

REPORT OF PROCEEDINGS BEFORE

PUBLIC ACCOUNTS COMMITTEE

**INQUIRY INTO THE ECONOMICS OF ENERGY
GENERATION**

At Sydney on Monday 26 March 2012

The Committee met at 9.15 a.m.

PRESENT

Mr J. R. O'Dea (Chair)

Dr G. Lee (Deputy Chair)

Mr B. E. Bassett

Mr M. J. Daley

Mr J. D. Williams

CHAIR: Thank you for attending the public hearing of the Public Accounts Committee on the economics of energy generation. The Committee's inquiry is examining the mix of energy sources used in New South Wales, comparisons with other jurisdictions and the potential for alternative forms of energy generation. Today the Committee will be hearing from key stakeholders in the energy industry in New South Wales, including the Department of Trade and Investment, Regional Infrastructure and Services, the Australian Energy Market Operator, TRUenergy, the Australian Coal Association, the New South Wales Minerals Council, the Energy Supply Association of Australia, the Clean Energy Council, TransGrid and Infigen Energy.

I declare the hearing open. In opening the hearing, I remind everyone to switch off their mobile phones as they can interfere with the Hansard recording equipment. I note that there is an apology from Mr Richard Torbay. I welcome our first witnesses, Mr Mark Duffy and Mr Andrew Lewis, from the Department of Trade and Investment, Regional Infrastructure and Services, Resources and Energy. Thank you for appearing before the Public Accounts Committee today.

MARK MARTIN DUFFY, Deputy Director General, Resources and Energy, Department of Trade and Investment, Regional Infrastructure and Services, sworn and examined, and

ANDREW JOSEPH BRUCE LEWIS, Executive Director Energy, Department of Trade and Investment, Regional Infrastructure and Services, affirmed and examined:

Mr LEWIS: Energy supply, security and generation are part of my responsibilities in the department.

CHAIR: Thank you. Do you have any questions concerning the procedural information sent to you in relation to witnesses and the hearing process?

Mr DUFFY: No.

CHAIR: Would either or both of you like to make a brief opening statement?

Mr DUFFY: I am happy to make a few opening general observations. We thank you for the invitation to be here. We would indicate that this is a very complex area that you are going into and we would like to suggest that if we, in the conversation today, get a better sense of some of the things you are looking for, we will go away and generate some more data that supports or helps you to focus on the areas in more detail. Energy policy is very complex. You will hear from various witnesses today that you are intending to take information from that depending on where you sit in the sector will give you various weighting on certain views. Retailers have a certain view about the amount of generation that they would prefer to be available. Regulators have various views about whether networks are pulling the wool over their eyes. There is a whole lot of grey that I do not envy your task of trying to sort through. If we can help you with some of the fundamental questions, or at least if you can indicate to us how we can help you to provide some further material that is useful to your exercise, we are very happy to do so.

CHAIR: I can confirm that from my perspective there is an element of grey. If you can help prevent that from becoming a fog then that would be very useful. I note that the Committee has not as yet received a submission from your department but anticipates it will be receiving something. I take it from your comments that you might be holding off on that pending some of today's discussions so that you can provide further information in useful areas. I do emphasise that we are looking forward to receiving a submission. I thank you for your flexibility as well as your willingness to answer other questions that may not necessarily be addressed today or through your submission.

Mr DUFFY: Yes, and I can confirm that we have prepared a submission and we do complete that submission by inviting the Committee to come back to us for further detail or clarification if we can assist, and that will arrive imminently.

CHAIR: How do you think the State Government can ensure long-term energy security in New South Wales?

Mr DUFFY: The New South Wales Government along with the others States—really starting under Paul Keating—developed a national energy market. You would have to congratulate the States for doing this work essentially on their own—the Commonwealth has come in later in the piece and claimed ownership and architectural royalties for it but effectively it was the States that did this. It is a fantastic piece of work, policy and practically, to tie the mainland States and Tasmania together, given that they have different fuel sources and technologies, and to be able to access all of those generators at various times of the day, given the various weather patterns and demand patterns across the eastern seaboard. It is a remarkably well-operating system; it does not mean it is perfect or that it does not have problems. Tying ourselves into the national market is one of the best ways of guaranteeing our security because we have interconnections of significance between Victoria and Queensland so that we are sharing the spare, if you like. We do not all have to carry three spare tyres in the boot; we are sharing the spares across the network. Really that was one of the drivers of it.

In a number of States, New South Wales in particular, had a large amount of surplus generation capacity when this discussion started and this provided a way of running down some of that excess surplus, providing some return on that surplus; avoiding investment in capacity when you already had capacity available. From my point of view, watching the evolution since the mid-1990s when I arrived on the energy scene, it has been a tremendous success for the States. I think it is that deepening of New South Wales access to other States

they gives you that level of security. Very rarely will you have a weather event in Queensland, New South Wales and Victoria of such enormity that the system is going to be stressed across the three States—that has happened maybe once or twice—but it is a very rare occurrence that the weather patterns and demand patterns are such that any jurisdiction is stressed.

The first part of the answer as to how we provide security is that we have already designed ourselves into a system where we are between two other large States. We have capacity ample to move electricity between those three States, and we have capacity to expand the transition system between the States if that is required and it can be demonstrated that that is an economic investment to make. The second area of security is about fuel. Obviously we have an enormous amount of coal in New South Wales and coal is not the issue. But the impact on the pricing mechanism that carbon tax seeks to engender and the renewable energy schemes do create a challenge for our security because we do not have domestic gas in significant quantities. The gas debate again has many facets but just focussing on the energy sector, in a general sense, the renewable policies will bring forward investment in wind, primarily wind, and wind is subject to weather.

So in order to rely on that capacity—and remember that the renewable energy target requires 20 per cent renewable resources in the mix by 2020—of wind we have to have available peaking power for when the wind drops, otherwise our system becomes unstable. That means we need a lot more gas. The carbon tax, if it is effective, will discourage investment in coal and encourage investment in gas. We need gas for that. We need gas for our existing peaking plants. I am sure this Committee has heard the numbers before, but we supply about 6 per cent of gas that is consumed in New South Wales from New South Wales. So we are relying on the other States for supply. You have probably also been informed that there is a significant demand for export gas, which means possibly they have signed more contracts than they have had in the pipeline or there is a real challenge to the domestic supply as a result of this export demand.

We have 6 per cent supply at the moment. We have about one million households relying on gas for their hot water and their cooking and heating. So depending on how many people you count in a household, there are well over two million people in New South Wales who are relying on gas for their water and their cooking and some part of their heating. So there is a challenge for us, and I think the challenge goes back to how our policy generates domestic supply of gas or stable imported gas into New South Wales to underpin the growth that we are likely to see in the use of gas both as a base load generator and also to underpin the renewables, particularly of wind generators. So we are plugged into the existing supply. That is good. Going forward under renewable energy and carbon taxes, the focus will be on increased gas and that is our challenge.

CHAIR: For the purpose of clarification, why do you draw a distinction between gas, in terms of the link between Victoria and Queensland—I note you do not include South Australia in that analysis but you would not include South Australia in that link—

Mr DUFFY: The States have links to themselves. Tasmania is linked up to Victoria, South Australia has a link into Victoria. So electricity rolls around.

CHAIR: Sure, but you see Victoria and Queensland obviously as the main links.

Mr DUFFY: They are the primary links, if you like.

CHAIR: But why would you not see the gas supplied in those jurisdictions as able to supplement New South Wales' needs in the same way that the first part of your response suggested?

Mr DUFFY: I will just make some general comments and I will let Mr Lewis pick up on this because it is part of his expertise, particularly with pipelines. Like all these things, ultimately New South Wales will tend—and I think that is the story about the electricity market—to draw supply, if it is available, from the lowest cost source. So this State has not produced an energy sector on a States' rights basis or on the basis of we want to produce everything we consume. We have looked at the most economic supply of energy because that is good for industry and households, and that is another part of the logic of the national market. The answer in simple terms is if the gas is available for sale to New South Wales and if the pipeline and transport capacity is there, then you would argue that you would take that into account when you are framing your policies and the other investors in New South Wales or potential investors in New South Wales will also take that into account when they are framing their investment decisions.

What I am concerned about at the moment is that the export demand and the production—there is already a gap opening up there and I am looking at New South Wales domestically and I am thinking that we have resources in the ground and it probably would not be a bad investment in security to make sure that we get some of it available to the market. So I suppose the answer is that you would want to have as many sources as are available to you, and I expect that physical delivery is an issue that we will need to look at and also contractual capacity to supply. But I will let Mr Lewis speak about that.

CHAIR: Perhaps I will narrow my question if it was not clear enough. The security issue on gas—

Mr DUFFY: Yes.

CHAIR: Is it security competing with exports or is it also security competing with other States to the extent that that eastern seaboard market may not be totally free and open to all potential demand points? For example, I understand that the gas reserves in the Cooper Basin in South Australia and also in Victoria are closer to peaking. Is it realistic for New South Wales to depend on their gas for interstate supply for about 94 per cent of our needs when those States may themselves be falling short because of export demands—

Mr DUFFY: And domestic consumption.

CHAIR: —and domestic consumption. Do we have equal access on a market competitive basis to other States' gas? That is I suppose my question, as much as the pressure from export markets and having to meet prices there.

Mr DUFFY: Again, I will let Mr Lewis pick that up in detail, except to remind you all that I think about four years ago we had brownouts in the gas supply, which was not unrelated to events in the other States as well. So I think the answer is those pipes are pretty full, one of them is pretty old, and the supply itself is peaking. I think you have asked a good question, and I think that is one of the reasons why I am focussing domestically as well to say, "Why wouldn't you cover your bets and make sure that you have some domestic supply as well?" because those other stresses are already built into the system. I will let Mr Lewis pick it up in detail.

Mr LEWIS: I think you have summarised in a nutshell that traditionally the sources of gas supply have been from Victoria, the Bass Strait and South Australia, the Cooper Basin, and they have been so for several decades now. As you would expect, those supplies are starting to peak, and looking forward to projections—I am sure AEMO, when they come in later today, will be able to give you more data around this—but those sources are expected to decline in their ability to meet the future demand for gas, which Mr Duffy has covered, from new gas-fired generation, increased household consumption as people are looking to gas as a fuel source, et cetera. So the focus is looking at where the new reserves of gas are. Queensland is probably where there is a fairly significant industry already developing in terms of coal seam methane and New South Wales has potential reserves that can supply our needs as well as other needs for a considerable amount of time. But at this point in time those reserves are only supplying about 6 per cent, so the industry both in Queensland and New South Wales will need to be developed, the gas will need to come out of the ground to be able to go to the markets.

AEMO are looking at some of their forward projections, particularly through their gas statement of opportunities, which looks forward about 20 years, is focussing on a fundamental shift from being a traditional Victoria, South Australia, south to north delivery, to things changing and being a Queensland and New South Wales delivering north to south. So potentially what we may find is that Queensland and New South Wales gas will end up maybe being exported to Victoria and South Australia as well to help meet two things: one, the decline in their offshore reserves and onshore reserves from the Cooper Basin and also any sort of increased gas demand from things like more gas-fired generation being installed in those jurisdictions. There are a couple of things that probably need to be put in place before that can occur. For instance, at the moment there is no pipeline allowing significant quantities of gas from Queensland to come into New South Wales, let alone to continue the journey south. So there is some infrastructure, whether it is actually developing the physical gas reserves or developing the pipelines that will enable that gas to flow to future demand sources that will need to be developed.

To answer the first question that you asked, to expand on what Mr Duffy has already provided, I think part of the role of the New South Wales Government is to support both the national frameworks and the domestic policy settings that encourage and support that investment to come from the private sector to ensure that there is minimal regulatory burdens, the appropriate regulatory regimes in place and to facilitate the

investment that we are aware of, that there is interest in investing in these assets, and we allow the market to determine when those investments will be made. So the role of Government is to facilitate and ensure that that investment comes in a timely and effective fashion.

CHAIR: Having heard you say perhaps that the gas supply lines or the pipelines from Queensland to New South Wales are not what they should be and conscious of the limited New South Wales gas that is currently supplied—and I have forgotten who the provider is but I know there is gas sourced around Gunnedah at the moment heading up to Queensland and there are further potential supplies; the only committed significant supply through Metgasco at the moment is that they are talking about going to Queensland or New South Wales. If we are going to promote gas in New South Wales how important is it to have that gas flowing to New South Wales rather than to Queensland, given the constraints you have identified in terms of pipeline, of production then flowing from Queensland back to New South Wales? That is obviously relevant to the issue of security.

