Teske—This square means that this is the amount of area needed for this global scenario. That is for solar and that is for wind. This square shows the area needed for a specific part of the world.

CHAIR—Is it the wish of the committee that the presentation *Energy Revolution: A Sustainable World Energy Outlook* by Greenpeace be received as evidence for the committee's inquiry and authorised for publication? There being no objection, it is so ordered.

Resolved (on motion by **Mr Haase**):

That the committee authorises publication of the evidence given before it at public hearing this day.

Committee adjourned at 12.59 pm