Mr LEWIS: As Mark has outlined, the main driver of future gas demand increases is primarily going to be generation and you really have two infrastructure options. If you have a gas field, you can either build a generator next to the gas field and build electricity transmission lines to get it to the market where the electricity demand is or you can build a gas pipeline and have a generator closer to the main load, so there are two options to capitalise on the gas reserves. I do not necessarily see that there is detrimental competition between different demands for gas. LNG export is one that is in the news at the moment and that has certain demands but from what I understand of both the Queensland and the New South Wales reserves there is more than enough gas potentially available to supply new emerging markets, LNG export, increased gas-fired generation as well as the increasing demands of the traditional domestic manufacturing, industrial and household sectors. So there is enough gas there; the challenge is about ensuring the infrastructure is there to make sure that the various demands can be met and that those solutions are ones that are affordable.

CHAIR: I am sorry to labour this initial area of questioning, but it may not be necessary for us to have those gas pipelines if we just rely on the electricity being generated and transmitted from Queensland even in a peak sense?

Mr LEWIS: Yes, that is one solution but from a State development perspective we would obviously like to see the reserves that are available in New South Wales developed.

CHAIR: That is totally understandable but it is not an issue of energy security?

Mr LEWIS: It does not need to be, but it is a matter that often it comes down to what is the cheapest most affordable option. There is currently debate about whether you build a transmission line, electricity line or gas transmission pipeline as to which one is the more economical investment but certainly from our department's perspective we are keen to see the domestic reserves developed in an appropriate and timely fashion because it will be of benefit to our State economy in a number of ways, not only by ensuring a reliable future supply but also from the other benefits that accrue from development of new industries such as coal seam methane.

CHAIR: I absolutely understand that perspective. If we look at the transmission of electricity, if it were transmitted, for example, from Queensland to New South Wales using gas or other fuel sources, how would you describe the current state of the network you have talked about and the need to invest in that network in the foreseeable future?

Mr DUFFY: Are you talking about the electricity transmission network?

CHAIR: Yes.

Mr DUFFY: I will let Andrew go into more detail but I think there is debate within the energy community about the method of working out options for expanding transmission. One of the things though that we should be concerned with in a general sense is that just because there are times when there is a little bit of congestion does not mean you would seek to build that congestion out because one of the cost drivers in energy at the moment is we are spending, particularly in the networks, a very large amount of money across the country in networks to cater for very short periods of time in peak circumstances—someone suggests there is about 20 per cent of infrastructure in South Australia, for instance, that is being used for 23 hours a year. Whether that is accurate or not, I am not attesting to, but that gives you some sense of the cost of infrastructure that is required

to maintain security of supply during those peak periods which obviously if you had mild summers and winters can be very rare events.

The same applies to transmission. You do not want to build out occasional congestion because the cost of that is enormous. I think the general question you would put to other parties who come here today is to say to them: can you identify any areas or capacity in the transmission network that you think are currently undercooked or we need further investment because it is not fair to me that the transmission system in the broad is screaming for new investments. They are expensive, they are complex, they have environmental impacts obviously if you are laying large towers across people's landscape and you do not want to invest in them unless the system is clearly asking for you to do so.

From that point of view whatever regulatory mechanism used to evaluate transmission proposals, there will be debates about which one is more or less efficient, but I do not think there is a lot of evidence to say that New South Wales is undercooked in the transmission side of business but I will let Andrew pick up on that as well.

Mr LEWIS: I do not have much more to add to what Mark said, but going back to some of Mark's earlier comments around the national market, transmission is regulated through national rules and so potentially part of the role that New South Wales can play is that if industry are aware of some of those concerns we would like to know of them. That is where New South Wales could support development in that area, by ensuring that the process for building new transmission is not overly burdensome and those investments can come on in a timely fashion through seeking to influence the national process and seek rule changes if that is appropriate and work with our jurisdictional colleagues to change those frameworks. The national market is a bit over 15 years old but it is always developing and evolving and rules that were set up 15 years ago are not necessarily appropriate at this point in time and we need to change and there are clear processes around that occurring.

Dr GEOFF LEE: Where do you see the major sources of electricity over the next 20 years, barring any legislative changes in terms of one of the key drivers of renewable and changes that the Parliament legislates? In the ideal circumstances to keep electricity prices down, what do you see as the major sources over the next 20 years?

Mr DUFFY: You can keep the price of electricity down?

Dr GEOFF LEE: Absolutely, yes.

Mr DUFFY: Again I will let Andrew go into more detail, but I think this is one of those grey areas that if you apply your economics 101 and say we are going to have a carbon tax and renewable energy targets, then you can predict that we will move away from coal and move towards renewables. The issue of price relativity will come into this. We obviously have abundant coal, and we just talked about price pressure potentially on gas from the export boom. You could see a world where the price of gas will go up significantly and even with a carbon tax we may still find ourselves using a lot of coal. The relativity will definitely change; if the renewable energy target is held into place until 2020 the relativities will change.

By definition it will be a legal requirement to have 20 per cent renewables in your mix but beyond that point what the relative changes have to do with relative prices in a carbon tax is only one of those price influences, so I think the thing to watch here will be what happens with gas prices because if the gas prices become significantly higher than even we are predicting that they may—there is general conversation about where gas prices are heading—it makes the renewable energy target that much more expensive because the cost of renewable energy is partly going to be a function of the buffer cost, if you like, of having gas coming into play when the renewables are not operating so that is going to be part of the price mix.

I think it is fair to say that the predictions currently before us are that we probably will not be building any new coal-fired capacity in New South Wales in the next decade or 15 years, but that will be subject to these sorts of price events happening. Presumably because a renewable energy target is a policy, if the effect of that policy is significant—and electricity prices are obviously resonating around the community and in other corridors—who knows how future governments will deal with future renewable energy policy? Some people argue that if a carbon tax is operating, whatever you think of the rights or wrongs of it, that is enough in itself over time to provide the signal that allows you to withdraw from some of those renewable policies.

In other words, that is a dominating relative price signal as time goes by and once that is in place the State does not have to pick winners. It can allow the carbon price to identify the lowest and most cost-efficient forms of carbon abatement and the market will deal with it. That is an argument that resonates with many people observing this because that is the whole interface of trying to reduce carbon output at the least price, which is what New South Wales sought to do in a way with the Greenhouse Gas Reduction Scheme [GGAS] scheme, which basically sought to find the lowest cost of abatement rather than just determining a certain fuel outcome, that is, a renewable energy target. The likely summary is that it is hard to see new base-load coal capacity being built in New South Wales in the next 15 years but all of this hinges on much more than the carbon price; it also hinges on the cost of gas.

Dr GEOFF LEE: Economically, coal is the cheapest way to go and it is just our artificial legislation, our targets and our carbon tax and the pressures on gas prices—

Mr DUFFY: Our presentation will give you some tables that show you the cost drivers and the likely cost drivers over time so you will be able to see the range of costs. I will not go into it now because it will be in front of you in a few days. Basically the answer is yes, coal is the cheapest fuel source and obviously in New South Wales we have a huge supply of good quality coal, so we are not challenged on the fuel supply side there.

Dr GEOFF LEE: How can we as a State Government encourage greater competition within the market?

Mr DUFFY: Entering into the national market was the first step because we now have unconstrained supply—unconstrained in any policy sense—from the other States. The second issue is the sale of the generators and obviously the sale of retail has created a situation now where the Government provides the transmission and distribution infrastructure—in a sense the natural monopoly aspects of the market are supplied by government-owned entities—and the competitive side of the market is going to be supplied by the private sector. The most important thing on the generation side has been the argument about how private investors invest in a market where the Government is the dominant player, because governments can make decisions that are not driven by economic or financial criteria. The Government has now determined it will look at the ownership of the remaining generation, so combined with that and the retail you have the competitive sides of the business in the private sector and the Government is not seeking to regulate the generation market in any way. There is a national market that is clearing day in, day out. Yes, we still have regulatory oversight on the retail price but that is very much informed by and flexible to what is going on in the wholesale market.

Let us make sure that we do nothing to impede the movement towards the private sector being able to operate within what is not a free market but a highly human-designed market, because this is not tomatoes or watermelons; this is a very lumpy sort of product, but it is also fundamental to households and I think the community is only going to support a market approach to utilities of any description if they continue to see that they provide both security of supply and prices that are consistent with long-term delivery rather than gouging or things that you might see or accuse of happening in markets.

Dr GEOFF LEE: Are you saying the answer to encouraging competition is to ensure we put the least regulation or framework about the generators and the retailers?

Mr DUFFY: The generators will have to do the same as everyone else. New generation proposals will have to go through a planning system and that planning system has been subject to a lot of conversation in the last nine months or so. The Government has owned development sites and they have advantages: they are near transmission and they are often near fuel supplies and all the rest of it, and the Government is also selling those sites. I understand the policy sees the rest of those development sites going out to the private sector. The answer is, firstly, yes we should be putting nothing in the way of sensible development. Obviously any environmental or planning policies should be consistent and applied even-handedly to the private sector. Secondly, the Government needs to signal very strongly to the private sector that it is out of the business and that the next spaces available for generation investment are solely to be filled by the private sector, not by the public sector.

Mr MICHAEL DALEY: Let us assume that, for whatever reason, in the medium term coal is still a significant player in electricity generation in New South Wales and one of the mechanisms available to government, given that all coal reserves are held in the Crown right, is to be able to develop as yet undeveloped coal sources and sell them cheaply to generators so they do not have to compete on the export market for the price of coal. Do you think there is a role for government to do that or would that just lead to a distortion in the

market? I know that the citizens of New South Wales would probably appreciate any assistance the Government could give them.

Mr DUFFY: The first thing we ought to do, consistent with our commitments going into the national market and the ethos of it, is to provide the private sector with fair rules, to trade fairly and not get into policies that somehow favour a particular region over another because to start in that direction risks the cooperative approach to the whole thing. What we as a jurisdiction are trying to do—you will see this in the material we are providing to you; we have ample capacity to provide the whole State with electricity almost all the time but we choose not to because it is cheaper for us to buy electricity when it is cheaper on the other side. We have quite a bit of unused capacity on a day-to-day basis. We could say for various reasons, for regional development or whatever, that we will put up the barriers and provide all this ourselves. I think what the Government should do before it worries about assistance is look at the planning system and the information system in relation to coal and recognise that you have a private sector with some very experienced coalminers out there. There are many ways to approach coalmines. You may seek to establish a whole new mine or you may seek—some generators have done this—to go back to a whole range of mines and look at sources that have not been fully mined out. I will not say it is a scavenger approach but basically they are providing a much broader range of supply of coal to their generators.

The real issue for me would be to say that once the generators are sold and the private sector is making determinations on fuel sources I would want to listen to them and let them tell the Government what is the constraint on their access to the cheapest fuel available rather than assume that the State should be intervening. It may be you are pursuing something that does not need to be pursued because our planning system is such and our information system is such. That is pretty important. Knowing what resources we have and where they are is part of the other side of our business, which is the resources branch being able to provide the private sector with information about where our resources are and their quality—

Mr MICHAEL DALEY: Are we doing that?

Mr DUFFY: Yes, we are providing a lot of information. I meet with interests who are looking at the coal question. We can identify where else they can go to if they have not been able to draw off the public resource. Can we do it better? Probably and I think there is definitely an argument that we can vamp up our information technology, our website and all the rest of it. We have a large amount of basic information about where our resources are. I guess in summary I would say let us not rule out the possibility that the Government can do more to assist the market generally and to put downward pressure on fuel sources. There is a real issue about coal at a certain standard which is not at export quality—in a sense it has a natural home for the generators here. Now that is not immutable. As costs of coal rise, the purchasers you said would not necessarily import that or they may start looking twice at even lower quality coal but within a certain range of price there is coal that is basically not going to be exported. It is not just a price but it is also the cost of getting into a port. In a sense you have got some fuel that is locked up and State focussed because it is too expensive to get to the port, given the current prices of coal, so it is not going to be exported and we know where that is.

Mr MICHAEL DALEY: I have other questions but I can ask them of other parties, given the time.

Mr JONATHAN O'DEA: You can ask one quick one and then I will invite Mr Williams and Mr Bassett to ask some questions. We will leave you with some questions we foreshadow on notice, if that is okay?

Mr DUFFY: Absolutely.

Mr MICHAEL DALEY: I have a quick question that might not be in your ballpark but it is one I intend to ask all parties today. The committee has received some very good submissions. One submission calls for an end to retail price regulation in New South Wales. Do you have any comment on that? What might happen to the retail price of electricity if that occurred?

Mr DUFFY: If you ask this question of the retailers who are operating in Victoria they will give us some insight. The first thing to note is that from a political point of view whereabouts you do that—and you have got commitments now on sale of retailers and all the rest of it and I will not go into that—if you deregulate prices in my view two very important things happen for the Government. One of them is that the private sector is responsible for electricity prices rather than the Government. No-one has been more articulate in my ear in the past 10 years than Mr Batchelor, former Minister for Energy and Resources in Victoria, who loved the fact that

finally the Government could go and kick these businesses, because they did not own them, and they become truly the consumer's friend.

You are the consumers friend because you are unconstrained in the way that it is not regulatory framework that has generated the prices, and it is not your ownership and dividend strategy that has generated the prices, it is the private sector that you have allowed a social licence to provide an essential service which is a utility, and if they do not operate you can go and kick them in the head, basically. Batchelor used to entertain all the other Ministers about how great it was to be a Minister for Energy and Resources in Victoria and actually be able to give the retailers some biff. All the other States were saying "Wouldn't it be great if we had that?" I think that from a political point of view, removing your political ownership of the regulation of electricity prices, allows you to become the consumers' friend. I think that is really important for the Government. You are the umpire.

Mr MICHAEL DALEY: What would it do to prices?

Mr DUFFY: The answer is, I would say, if competition is effective, and that is what will be determined for you because the AEMC is looking at that issue, and it looked at it in Victoria, if you are satisfied that competition is effective then the answer would be that the price would be roughly the same or a little bit better than they are now for consumers. If they are not effective, whilst they become ineffective you do not give up your constitutional right. In the same way as I was saying about the generation you do not want to signal to the private sector that you are going to jump back in, but if it gets untenable then you do not give up your constitutional right to come back in there. That is another threat that retailers have over them.

From my personal point of view you have come this far: we have demonstrated over the year that generators can operate in peak—and if you look at the wholesale price in electricity, on the generation side, it is pretty flat, or even falling, I think there have been some good stories in the past week or two on that. If you go to Victoria where competition has been found to be effective—I think the Victorians will tell you—yes, prices go up when events happen. So when we go into a world where the carbon tax will flow through and where network expansions are impacting on the retail price, yes they will flow through, but they will flow through the regulator as well. I mean, you will see this in July in New South Wales. The networks have to be paid for and that comes through the retail price. But do I think that with effective competition the retail prices will be better than otherwise, yes, certainly not significantly worse. But the Government is in a much better position to be far more aggressive and even handed about its approach to the electricity market.

Mr MICHAEL DALEY: Imagine telling Chris Hartcher to be more aggressive.

Mr DUFFY: Could I just say, that is a personal view? Obviously I am not speaking on behalf of the Minister or the Government: that is my observation of the question you have asked me theoretically.

Mr JOHN WILLIAMS: The committee has discussed the historical position for the Government to take. It is now embarking on a privatisation mission which should see electricity generation privatised in New South Wales. Security is not something they are really concerned about. They are there to generate electricity and sell it at a profit. It may even be the fact that if it is a national generator they might even move out of New South Wales where they are generating and import it. But these are all decisions that will be made by the private sector. It will no longer be a decision of the Government but security still becomes an aspect so how do you see the Government's role in the future to ensure that the interests of private entities do not get confused with security that is so essential to us as a Government?

Mr DUFFY: I think that is a really good question. I think that it allows me to go back to the point that the market is not simply where you can walk in and out when you feel like it, but the market is highly regulated. You do not have a right to withdraw your supply. There is all sorts of focus on behaviour, even management of maintenance issues, if they look suspicious then the national bodies will intervene and ask questions. You have got responsibilities in this market, and you have identified them. Basically if the Government is to hand over to the private sector an essential utility function it has to do so with a high degree of confidence that the market is not aimed that operators are not just operating from a private profit point of view.

Aside from other economic reasons someone is unlikely to spend money on a generator here and then turn around and import because, going back to the discussion about the transmission system, you would not buy here. The point really is they are driven by their own economics, and secondly they are driven by a regulatory framework that is actually designed to keep the lights on everywhere at all times, and has so far done so. There

is no evidence in the national market, I would argue, that there are isolated regional events when there is some supply constraint, but overall I think the argument is that the system has been distributing electricity and pricing it and sending signals about investment and those other things has been a remarkable success.

From watching this for the past 15 years or so I am not worried so much about that but I think the issues for us to concentrate on are the issues in relation to the policy changes—so it goes back to government policy changes—and carbon price, in particular, will stress the market. The Commonwealth and the State Ministers are alive to this and they are setting up a lot of processes to identify stress points and manage them through. So a lot is going on in the regulatory oversight and new bodies being brought in to look at the de-stressing of the implementation of the carbon tax. It is a policy issue at the Commonwealth level that is going to generate potential shocks or stress but the States and the Commonwealth are working together to find ways to minimise that. I think New South Wales is probably likely to be marginally less stressed than the other places because although we do not get compensation from the Commonwealth scheme we impact on our generators, which is a significant issue for the Treasurer and for the State itself. The financial vulnerability of our business, I suspect, is slightly less of a problem than some of the other jurisdictions.

To summarise, I think the State will always have an interest in following the security of the electricity sector and in developing new policies as the market develops. I do not think the ownership of the generators makes it any less secure because they are doing it within a very tightly oversighted and professionally operated electricity market. Our issues relate to the policy frameworks for the development of investment in transmission and distribution and also ensuring the correct investment signals are there for the private sector in the generation market to decide where it should be, what sort of fuel it should be and when it should happen. We should be concerned with creating the regulatory framework to provide the best signals to the private sector.

Mr JOHN WILLIAMS: Surely it will be private enterprise that makes a choice whether it uses gas or renewable energy? This is not something we are going to give ourselves a headache about.

Mr DUFFY: No, but we must make sure that the framework in which they make those decisions is not corrupted. The information about the fuel source, the price of that fuel and all those other things must be consistent and not disturbed by policies at the State level. You are right, we do not have to make those decisions and that is the beauty of this. As the sector has moved from the government-dominated market towards the private market it has already been making those investment decisions. The private sector has already been making decisions about investment in gas peaking plant and that will continue. Ultimately we will see them make all those decisions.

Mr BART BASSETT: You have mentioned maintenance and not being confident about the ongoing price of gas. Has a comparison been done of the cost of maintaining gas pipelines as compared to transmission lines? You said that there is ongoing debate about the capital investment comparison.

Mr DUFFY: That is a fabulous question. Again, it requires a complex answer. We probably do not have much gas infrastructure to compare and contrast. It is not only an issue of the cost of the infrastructure; it is also relative to the fuel that it transports and the price of that fuel.

Mr LEWIS: I am not aware of a detailed analysis because it is very much site specific. Where the gas is, the distances travelled and so on will determine whether it is more economic to build generation close to the source and build electricity transmission lines or to build a transmission pipeline to get the gas to a different location, where the gas is, where the existing transmission network is, whether water is required or other things that are required for the operation of the generator. As Mr Duffy said, a number of development sites could be made available that have been identified by the government-owned generators. Some are close to existing pipelines and some are not, but they would require new pipeline developments. As we have said, it will be up to the private sector to determine what is the most cost-effective and economic approach and how they bring on new generation and gas supplies to meet future demand.

Mr BART BASSETT: Even if the private sector is going to roll it out, the maintenance is included in the price. If the private sector is making a decision about how to produce that electricity either onsite or offsite—pipeline or transmission—over 10 or 15 years the maintenance comparisons could be significant.

Mr LEWIS: I am happy to look into that a bit more and to provide more information. I am not aware whether that comparison has been done over that period.

CHAIR: Thank you for appearing before the Committee today. The Committee will send you some additional questions and your replies will form part of your evidence and will be made public. You have already indicated that you are happy to provide written replies to those questions. I will now read some questions quickly to get them on the record for your benefit and for the benefit of those reading the transcript. Are there any regulatory impediments to investment in new generation projects? Most reports on the levelised cost of electricity indicate that the cost of any type of new generation, including coal, is higher than the average wholesale spot price in New South Wales. Does this suggest that wholesale electricity prices in New South Wales are unsustainably low? Do you see a role for measures to manage demand more effectively? How can governments assist in managing demand? What do you think will be the impact of a carbon tax on electricity generation in New South Wales?

There are a number of different green energy schemes operating at the state and federal levels. Can you suggest any changes to New South Wales schemes that would make them more cost effective? In light of your earlier comments, should New South Wales be involved in any schemes? If so, which ones? Should the Federal Government rationalise its schemes given that we now have the overarching carbon tax regime and the 20 per cent renewables target? The submission from the National Generators Forum suggested that the New South Wales greenhouse gas reduction scheme was the least expensive scheme for emissions abatement in this State. Can you explain how the scheme works and comment on its status given the introduction of the Federal carbon price? In December last year the Federal Government released a draft energy white paper. Do you have any comments on the paper and how it may ultimately affect energy generation in New South Wales? What do you think are the most successful examples of emerging electricity generation projects? What are the externalities of energy generation and how can they be taken into account in planning energy policy? Sorry to bombard you at the last moment.

Mr DUFFY: Some of those issues are addressed in our draft paper. We would be happy to expand on the other questions that are not addressed. We look forward to getting the transcript, after which we may embellish or even correct some of our answers. I was looking for a broad indication of where the Committee wanted to go and we now have a much better focus. We will take that on board in our submission.

CHAIR: Thank you again. You will also be able to read the transcript of the rest of today's hearing, which may also provide further guidance.

(The witnesses withdrew)

DAVID GORDON SWIFT, Executive General Manager, Corporate Development, Australian Energy Market Operator, sworn and examined:

CHAIR: I note that Mr Swift has briefed the Committee on a previous occasion. Welcome back. Thank you for appearing before the Public Accounts Committee today to give evidence. Do you have any questions about the procedural information sent to you about witnesses and the hearing process?

Mr SWIFT: No, it is clear.

CHAIR: Would you like to make a brief opening statement?

Mr SWIFT: Thank you for asking me to speak this morning. In our brief submission to the Committee we outlined the roles and responsibilities of the Australian Energy Market Operator, which is an independent member-based organisation with ownership held 60 per cent by governments and 40 per cent by industry. I note in this context that the New South Wales Government and the major energy companies based in New South Wales are members and key stakeholders of the organisation. The Australian Energy Market Operator seeks to work in the long-term interests of consumers by ensuring that energy markets work efficiently and effectively and balance issues of price, quality, safety, reliability and security of supply.

Of particular relevance to this inquiry, the Australian Energy Market Operator [AEMO] operates the National Electricity Market [NEM]. New South Wales is a critical component of the National Electricity Market, both in terms of its role in supplying part of the national grid and being the largest region in the market in terms of customer sales, peak demand and generation output. The evidence suggests that the National Electricity Market has generally delivered competitive wholesale prices and driven efficiency in the generation sector here, particularly around the time of market start when there were dramatic improvements. The market provides a competitive dispatch process for today's suppliers and an open access regime that allows new generators to connect and supply where they see a customer need that they consider they can competitively meet. There has been significant entry of new generating plant in New South Wales and increases to the existing capacity here over the time that the market has been operating.

Another role of relevance to your inquiry is the Australian Energy Market Operator's role as a national player. The Australian Energy Market Operator produces a range of planning documents which are outlined in our submission. All those reports are publicly available and are provided to industry and policy makers to inform the market. The National Transmission Network Development Plan [NTNDP] published in December 2010 explores a wide range of scenarios to determine potential electricity transmission impacts of different generation outcomes. The scenarios are based on several drivers, the two most prominent being demand growth and carbon price. Based on the information from our planning, I will seek to address some of the key issues that I think might be relevant to your inquiry.

In relation to future generation mix, the Australian Energy Market Operator's analysis in 2010 indicated that the most likely forms of new generation entry during this decade are those powered by gas and wind. In respect of gas generation, I note that AEMO runs a number of gas markets including a short-term trading market in wholesale gas based in Sydney and a retail gas market for New South Wales. We also publish a wide range of gas planning information for the eastern and southern areas of Australia. The 2011 National Transmission Network Development Plan undertook some more detailed work, including a comparative analysis of energy transmission. This work showed that gas pipelines can be a very competitive form of energy transport compared to electricity transmission. The future role of gas and electricity will, of course, be an area of interest for the Committee.

The National Transmission Network Development Plan also looked at the potential impacts on the network of large-scale investment in wind generation and other renewable technologies. Australian Energy Market Operator modelling incorporates the Australian Government's national Large-scale Renewable Energy Target scheme, which does provide an additional source of revenue for renewable generators entering the market over and above that provided to fossil fuel generators. The 2010 National Transmission Network Development Plan indicated that provided there was at least some price on carbon the Large-scale Renewable Energy Target [LRET] should achieve all its objectives and our modelling indicates that up to 10 gigawatts of new renewable energy generation—predominantly wind—could connect in the National Electricity Market by 2030. The modelling suggests that in the first 10 years wind power is most likely to meet the target and in the second 10 years we see some emergence of newer technologies like geothermal and solar thermal.

For the 2011 National Transmission Network Development Plan, AEMO investigated world's best practice for wind integration to understand how well placed the National Electricity Market would be to accept some large amounts of wind and any changes that might be required. To date, wind generation has focused in other states in the national market; however, based on industry information, investors are increasingly focusing on New South Wales when developing new wind generation projects. This is consistent with the latest Australian Energy Market Operator modelling, which shows that New South Wales could become the region with the most generation capacity in the next 10 to 20 years. This is due in part to the better statistical correlation of wind generation in New South Wales with demand. Wind generation therefore also might be an area of interest to the Committee.

"Energy security" are two interesting words and I note that they were in the Committee's terms of reference. The Australian Energy Market Operator is responsible for energy security in the short-term sense of maintaining the stability and the resilience of the power system on a minute-by-minute basis. The National Electricity Market works on the principle of security constrained optimised dispatch, that is, the most economic dispatch of plant is used to supply customers at each point in time, subject to the imperative that we maintain the security of the system. However, in considering the long-term energy security in your terms of reference, I expect the Committee will need to define a different form of security from what we talk about and the particular situation with respect to New South Wales to be considered against those criteria.

In terms of interconnection, the mix of plant operating in the National Electricity Market at any particular time reflects the most efficient dispatch possible with the plant available, subject to the transfer capacity of the network. The National Transmission Network Development Plan considered the net benefits available from increasing interconnector capacity and showed that there are some benefits from that in the medium to longer term—none right now. In October 2011 TransGrid from New South Wales and Powerlink from Queensland jointly announced that they were studying a possible upgrade to the Queensland-New South Wales interconnector [QNI]. The announcement outlined an option which would increase the transfer capacity on QNI by about 25 per cent. I understand that analysis and consultation on the potential upgrade is continuing.

In relation to national forecasting, the need for generating plant cannot be considered in isolation of customer demand for energy. Electricity consumption patterns are showing significant change at the moment in response to own use generation, and particularly I guess the growth of small-scale photovoltaic generation, and to increases in energy price, which have had an impact on people's consumption and their patterns of consumption. Further increases in price are expected, including those relating to the Clean Energy Future plan, which will have more effect on customer load. The Australian Energy Market Operator has commenced a national forecasting project to ensure that these and other important drivers of demand are considered on a nationally consistent basis. Early information indicates that energy consumption is falling in the National Electricity Market and in New South Wales, while growth in peak demand has significantly slowed. This is expected to have a significant impact on the future need for additional generating plant, at least in the medium term. The Australian Energy Market Operator welcomes the opportunity to meet with the Committee and would be happy to provide future information from our planning and other data sources as required.

CHAIR: Can you comment on the suggestion that the vertical integration of retailers and generators may inhibit competition in the electricity market?

Mr SWIFT: The Australian Energy Market Operator is not responsible for competition matters in the market. Obviously the Australian Energy Regulator, which is a constituent part of the Australian Competition and Consumer Commission, has primary responsibility for competition, but we do see that the emergence of the larger gentailers has been a feature of Australian markets and has been, from what we see, a natural response to managing the risks and opportunities in the market. We note that there has still been strong growth in financial markets with futures trading increasing, so I guess the evidence is a bit mixed there in terms of whether that limits or does not limit competition in particular sectors.

CHAIR: Mindful of your comment that the Australian Energy Regulator is probably better placed to comment on competition matters, do you have any suggestions to encourage greater competition in the electricity market?

Mr SWIFT: I think there are a number of factors associated with the market that are the responsibility of the states, particularly development consents and the way in which the energy industries themselves are managed and regulated, and areas where that can be brought more in line with the national market can be useful.

And I think the Government has a number of policies that are aimed to try to increase competition through their current policy manoeuvres.

Dr GEOFF LEE: Can you describe the difference between capacity-driven investment and energy-driven investment, and how is it likely to affect the future types of electricity generators built in New South Wales?

Mr SWIFT: In the past people often talked about base load generation and peak load generation. I guess in the new world whether exactly those terms survive or not will be a matter of what generation does emerge, but certainly some generators are devised to be competitive, generating a lot of energy a lot of the time. Traditionally, base load generators were looked at in that sort of mould. The changing profile of customer demand and the emergence of intermittent generation like solar and wind have increased the need for flexible plant where the capacity is more important than the energy that it produces. So that is a matter of the market signals that are produced and because we produce a half-hourly price that market signal creates quite a sophisticated pattern of prices. Parties who are looking to invest in the market need to understand that. Then they would see out of that whether there was the opportunity for investment, which was designed to fill those capacity needs in the market, or whether they believed they could actually compete for bulk supply of energy.

Mr JOHN WILLIAMS: Obviously one of the important roles of this Committee is in respect to what we have seen in electricity pricing, particularly in New South Wales. The reduction in demand has clearly demonstrated there has been a far resistance to the price and we are anticipating some further resistance in the future. How do you see the future of prices in New South Wales? I guess we are starting to talk about the affordability of electricity?

Mr SWIFT: I think that is an issue in every state of the market at the moment. There has been a report produced by the Australian Energy Market Commission [AEMC] forecasting prices for the next couple of years, which I am sure the Committee has access to. We do know that there are further network charges that are flowing through on the basis of the investment programs progressing in this State, both to replace old assets and to improve the reliability of the networks. There are costs arising from the energy-efficiency and renewable energy schemes, and there will be an increased cost of carbon in the middle of the year. I think it is fairly evident that there will be a real price rise in New South Wales, as in other States, in the second half of this year.

Mr JOHN WILLIAMS: Overall in the long term are we going to see this as a constant trend? Some of the price increases that we have experienced directly relate to investments that have been made, as you say, in renewables but how does the future look? Is this growth in price going to be experienced every decade or will we reach a point where price has peaked?

Mr SWIFT: I guess there are a range of answers to that question. All we can say is that there are a number of price pressures out there, which relate to carbon. That is a view that different parties have as to how much price you would put on carbon; how much value you put on low emissions generation. There have been a range of reports done on the future price of gas in Australia and views taken as to what the future price of gas will be in Australia, given the fact that on the eastern side of Australia we will connect to world markets within a few years. But certainly some of the network investment you would hope is cyclical because there were a lot of assets built in this country in the 1950s and 1960s that are requiring replacement at the moment and that should be something of a hump that can be got over. I know there are several inquiries into the regulation of distribution investment pricing, which will examine that in more detail.

Mr JOHN WILLIAMS: But that becomes a fixed charge associated with the variable cost of electricity. I guess the greatest impact that has been experienced by the consumer is the price of electricity as opposed to the price of renewing the transmission lines—that is certainly what we get back.

Mr SWIFT: Yes.

Mr JOHN WILLIAMS: From a consumer's point of view the fixed cost represents about \$56 on an electricity bill whereby the electricity price has seen the greatest growth.

Mr SWIFT: I think the reports would generally show the largest single component of price rises over recent rises has been the increasing cost of networks.

CHAIR: Just to clarify, Mr Williams has obviously identified price as being a reason why electricity demand and projections for electricity demand have been revised down over the last few years but other factors might have included the global financial crisis or energy-efficiency renewables. Do you believe the trend of lower than expected growth in demand is a short-term anomaly or should the forecasting models and assumptions be re-evaluated?

Mr SWIFT: As I outlined in my introductory statement, we are doing a national forecasting project and it is a bit early to give the answers from all that, but we do not think it is only price. Obviously there have been a number of initiatives by governments, which have included initiatives to get a lot of embedded generation solar cells, and that has had an impact. There have been a range of policies to improve energy efficiency, both at a State and a Federal level, and that has probably had an impact. We suspect there is some restructuring of the Australian economy and the customers that we serve, in the sense that some parts of the economy have suffered with the Australian dollar and high energy prices. Whereas the resources sector has been very strongly growing, other sectors have not.

Mr BART BASSETT: On page 2 of your submission you referred to a study being carried out to consider the market and transmission implications of increased use of renewable energy. Can you make a general comment about that? Also where are you up to with the study and when is it expected to be completed?

Mr SWIFT: We have done a first round of work and looked at international best practice and international trends. We have looked at market modelling and modelling of the power system to see how much of an impact those new forms of renewable energy will have on the development of the power system and, in particular, what sort of issues we need to look out for in the future. We are currently devising a second round of work based on that first round, which is published—and I am happy to provide information on that—and has identified a couple of technical areas that need tightening up in terms of the technical standards, and we are looking at advancing that this year. But generally it has shown that the market is capable of accepting the kind of levels of renewable energy, of wind in particular, that we are expecting.

Mr BART BASSETT: Do you have a prediction as to what you think the major sources of electricity will be in New South Wales over the next 20 years?

Mr SWIFT: On our analysis at the moment it is based very much on gas-fired generation and a significant amount of wind-powered generation.

Dr GEOFF LEE: The Australian Energy Market Operator [AEMO] seems like an ideal vehicle to coordinate pricing. What do you see as the future barriers for AEMO in optimising its coordination of demand and supply and are there some things we can do better as a government to help you in that?

Mr SWIFT: I was very pleased to hear Mark Duffy say that the national electricity market has been an outstanding success. I think the States have worked very well to make it work, surprisingly at times. There has been plenty of debate and discussion and it has taken time, but there is a very formal framework for the operation of the market and it does guarantee that within the plant that we are offered and the companies that are participating in the market that we do get the best outcome that we can. I guess that is where the policy settings around the companies that New South Wales owns and manages and the development frameworks that you run, those tend to be the sorts of things that I guess are left for State governments to ensure work well to make sure we deliver the right options when we are operating the market.

Dr GEOFF LEE: I guess what you are saying is that it relies on the commitment of each State Government to participate in the program.

Mr SWIFT: Yes. The State Ministers meet twice a year and look at high-level policy matters, and we have the three energy market institutions that have been functioning for several years now and work to make sure the market does operate on a competitive and efficient basis.

Mr BART BASSETT: Can you briefly describe your Australian wind energy forecasting system [AWEFS] and the outcomes of the project thus far?

Mr SWIFT: The Australian wind energy forecasting system is integrated into our market systems and feeds into those systems forecasts of generation both in the very short term—for the next five minutes, one hour, day—out to longer periods of time. That information is used in the despatch of plant to make sure that the

system remains stable and resilient by incorporating the best forecast of the wind generation. It is also incorporated in the data that flows back to all the generators that are in the net. They can see what the scope for supply is four hours out, 10 hours out and for tomorrow, that sort of thing, in their short-term planning time frame.

In those planning time frames the AWEFS has achieved very good accuracy. I am certainly happy to provide that to the Committee, but it is probably of the order of 4 per cent or 5 per cent error. That is very important in our market because other market participants need to efficiently be able to bid and to know what they are bidding into. Are they likely to be required this afternoon? Are they likely to be required tomorrow? The large coal-fired power stations require notice to be able to generate. Even larger gas-fired generators need to book their gas shipments. We see the wind energy forecasting system as a very valuable adjunct to the market to make wind integrate into the market more seamlessly and to ensure that we maintain security of supply.

Mr BART BASSETT: That is interesting about the accuracy that you just commented on. Where is your input data coming from for those short-term and more medium-term predictions? Is it through the Bureau of Meteorology?

Mr SWIFT: The system works on two sources of data. One is data from the wind farms themselves. All the wind farms across Australia are live feeding data into the system, plus we get two different numeric weather models, including ones from the Australian weather bureau.

Mr JOHN WILLIAMS: Obviously New South Wales has not participated in the renewable energy market to the degree of other States. Do you believe that New South Wales will get to the 2020 targets that have been set?

Mr SWIFT: I think it is important that in the national electricity market we see these targets as national and try to use the best resources available nationally. But as I was saying before, I think wind generation has been primarily based in the other States until now; South Australia has the largest concentration but there is also significant wind farm activity in Victoria and Tasmania. As of today the wind generation in South Australia is so significant that it is starting to congest the network in that State and reduce energy prices to the wind farms. Our analysis shows, and the contacts we are having with potential new entrants backs up the view, that New South Wales will become more important as a wind generator over the next decade.

Mr JOHN WILLIAMS: So in saying that we will meet our renewable targets.

Mr SWIFT: To be honest, I have not looked at targets on a State-by-State basis, but our analysis shows that we would meet Australia's overall target, yes.

CHAIR: In light of those comments about New South Wales, and obviously it is a national target which we as a country have to meet of the 20 per cent, in the New South Wales context do you think that New South Wales should be doing anything more appropriately to encourage investment in alternative forms of energy generation? Hand in hand with that, are there any regulatory impediments to investment in any particular new generation projects?

Mr SWIFT: There have been some issues with changes in the national scheme which mean that at the moment we are not getting a lot of investment flowing through but we expect a backlog to be cleared in the next couple of years and for investment to reinvigorate over the near term. From a market perspective and from AEMO's perspective we are not aware of impediments here. We know the transmission company here, TransGrid, is talking to a number of parties that are interested in connecting.

CHAIR: You have talked a little about the demand for electricity. In terms of governments helping to manage demand, what role do you see is ideal there and are there any shortfalls at the moment in the New South Wales context?

Mr SWIFT: There have been a number of inquiries looking at how we can better have consumers participate in the market to become more active buyers, if you like, to discriminate in terms of the way in which they use energy. A lot of those studies indicate that there are some barriers in some cases, for example, cases where in commercial buildings the building owner could be quite different than the person who actually uses the energy, those sorts of matters. At an industrial level, there are several schemes that have been in place to encourage companies to look at their opportunities to save energy. Across the board there have been changes to

appliance standards, which have had an impact. At the domestic level, there is still a number of blockers and there is a study going on by the AEMC, which I understand is speaking today. They could give you more information on that. They often relate to the availability of more sophisticated metering, which does not exist at the household level and which is quite expensive and has its own overheads.

Dr GEOFF LEE: In your opinion what will be the impact of the carbon tax on electricity generators in New South Wales, besides the prices going up?

Mr SWIFT: The various scenarios in our plans—perhaps I should take that question on notice and provide more information back out of our planning. But we do expect there will be some adjustment to the relativities between the various generators as a result of that. In terms of the New South Wales generators, the newer generators here have lower carbon emissions than Victorian brown coal, so you expect them to have a competitive advantage there, although they have higher emissions than a number of gas-fired generators, so they have a competitive disadvantage against those. It is a matter of particular scenarios, how that plays out in terms of the actual generation outcome. But I would be happy to provide the information from our particular modelling on that.

Dr GEOFF LEE: That would be good, thank you.

CHAIR: Perhaps just on that point, we have some comments from previous witnesses on this, obviously AEMO is interested in a free and effective market. Do you think the fact that there is compensation for Victorian brown coal in the context of the carbon tax is justified in the context of New South Wales not receiving compensation for black coal? Is that anti free market? What is your perspective on that?

Mr SWIFT: Obviously that is a matter of government policy in terms of how they have decided and created the formulas for the subsidies. The way the subsidies work through cash and through free permits they do try to ensure that there is no distortion to the market outcomes per se although the commercial outcomes would be quite different as a result of the compensation.

CHAIR: I understand that you cannot dictate government policy at a Federal level but from a market perspective and from the perspective of the principles by which your organisation operates do you have a particular comment or perspective?

Mr SWIFT: No, we do not think the compensation packages will affect people's bidding in the market per se. As I say, it will affect their balance sheet position; it will affect their commercial position generally but because of the way in which they are structured we do not expect that they would significantly change anyone's bidding, so you should still get the same outcomes.

CHAIR: Perhaps it might be a question better directed to the Australian Energy Regulator in terms of fair competition.

Mr SWIFT: Yes.

Mr BART BASSETT: I seek clarification on what you said a few questions back about South Australia and the wind farm sector meeting capacity. Did you mean it was meeting capacity based on their alternative energy demands and targets? You went on to speak about the potential in the New South Wales. Can you clarify what you meant?

Mr SWIFT: There is plenty more potential for wind generation in South Australia and there are no State-based targets so you can produce as many renewable energy certificates as you like where ever, even off-grid certificates, but in South Australia there has been a large amount of wind generation placed into the network and when all the wind is blowing in low demand periods, the network is unable to transport all that energy out of the State and that leads to very low prices and we often have negative prices now in South Australia caused by that network congestion. There is a study looking at whether to expand the interconnectors and I expect some expansion will be justified but expanding any connectors to shift all that energy to another State has its own costs and you have to weigh up against that the option of slightly worse resource in other regions but much closer to the demand and how that pans out and a lot of the analysis we have done now shows that New South Wales is more attractive for that reason.

CHAIR: If retail prices were deregulated in New South Wales would that affect your pricing mechanism oversight or not?

Mr SWIFT: No it does not. We have not had the situation where anyone has imposed a retail price regulation which has been so onerous that it has affected behaviours back in the market and our market works across Australia and at the moment Victoria is the only State that has fully deregulated retail prices.

CHAIR: So if New South Wales went down that path you would not see any impact in terms of how the market that you are looking at operates?

Mr SWIFT: That is correct.

CHAIR: Thank you for appearing before the Committee today. The Committee may wish to send you some additional questions in writing. I think you indicated that you might have already taken one of those questions on notice. The replies to any of those questions will form part of your evidence and be made public. Would you be happy to provide written replies to any further questions that the Committee might have?

Mr SWIFT: Certainly.

(The witness withdrew)

(Short adjournment)

PETER JOHN MORRIS, Director, Economic Policy, Australian Coal Association, sworn and examined:

GREGORY STEPHEN SULLIVAN, Deputy Chief Executive Officer, Australian Coal Association, and

SUE-ERN TAN, Deputy Chief Executive Officer, NSW Minerals Council, affirmed and examined:

CHAIR: Thank you for appearing before the Committee. Do you have any questions concerning the procedural information sent to you in relation to witnesses and the hearing process?

Mr SULLIVAN: No.

CHAIR: Would any or all of you like to make an opening statement?

Mr SULLIVAN: I will make an opening statement on behalf of both the Australian Coal Association and the NSW Minerals Council. Thank you for the opportunity to appear before the Committee to discuss the submission put together by the Australian Coal Association and the NSW Minerals Council. We endorse the importance of this very timely inquiry, particularly against the backdrop of rising electricity prices, which of course affect every one of us.

By way of background, the Australian Coal Association represents Australia's black coal industry. Its members are responsible for over 95 per cent of New South Wales's coal exports and they supply most of the coal for the State's power generation as well as for the competitive manufacture of iron, steel and cement. The NSW Minerals Council is the peak industry association representing the State's \$20 billion minerals industry. Coal is New South Wales' largest export earner and generated \$14 billion in export revenue in the last financial year. In the 2010-11 financial year, New South Wales' 63 coalmines directly employed some 21,000 people and of course many more indirectly, most of those in regional areas. Their pay packets alone inject millions of dollars into the local economy and those mines are substantial long-term contributors to their local communities. The coal industry also provides 95 per cent of the State's mineral royalties, this year alone contributing an estimated \$1.7 billion to the State's budget.

Of course, coal is not just an export industry. It also supplies almost 90 per cent of electricity in New South Wales. It provides industry and the New South Wales community with secure, reliable and relatively affordable energy. This underpins a traditional source of the State's comparative advantage in energy intensive manufacturing and the jobs that flow from that. It would be fair to say that the society we live in in New South Wales and the quality of life expectations that we all have are very much built on the back of our coal resources.

An important question for the Committee is this: How will New South Wales ensure it has the right policy framework that will safeguard the State's energy security, protect the quality of life enjoyed by New South Wales citizens and allow its coal industry to grow so that the State enjoys the benefits of its natural endowment of coal resources? In assessing the best way to answer this question policymakers are encouraged to consider the following inter-related challenges.

Firstly, there is concern in the community and in business about the increasing burden of the delivered cost of electricity. Secondly, how does the State transition to a low carbon economy whilst ensuring that associated policy settings are principle and evidence based as well as equitable? Thirdly, how can a transition to a low carbon economy be managed in a way that protects jobs and the strength of the overall economy? The coal industry, therefore, welcomes the far sighted approach of the current State Government to address these challenges through the initiation of this inquiry, the creation of Coal Innovation NSW and its recently released strategic regional land use policy and plans, and other complementary initiatives. All of those initiatives will complement the Australian Government's Energy White Paper process which is also currently underway.

The industry acknowledges that there are concerns in the production of electricity from fossil fuels, and the impact of mining on regional communities. The industry also recognises that together with the gas and brown coal industries it is at the sharp end of policy development where energy and climate change objectives intersect. This inquiry gives New South Wales the chance to strike the right balance and set the energy policy framework for the next decade at least. Coal-fired power is the principal source of base-load electricity in New South Wales and, indeed, in the national electricity market. While Federal Government modelling points to a decline in the share of coal-fired generation in the power supply mix, coal will still be the largest single source of New South Wales power in 2034-35.

Policy approaches, therefore, need to recognise that coal remains the most competitive base-load option for New South Wales and its continued use will help to ameliorate projected electricity price increases. The rational course for government is therefore to take account of this natural coal endowment. In that light, the focus of the inquiry on the economics of energy generation is welcomed. While economic considerations cannot be the only concern of government in forming policy positions, it is important to understand that policies affecting the coal industry will have significant economy-wide impacts that will impact also on the people of New South Wales, and not just those in mining regions.

In our submission we argue very strongly that the energy security debate needs a reality check as there are no easy solutions when it comes to meeting future electricity needs. State policy making should be open to the potential benefits of all emerging low emission technologies and have a clear appreciation of their attributes. Looking beyond 2020, given the huge coal resource available for New South Wales, the need for enhanced development of carbon capture and storage, often referred to as CCS, is clear, and the present state of research, development and demonstration of this technology needs review and enhancement.

A target of having commercial scale CCS demonstrations in Australia from 2020 makes great sense in the light of the recent Federal Government analysis. We would also like to stress the importance of energy literacy amongst the community. We are concerned that there is a limited understanding of where electricity comes from and the roles, for example, that different energy sources, such as renewables can actually play. To illustrate this point I would point to some recent work by the Australian energy market operator and it was talking in that context about wind energy. It made the observation that while wind generation may be used effectively to meet regional energy requirements it cannot be used to the same extent when meeting capacity requirements, and that is due to the intermittency of wind generation.

Similarly some work by the Australian Strategic Policy Institute looking at energy mixes and the energy supply options gave some consideration to solar energy and it is estimated that to generate sufficient power to meet Australia's current demands, it would be necessary to construct an array of solar panels that would occupy more than 4,000 square kilometres—that is an area twice the size of the Sydney urban area. Our point generally is that each of the energy sources available to the community have their own set of constraints. That applies whether you are talking about coal, solar, wind or indeed any other form of energy.

In conclusion, I bring to the attention of the committee our joint submission's primary recommendations in our three areas of focus. Firstly, New South Wales needs a clear energy strategy both for the immediate term, the mid-term and indeed the long-term to assess when new base-load power is needed and to provide enough time to develop low emission technologies, given their strategic importance to the New South Wales domestic electricity generation and protection of coal export revenue.

Secondly, locating suitable storage sites for CO₂ sequestration is fundamental to the deployment of carbon capture and storage technology. It should be a focus of the Coal Innovation NSW work program. Thirdly, and picking up on my point about the energy literacy of the community, we are calling on government to take a leadership role in discussions about the many complex related issues, such as land use. That would help to provide public confidence in the industry and also to ensure that government policies do not unnecessarily sterilise coal resources or burden industry with unnecessary delays and costs. Each one of us is very pleased to appear and to take any questions from the Committee.

CHAIR: Thank you for that very good opening statement, in which you posed as many questions as we will ask you today.

Mr SULLIVAN: We know you have a difficult task.

CHAIR: You have identified a number of challenges facing the Committee and a number of questions with which we will grapple. In your opening comments and your submission you note that substantial growth in coal production is projected for the future and you outline the substantial contribution that your industry makes to the New South Wales economy. Do you have any projections? You have given us various figures and made comments about the past and the present. Do you want to highlight any projections about how your industry might impact on the growth of the State's economy in the future?

Ms TAN: The Government's own budget forecasts project \$8.5 billion in additional royalties over the next four years. On the industry's calculations, we have the potential to add another \$10 billion worth of capital

expenditure from 33 coalmining projects that are proposed just here in New South Wales. That is another 161 million tonnes of coal, 6,000-odd construction jobs and nearly 5,000 operational jobs once the mines are constructed. That is obviously a very large amount in the coalmines themselves. There is also the development of the supporting infrastructure that will be needed to get the coal out of the ports. That is worth about \$8.6 billion in capital expenditure. Those figures come from the Federal Government statistics as of October last year.

CHAIR: Can you comment on future coal and gas prices and their potential effect on electricity prices in New South Wales? What will be the effect of contracts that might be expiring in the next few years?

Mr MORRIS: It is always difficult talking about prospective prices, although economists do that with relish. I will talk about three elements: the prospects for coal, the prospects for gas and the contract issue. Clearly, as long-term contracts are renegotiated there will be a move in the marketplace towards their being based on the international price of coal. Contracts in the past have been based typically on quantities with price restrictions and also with restrictions on the ability to pass on certain taxes, such as the carbon tax that will begin on 1 July. Therefore, with new contracts we can expect that there will be some pass through of the higher international prices, although they have been softening of late. The domestically delivered product price is not necessarily the price on the international market, because that price is the delivered price, which includes transport—and that is a very significant component of coal prices. Of course, if the coal is close to a power station it may be much cheaper.

Gas is an unknown quantity. However, clearly gas on the eastern seaboard is now priced at a lower rate than the international parity price. That is clear if we compare the gas price in the eastern part of Australia to the price paid in Western Australia. With the likely development of an international export gas industry, particularly from Queensland, and the nature of the national electricity market, which is interconnected and highly competitive, those gas prices will feed through. Obviously there is a question about how long that will take. However, various commentators—for example, Ernst and Young in the research it undertook for the Australian Electricity Market Operator—are suggesting that the price of electricity could more than double by 2016. I probably covered the contract issue in my earlier comment.

CHAIR: Would you hazard a guess about the percentage increase you are expecting for coal and gas prices over the foreseeable future?

Mr MORRIS: I will take that question on notice. It is complicated and there is a difference between the wholesale price and the retail price passed through.

CHAIR: What will be the impact of the international parity price issue and other factors such as the carbon price?

Mr MORRIS: I will take that question on notice.

Dr GEOFF LEE: In your submission you predicted that coal will continue to play a very important role in electricity generation in Australia, even with a falling market share. Who do you see as your major competitors in the electricity generation market in the future?

Mr SULLIVAN: Clearly, gas is one of the key alternative sources of electricity. We already have an existing and stable hydro capacity in Australia. The wind sector has been growing significantly and it is expected to continue to grow, as is solar, but from a lower base. Each of those sectors will play an important role; they are all competitors. In relation to alternatives, given the emotive language used in the popular media it has been presented as a competition between clean and dirty—almost good and bad. Unfortunately, that obscures the point that we need all the energy we can get and that we need various sources of energy. They will all play critical roles. The Federal Government's projections out to 2035, and even beyond, demonstrate that each of those sources, including coal, will play a significant role well into the future. It is not helpful to the debate when people talk about alternatives as if one is better than the other. We need them all performing as efficiently as they can. We certainly need coal and, indeed, clean coal technology to succeed.

Mr MORRIS: A number of the policies in place—particularly the renewable energy target at the national level—will obviously lead because of the statutory requirement to increase the share of renewables. However, as Mr Sullivan suggested, the Australian Bureau of Agricultural and Resource Economics is projecting that in 2034-35 coal will still be the most significant supplier in the national electricity market. That

is a combination of black and brown coal. Black coal will still be the major fuel—it is greater than gas—even though gas will have made inroads. The renewable energy target is in fact crowding out investments in gas in favour of wind, in particular. However, wind is still projected to be less than one-third of the supply in 2034-35.

Dr GEOFF LEE: Your submission refers to carbon capture and storage technologies being an important part of the portfolio of energy options for New South Wales. When are these technologies likely to be deployed in New South Wales?

Mr SULLIVAN: There is still a good deal of work to be done to prove up carbon capture and storage technologies at a commercial scale. Work is being undertaken in New South Wales and Queensland and, indeed, elsewhere in Australia. It is funded by state governments, the Australian Government and the coal industry through its COAL21 Fund. The projections for the commercial deployment of carbon capture and storage are still around 2030 to 2035 at this stage with initial deployment of commercial-scale demonstrations in the early 2020s. That is the earliest they would be available. It does not seem at this stage that the 2035 scenario has moved forward based on the work that has been done.

Dr GEOFF LEE: You talk about State and Federal funding, and obviously there is funding from your association members. If we are at \$23 a tonne now and generators are producing however many millions of tonnes of carbon dioxide, if the price for carbon tax goes up further would it not increase the pool of money and opportunity for generators and miners to invest more and more money? Why should the Government fund something that inevitably market forces will demand that you put in because there is cost benefit? I forget exactly how much carbon dioxide is produced by New South Wales generators but I think there will end up being \$1.2 billion in terms of a tax which, if it could be shifted to CCS storage, would probably be a viable investment.

Mr SULLIVAN: Perhaps I will start and then get Mr Morris to provide some further observations. You are absolutely correct in the sense that as the carbon tax or carbon price rises then, in theory, over time it would create an increasing incentive for producers of carbon to take steps to reduce their emissions. That is how it is designed to operate. That said, we also know that first-of-a-kind technology—and this is true really irrespective of the particular technology—has very often required substantial public sector investment for many years to bridge the commercial gap that exists at the outset of the development and deployment of the technologies. There are a number of examples, indeed in the electricity industry itself, the nuclear industry in terms of nuclear energy production, and there are a range of others where, but for sustained public sector investment, you would not get these technologies being reduced to the point where they can be taken up in a commercially viable sense by the private sector and then taken onwards from there. There will be an ongoing need for public sector investment in CCS and that is true in every country. The specifics around the level that the price would need to get to—I might invite Mr Morris to say a few words about whether \$23 a tonne will generate that type of investment shift.

Mr MORRIS: The quick answer is no, it will not. Some work by the Australian Strategic Policy Institute, which Mr Sullivan referred to earlier in the opening statement, suggests that the price on carbon would need to be \$70 or more for carbon capture and storage to be driven by the market. That price would still not be sufficient, they feel, for renewable low emission technologies apart from wind and some solar to be driven by the market, so an additional price beyond that is probably needed for renewables. To go to the thrust of the question, which was about inevitably market forces taking over—they will because markets work. But there are two issues here. One is putting a price on carbon, because it is not priced by the market, and that is a market failure. The other is that there is also a market failure in having the market operate in a way whereby the investors in a new solution, a new step change technology will be able to reap the rewards from that investment, and without a very high price that will not be possible. That is why Lord Stern in his report for the United Kingdom Government, Professor Garnaut in his reports for the Australian Government and Roger Wilkins in the Wilkins inquiry report for the Australian Government all recognised the need for a very significant role for Government, and indeed the group of eight countries have agreed on a target of 20 major commercial-scale carbon capture and storage projects to be developed around the world by 2020 and many more after that, and have recognised the need for seed funding from Government to be able to do that.

Ms TAN: Can I just quickly add that the thing with carbon capture and storage is that it is about carbon, it is not about coal, so it is technology that is also necessary for gas and the fossil fuel generation industry generally. It is also a technology that is used for industrial processes, like cement production, so it does have a role to play generally in getting to a low emissions energy future. The other element to consider is that there is an international dimension to this, that it is a technology that we invest in as a country that has the

potential to be exported as a brand new growth industry for Australia, particularly given the fact that the international energy agency and every other international work that has been done see a role for coal. It clearly will have a role in countries that are developing rapidly, like India and China, and if there is a technology that we can export in terms of the CCS dimension I think that is a very important role that we will also play.

Mr SULLIVAN: Dr Lee, you asked the very pertinent question about why the New South Wales Government continues to invest in CCS technology. One short answer, as Ms Tan has highlighted, would be to protect the future of the coal industry and the royalty revenue that the Government derives from it.

Dr GEOFF LEE: Are you suggesting that, if it happens, a tax of \$23 a tonne to raise through the Federal Government the \$1.2 billion or whatever I roughly calculated is not enough for the industry to start investing significant amounts of money into CCS technology? It has to go to \$70, which would be \$3 billion or \$4 billion in tax.

Mr MORRIS: That is correct.

Dr GEOFF LEE: Your members will sit or lie down and pay that tax every year without deciding that they are going to devote significant amounts of money to ameliorating in the future?

Mr SULLIVAN: The first point would be that it is not just about the coal industry. The coal industry has taken the issue seriously and is investing very large sums of money in CCS technology, its development and its deployment, but it cannot just be the coal industry. Ms Tan has mentioned the gas industry. CCS is critical for gas. It is also a key part of a range of different manufacturing processes that are heavily carbon intensive, so it is actually about a whole range of sectors of the economy and Government. It is a community issue, it is not just the coal industry. The coal industry is taking it very seriously.

Dr GEOFF LEE: The coal industry provides 89 per cent of power and the one with the biggest share of the market normally contributes the most because it is in their best interest. Of course, the gas industry and cement industry are there also, but the amount of money you are going to fork out on 1 July will be astronomical to the Federal Government.

Mr MORRIS: There are a number of difficulties here. Firstly, yes, we will be paying a carbon tax from 1 July. That effectively reserves that money, so in addition to that we are voluntarily imposing an additional tax on ourselves and we have been for some years, which is designed to raise over \$1 billion in 10 years. The challenge here is really to develop new generation technologies and prove up and demonstrate the safe application of carbon capture and storage. We know it is feasible in the different elements of it, it has been proved, but it has not been done internationally yet—the complete package—and therein lies a huge challenge because it roughly costs \$4 billion to build a power station, but if you are building one with carbon capture and storage it adds another perhaps \$2 billion on top of that.

A bank would say, "Why would I lend you an additional amount of money to build a more expensive unit when something in the marketplace can already produce that at significant less cost?" We are doing things. We are doing quite a lot not just with the COAL21 program but also in other areas to deal with our fugitive emissions. We are an export industry and although we do produce about 20 per cent of our coal for domestic use this is a problem that needs to be addressed internationally, because it is going to be very expensive and it is going to take time. But, as we alluded to earlier, all solutions are going to take time and will be expensive. International comparisons of the levelised costs of these different technologies suggest that carbon capture and storage is very favourable in the race and is something that really should be invested in.

Ms TAN: If I could just add, the reality is that technologies like renewable energy do get a lot of public sector funding, whether that is indirectly through the renewable energy target or more directly through the clean energy package that the Federal Government has designed to support future renewable energy technology development. So it is not a question of whether or not the coalmining industry, which is different to the coal generation power plants themselves, will play its part. We will all step up and play our part but I guess, as Mr Morris has said, it is far more complicated and a very large amount of money is required, and that cannot be done by our industry alone.

Mr JOHN WILLIAMS: When I read your submission I am basically in agreement that the fork in the road for the coal industry is definitely going to be how you deal with carbon capture and storage. From reading your submission and relating it, say, to the motor industry when it was dictated, predominantly in America, to

try and address emissions from motor vehicles—probably the solution was a lot easier—but it was up to the industry to take the lead and come up with a solution. The first attempts at dealing with emissions were pretty ungainly but over time they streamlined it and improved the technology, but initially they got to a level of emissions that were acceptable. From reading your submission there is an expectation that the Government is going to take a lead role. If you have a future in using your low-grade product to generate power in New South Wales, I think the industry has a responsibility to take that lead role. The frustrating thing for me is that we hear about this technology and it sounds like pie in the sky. No-one wants to own it. It is all talked about. It is all left out in the ether and no-one wants to grab hold of it. You really have the challenge. If you want to generate in the future this is the point you have to reach and the sooner it is reached the better.

I agree with Dr Lee that we have a huge problem in how the industry can maintain a carbon tax at a certain level. The fact is that the price has not been found as yet; it is a starting price. From an industry's perspective there are some great challenges. No-one wants to own this and if you expect the New South Wales Government to work on this technology we will be here for another 100 years because governments are technically pretty poor in engaging in this sort of research.

Mr SULLIVAN: Can I start by saying that the industry certainly acknowledges that it is a very important challenge. That is why it has been committed since 2006 to putting money into investing in carbon capture and storage [CCS], its research and its deployment. With respect to the technology—contrary to what sometimes appears in the popular media—the technology is not as futuristic as some would have you believe. It is actually well tested and well tried. If you divide CCS into its component parts: capture, transport and storage, the capture component has been done for many years, overseas particularly. It is often used in enhanced oil recovery operations, where they capture CO₂ and inject it to extract further oil from wells. The actual technical processes of capturing CO₂ can be done. There are plants being built now. For example, there is one in Rotterdam, which is a coal-fired power station that has been equipped with CCS capture. So the technology exists; it is not quite what you would call off-the-shelf but it is certainly a known thing and can be done.

The transport is also well understood: the technical side of the pipelines. Not only is there significant expertise on pipelines in Australia but there are decades of expertise in the United States on CO₂ transport in pipelines, so that is well understood. The storage has actually been achieved in a range of locations. In the Otway in Australia they have injected 60,000 tonnes of CO₂ and they are now monitoring it, and so far it has been found to be successful. There are some three million tonne of CO₂ to be injected into the Gorgon Project, and there have been other demonstrations around the world that have found that it can be done. There is no doubt that technically it can be done. The challenge is really a commercial challenge; it is how to make it commercial. If you are, for example, generating electricity there is no other reason to capture and sequester carbon other than avoiding a tax liability—that is the whole point of the exercise with the carbon tax. Until that commercial gap can be breached that will mean that the cost curve will need to come down—this is the same for large-scale solar, wind and nuclear.

There is a cost curve where it is more expensive when you are looking at the first plants of their type, the more there are the cheaper it gets, and over time that commercial gap is closed. As I said earlier, there are numerous examples where these types of technologies do not get off the ground without public sector investment. It will not just be public sector investment from, say, New South Wales; it will be multiple jurisdictions in Australia and multiple global jurisdictions. The United Kingdom government is putting a billion dollars behind the next CCS plant, the United States government has put more US\$1 billion and the Chinese government is investing. There are many countries investing in trying to bring the cost of this technology down.

Mr JOHN WILLIAMS: The industry has already indicated that it is prepared to put in a billion dollars in ten years. Do you see a role for the private sector to invest in a new coal-generating facility? Being mindful of the fact that the technology needed to be involved in carbon sequestration was a couple of billion dollars, does the coal industry see that it could assist in some of those costs to ensure that its future is guaranteed?

Mr SULLIVAN: One of the models that is being examined for future baseload power generation in Australia—we do not know where the next baseload plant will go—would be that a private sector generator builds the plant and that the CCS component, the capture and the storage component, might be met via a combination of funding sources, be they public sector and industry sources, that together would bring it to a commercial outcome for the operator of the plant. Because on their own they will not bear the cost but they would certainly bear the cost of the actual plant itself because presumably there would be a commercial base on which you would build a baseload plant.

Mr BART BASSETT: In your submission you say that government should not burden industry with unnecessary delays and costs. Will you give the Committee a couple of examples of where there are unnecessary delays or costs that the industry faces?

Ms TAN: I think we have outlined a few specific examples in our submission. I think the biggest one is really about the planning approval processes and the delays that we are currently experiencing getting coal mining projects, whether they are modifications to existing projects or new greenfields projects for approval. There are currently 51 projects sitting in the assessment pipeline at various stages. That is a very significant number and that has gone up in the past six months in particular as the Government has released its new planning and transition provisions for us to get major projects approved—that is a significant amount of projects. I think the real problem for us is the delays and the uncertainty about when you will finally get a project approved. It is very uncertain from an investment perspective. We have to remember that mining projects are very long-term projects; they are 40, 50 year plans. There is a lot of background planning from an investment perspective that goes into putting up a project. If you are sitting in a pipeline waiting for an assessment process for over two years in some cases, that is not a good indicator to give investors security and certainty for their investment. So I think the planning approvals delay is a problem.

I know the Government is going through its planning review process at the moment, and we are actively participating in that process. I guess we can only urge the Government—I know it is a complex issue with a lot of different stakeholder views—that the sooner we can get a clear path forward for how the Government wishes to deal with development, the better it is for us from a major export industry and a major contributor to the New South Wales economy perspective. I guess the second area sits around just general duplication particularly between the government agencies once we get a project approved. We would urge the Government to take a whole-of-government approach to how they wish to regulate the industry. For example, when it comes to environment assessments, often we end up providing information to the Department of Planning and Infrastructure, the Department of Resources and Energy, to the Office of Environment and Heritage on say the issue of noise or the issue of dust. It is really just the same information provided to three different agencies.

I would think it is not about us not providing you with that information—we want to be transparent in the way we operate—but it is about being more efficient in the way the Government accepts that information and then processes it. But I think a lot of these things will hopefully be considered by the Government as it does its planning review. We have had very positive interactions, particularly with Minister Hazzard, on the way forward for the State on that issue.

Mr BART BASSETT: In your submission you state that electricity generation policy should be based on principles of open market, transparency, et cetera. Should the Government's policy also take into account environmental impacts of electricity generation from your viewpoint?

Mr MORRIS: Governments are, so that is probably the answer. Always we are conscious in the mining industry of the need to work to maintain our licence to operate, and we in Australia have a very long, proud history of endeavouring to meet the requirements of the regulatory processes and indeed develop regulations and impose some self-regulations. Those have gone to issues in particular about safety and environmental issues. We are doing quite a lot of work in that line with government, with the inspectorates, for example, for safety. Also, if I could add with Coal Innovation New South Wales in terms of post carbon capture research in Australia and in terms of storage. We are investing in storage. So we do have a road map, a view, about how carbon capture and storage could be brought forward and how it could play a role but because that can take two decades we need to start planning now what needs to be done in terms of dealing with the environmental, safety and other issues so that we can deliver an outcome in, say, the 2030s.

Mr SULLIVAN: New South Wales has a comprehensive environmental regulatory framework. The coal industry is amongst the most highly regulated of industries. Indeed, if you were to look at an international comparison, the regulatory framework that sits around the coal industry in Australia and in particular New South Wales would be second to none, I would expect. It is also the subject of scrutiny from multiple regulators and they are very active regulators. So I think the answer, as Mr Morris said, is that the Government does take into account the environmental dimension of the mining industry and the industry recognises that it is a critical dimension and is robust in its efforts to make sure that it is meeting all the requirements imposed upon it.

CHAIR: Mr Daley has rejoined the hearing, and I know that is an area he is particularly interested in. In the context of the earlier discussion about CCS you quoted the Wilkins report which proposed the Government should commit funding to demonstrate carbon capture and storage technology and you suggested that ought to occur both at a State level and a Federal level and that you are looking for perhaps more support or guarantees from the New South Wales Government in the shorter term to enable you to feel more confident and proactive about making an enormous financial investment in technology for the longer term. With that background lead in, I know Mr Daley has at least one question in that area.

Mr MICHAEL DALEY: I was not here for those comments but they are salient. Let us play devil's advocate then. A great many of the submissions we have received—and they have all been excellent—have said the Government needs to butt out and let the market decide a great many factors in relation to electricity generation and investment but on the other hand the Government should invest heavily in research and development and now you have said today that the Government should do that in terms of carbon capture and storage. Why is it so important that the Government should do it? If the coal industry is so up against it because of having a price put on carbon, would it not be well within your best interests to do it yourself?

Ms TAN: Firstly, I will deal with that issue about the coal industry being against a price on carbon.

Mr MICHAEL DALEY: I did not say you were against it; I said you are sort of up against it as it increases the cost of your commodity.

Ms TAN: The reason we have opposed the Federal Government's tax is because it is acting in favour of what our competitors do. So it is from an export industry perspective that our concerns have been loudly raised on the issue of the Federal Government's carbon tax. I think the reality is that if we all accept that we want to move towards a low emissions energy future—I think there is agreement generally and certainly from the industry's perspective we support that—we know that we need to continue to have energy security because that is the foundation of how we are a developed country and an industrialised country and we keep businesses going in this country. The Government has in the past supported the development of all low emissions energy technology and that included, for example, the substantial amount of public investment for renewable energies. We are not against that. We think that is necessary for us to move towards more advanced renewable energy technology development, but the reality is part of the picture for a low emissions energy future is carbon capture and storage as a technology, not just for coal but as we have said before, which Mr Daley was not in the room for, but also for the gas industry and other industrial processes.

Mr MICHAEL DALEY: I was not expressing a view; I was just playing devil's advocate because I agree with you.

Ms TAN: I guess I have given you a bit of that context and that perspective, but I will let Mr Sullivan talk a little more specifically on the CCS stuff.

Mr SULLIVAN: As Ms Tan said—and this is the comment I made earlier before Mr Daley returned—it is a multi-industry issue. While there has been I think a connection perhaps in the media and in the public mind between CCS and coal, it is actually about carbon and carbon is at the heart of our whole energy intensive society that we have constructed here. So if we want to move to a low-carbon economy and low-carbon society, it is a societal issue and the critical industry players are of course the coal industry—we acknowledge that and that is why we have been investing in it—the power generation industry, the gas industry, other large emitters of carbon, and the major manufacturing, cement and so on. They all have a role to play, but so does government because it is a significant technological exercise, but it is also a significant commercial exercise. So there is a gap to be bridged and that is to bring CCS to the point where it is commercially viable. There is a long history of the public sector investing in first-of-a-kind technology around the world in order to bridge that gap. So we understand your point and we understand that you have a right to put up the devil advocate's view. We think there are very sound reasons for both the public sector and the private sector to continue to invest in this technology.

Mr MICHAEL DALEY: A few years ago some of us went down to southern Victoria to have a look at a pilot plant down there. It was very interesting, educational and we had some good briefings at the university afterwards. One of the things mentioned there was that New South Wales may not have the geological foundations to store carbon long term and that we need comprehensive mapping. Could you give us a progress report on where that is up to and what percentage of the State has been sufficiently mapped to educate us all in our capabilities?

Mr SULLIVAN: That is a very important point because earlier I was talking about the different components of CCS with carbon capture then transport and then storage. The first two are really generic in the sense that the technologies developed elsewhere—capturing carbon is capturing carbon—it will be applicable where ever you do it. The bit that is peculiar to any location—and New South Wales in this case—is of course storage and storage is the ongoing challenge. I forget the name of the particular inquiry but there were recent observations by a study saying that New South Wales was underexplored in terms of geosequestration. The New South Wales Government, coupled with industry, has been investing in a program which has commenced its exploration work. Some of the initial studies were not terribly positive. I forget the exact location but I think north of Gloucester, perhaps it is the Merriwa region—I am not sure of the exact title—

Mr MORRIS: Yes, Merriwa.

Mr SULLIVAN: —did a number of test wells and found that they really were not suitable for large-scale sequestration.

Mr MICHAEL DALEY: Too deep or just not the right rock?

Mr SULLIVAN: Not the right rock. The search has now turned to other parts of New South Wales, including the Darling Basin.

Dr GEOFF LEE: An excellent area.

Mr SULLIVAN: It is ongoing. There is going to be some \$50 million-odd ultimately devoted to this search. I know that the industry is contributing at least \$18 million and there are other contributions. It is still early days but it is very important work because there are not the obvious geological structures. In Queensland, for example, the Surat and the Galilee basins, they are very confident that there are significant structures that can contain large amounts of CO₂. That level of confidence does not exist in New South Wales yet.

Mr MICHAEL DALEY: Is the CSIRO in on that research in a big way yet?

Mr SULLIVAN: The CSIRO is involved in aspects of carbon capture and storage research; whether they are intimately involved in the storage search; they have done work in the past, I understand. I am not sure whether they are currently involved. I can certainly find that out for you.

Dr GEOFF LEE: You said that the United Kingdom has spent \$1 billion on carbon capture and storage research and development. The amount we are spending is only a tiny amount compared with what they are spending overseas. Do you work with them to specialise on some parts of it? As you said, a pipeline is a pipeline, capture is already a technology, so the final hurdle is the sequestration part of it. Is that where all the money goes?

Mr SULLIVAN: To answer the first part of your question, through the carbon capture and storage institute, an Australian Government initiative, there is regular dialogue and exchange of information across the world between projects. In addition, some Australian coal companies and international coal companies invest in a range of these projects through funding in order to ensure that they can also obtain the IP, the learning from those exercises, so an exchange of information occurs.

More specifically, research at the moment is in two parts at least; that is, at the capture end there are a variety of different technologies that can be used to make the capture process more efficient, so there is investment in all of those. For example, oxyfuel combustion where the fuel is combusted within an oxygen environment, is one way in which the CO₂ can be drawn off in a more concentrated stream which then allows a more efficient capture of that CO₂ liquefaction and then obviously transport. There is research ongoing there across the world, including Australia.

At the sequestration end the expense really is the search. What has been discovered—and this is perhaps a bit of a sleeper initially for the carbon capture and storage industry—is there were assumptions initially based on the knowledge of gas and oil exploration done right across the globe in the past and it was thought it would be relatively straightforward, utilising that massive experience and knowledge that exists. It has been discovered that it is actually quite a different discipline; it is a specialist area and some of that information and learning does not transfer straight across to a carbon capture and storage to a CO₂ search in terms of

sequestration. What has emerged over time is that the sequestration side of the equation has proved larger and more difficult than was initially anticipated and as a result is absorbing more funds but because it is peculiar to a location it falls to the industry players and the government in that location to do the search.

Dr GEOFF LEE: That was my question and you have answered it well. If they spend \$1 billion in the United Kingdom developing capture why would we be developing in parallel with them? I am sure researchers do not often do that. I guess it is the geographic specificity of sequestration that would be very expensive?

Mr SULLIVAN: That is absolutely right. With respect to the capturing end, what has been tending to happen—and this is true of other technologies—is once there is a successful plant operating, whether it is a demonstration scale or larger, then the lessons learnt from that are applied in the second plant, then the third plant, the fourth plant and so on. That is probably the stage we are just getting to now, where globally there are a number of projects which are in actual construction phase or about to enter construction phase which will deliver full demonstration scale, commercial scale plants and it is expected that the lessons learnt from those plants will be applied in the mid 2020s into future plants. For example, the Chinese Government is planning five to eight commercial scale carbon capture and storage plants within the next five or 10 years, so we will see this technology decrease in cost and become much more efficient.

CHAIR: We have run into a time problem and mindful of that I ask whether you would be happy to provide a written reply to further questions, including a few I flag now?

Mr SULLIVAN: We would be very happy to provide written responses for the Committee.

CHAIR: I flag a few questions now for the record. Do you see a role for measures to manage demand more effectively and how can governments assist in managing demand for electricity? What should the State Government do to ensure long-term energy security in New South Wales? Some submissions have referred to the need for certainty in government policy to promote investment. What do you think government can do to provide certainty to investors in the electricity market? The final question goes back to the carbon capture and storage issue. In your submission you refer to a number of projects that are currently underway—the New South Wales storage program and the Delta post-combustion capture project. Could you provide a little bit more information about the projects and what they aim to achieve? I have heard you perhaps suggest that governments should invest in this technology not necessarily in preference to other low emissions technology but as well as—I see you nod there in affirmation—but in the context of governments particularly in New South Wales potentially investing in technology, what you are looking for in particular from the New South Wales Government. Is it more around that mapping process rather than actually leading research and development technology—more understanding what capability there is in New South Wales? If that is the case can you steer us in that direction; if it is somewhere else please identify where that is?

Mr SULLIVAN: I would be very happy to, Mr Chairman.

CHAIR: Thank you very much.

(The witnesses withdrew)

ROSS CARLISLE EDWARDS, General Manager, Business Development, TRUenergy Ltd, and

LANA MAREE STOCKMAN, Manager, Wholesale Regulation, TRUenergy Ltd, sworn and examined:

CHAIR: Thank you for travelling from Victoria to appear before the Public Accounts Committee. Do you have any questions surrounding the procedural information sent to you in relation to witnesses and the hearing process?

Mr EDWARDS: No.

Miss STOCKMAN: No.

CHAIR: Would either or both of you like to make a brief opening statement before we ask questions?

Mr EDWARDS: Thank you for the opportunity to appear before the Committee. When we think through the economics of generation there are a few things to take into account. With a new generator or an existing one there is the fuel and resource element, the technology cost of existing or new technology, the cost of capital and the availability of capital given the risk profile, and the development and construction of new projects and opportunities. From our perspective, key things that are important are, firstly, on the fuel side, that we have competitive markets free of distortions such as making one fuel cheaper than another through contracts by the Government or through other means. Examples might include the Cobbora project. Those sorts of distortions create uncertainty about fuel costs in the market.

On the technology side, I was listening to the discussion you had and would be keen to volunteer a few comments about that. Generally speaking, the Government should be very selective about where it is looking to assist in bringing down the cost of technology. It clearly needs to be something that is in the State's interests. These are very complex and challenging situations. There are so many different parties involved. We are looked at as one of the key parties involved but we also note that electricity is fundamentally a regulated industry, particularly in New South Wales, with caps on price. TRUenergy is a vertically integrated player. We have a cost of capital that is associated with the wholesale element in the retail tariffs. That cost of capital is really designed for existing technologies, proven low-risk investments, not for developing new technologies. There is the tricky question of who really should take the risk and can justify the investment in some of those sorts of technologies. In theory it should be the equipment suppliers because they are the ones looking to sell the equipment, but who encourages them to bring forward those investments? We are happy to talk further about that.

On the capital side, its availability, particularly since the financial crisis, and the ability to attract capital is ever important in this industry. To do that we need stable and long-term policy and to be seen as an environment that supports those long-term investments. My job at TRUenergy is to recommend the major acquisitions or projects and on the generation side, as of today, probably 30 to 50 per cent of the revenue stream of any investment that we make in generation is a function of either a carbon price or a renewable energy policy scheme. These schemes are not a little bit extra to make these investments viable; you would not do them without it. When we need to recommend a \$500 million investment off the back of, say, the renewable energy target, we need to be certain that it is there to support 25 years, which is the asset life. Those are the sorts of considerations. On the carbon tax side there is a tax in place at the moment and I think that is a step in the right direction but I think it will be quite a long time before anyone makes a significant investment off the back of it. We have just had an election outcome in Queensland on the weekend and one side of government says it will repeal it and the other side says, "Here it is." It is a very difficult environment in which to justify expenditure of a lot of money that relies on that as a revenue stream.

Those things are challenges, but the important aspects and the things that can be controlled are around tariff policy. Whilst this is about generation, a lot of it for us is to do with the retail tariff. We are a vertically integrated player in this market and we need to ensure with the retail pricing that we see benefits in markets where it is deregulated, and in markets where it is not deregulated we need to ensure there is sufficient incentive or comfort that any new investment to manage energy security risk will have its costs recovered. That is important on the retail tariff side. The current Independent Pricing and Regulatory Tribunal [IPART] policy does that so we are quite happy with the way that is structured at the moment. That is something not to change, I suppose.

The last thing is on construction and development. We seem to have in some areas energy policy, primarily at a Federal level, contrasting the objectives to some extent of planning policy. We are seeing it in a number of places where policy planning arrangements on wind and other things to some extent are being designed to address the concerns of a minority. We certainly find the case where there are a lot of supportive people of wind, but the changes ultimately end up just putting up the price of energy for everyone. It is a balance. We have planning policy making it more difficult but we are getting a lot of pressure on us to commit to projects from the Federal level. I think New South Wales has great resources and great opportunity to ensure that it does not have any energy security issues moving forward. The keys to ensure that that is the case is to have markets which are free from distortions and to have policy which is long term and stable to support the sort of investments that are to be made.

Miss STOCKMAN: I have one point to make: I have noticed we have made an error on page three of our submission in the graph of the capacity to forecast demand days. I will provide an updated version. The gap is not that big but it still goes to the point around the fact that New South Wales is reliant on what is happening, particularly in Queensland and Victoria, and energy policy needs to be developed with that in mind.

CHAIR: Mr Edwards, you have provided the committee with some background about TRUenergy and obviously you have an important role in the national electricity market. What particular issues does TRUenergy face as both a generator and retailer of electricity?

Mr EDWARDS: In New South Wales I suppose we face strong competition in the retail market which I think is generally a good thing. It is on us to ensure that we meet our customer's requirements and maintain our customers. I think that is a positive but always a focus for our business. On the generation side, really to manage our wholesale exposures within the electricity market which are, I think, unique in terms of the volatility and exposures that that market presents. I think personally that the risks are really quite high in the electricity market when you have prices that can go anywhere from negative \$1,500 to \$12,500. That is a key focus for us on the generation side. I think downstream from there is ensuring that we have competitively priced fuel, particularly in New South Wales, one of the key things on both gas and electricity is transition to export price parity.

On the gas side, that is a key thing with the projects going on in Queensland and the question of how and when will the transition to export net-back sort of pricing. The same thing on the coal side, I mentioned the Cobbora situation. For us, as you may be aware, we have the Delta West gentrading assets and this market is at a point of transition, transitioning off legacy contracts and all of the parties are negotiating with coal companies at the moment around renewing and extending their arrangements. Those transitions are challenging. They are challenging in an environment where we have actually had quite low wholesale prices recently and very high export prices.

CHAIR: It has been suggested that the vertical integration of generation and retailing of electricity somewhat inhibits competition in the electricity market. What is your view on that?

Mr EDWARDS: I do not think so. I think people have moved to a vertically integrated model to deal with the risks of the wholesale market. There are very few stand alone generators in the market today that are not under some form of financial distress. Most of them are negotiating with their banks around work-out arrangements because the reality is that the wholesale electricity market has been very volatile. It was high at the time of the drought, but this summer it has been very low. We have had a lot of demand come off. Whilst you have still got a lot of supply in the market, I think we have had some of the lowest prices over summer that we have had for some time. The way in which companies such as ourselves have attempted to deal with the risks and that volatility is to vertically integrate so that we have retail offsetting what would otherwise probably be a challenging environment for a pure generator.

CHAIR: It has actually been suggested that, in fact, retailers like TRUenergy have contributed to the lack of profit of the generators by flooding supply, forcing down the price, and the generator margin come lower, the retail margin is perhaps a little bit bigger, but overall affecting the dynamics of the supply chain, and thereby perhaps also forcing down the value of generation assets at a time when some of them are likely to come on to the market. Will you respond to that suggestion?

Miss STOCKMAN: Can I respond as this a topic dear to my heart?

CHAIR: Yes.

Miss STOCKMAN: There are two players in the market: there are generators and retailers. Generators are naturally long which means that they have got an exposure to prices, and they invest a huge amount at some cost so they really want to enter into long-term contracts so that their financiers have got the certainty of revenue coming through. That is where they come from. On the other side, a retailer does not want to enter into long-term contracts. Let us say I do enter into a long-term contract and, for a variety of reasons, the spot market prices are lower and I have got Ross here, who is a competitor has not entered into a long-term contract, he can undercut my prices very quickly because I am stuck into this fixed relationship. So a retailer is naturally not going to want to enter into long term contracts.

Vertical integration seeks to balance that out in the least cost risk way possible. If you did not have vertical integration that requires the participants to enter into long-term contracts because the generation just would not get built. You are either going to have a whole series of generators with long-term contracts with independent retailers or you are going to have vertically integrated companies. That is how it plays out. You cannot resolve the issue of wanting to contract for long term on the generation side with retailers wanting to contract short term.

In terms of vertically integrated players suppressing market prices, what actually happens is not the end that directly does it, how that arises is that natural retailers—let us say, for example, Ergon Energy is not a vertically integrated player, they are based in Queensland, they will seek to buy as many contracts as they can and will over-hedge themselves. If you are generator and you have sold a whole lot of contracts, you have an incentive to increase your generation which will suppress market prices. There is a strategy around how retailers can overbuy and actually force the wholesale market prices down lower. That tends to be what happens and that is part of the reason why vertical integration comes into play because if, as a retailer, I am trying to push down market prices, because that is the outcome that I want to lower my purchase cost, I will either overbuy contracts or I will build peaker power stations so that I can push down market prices.

If I am starting to build peaker power stations I am starting to move into a vertical integration model. That is how that evolves. It is not the case that these vertically integrated players just appeared on the scene and then smashed down the market prices, which hurt the generators. That vertical integration evolved as a result of non-vertically integrated players interacting with each other.

Mr MICHAEL DALEY: Therefore, if you are a non-vertically integrated retailer and you over purchase supply contracts and the demand is not there for you to lay off all of the electricity you have purchased, do you not take a bath?

Mr EDWARDS: Yes. You are long to low prices.

Mr MICHAEL DALEY: Why would you do that?

Miss STOCKMAN: Because it is in your long-term interests to keep the generators generating power.

Mr MICHAEL DALEY: It is a mathematical exercise.

Miss STOCKMAN: It is a trade-off point. It all balances out. There is an optimum point. Obviously you would not double your exposure. You might go to 5 per cent or 10 per cent.

Mr MICHAEL DALEY: There is a huge risk.

Mr EDWARDS: Yes—

Miss STOCKMAN: There is.

Mr EDWARDS: —because you are trading off the risk of being short to high prices or long to low prices.

Miss STOCKMAN: Being short to high prices is a much worse proposition. If you are exposed to high prices you could go bankrupt virtually within hours. I was involved when AGL went bankrupt in New Zealand. That is the situation it was in. Effectively within four days it was out of the market, and it was the major retailer. If you have to pay a little more on your purchase price by over-hedging you are protecting yourself from a catastrophic failure.

Mr JOHN WILLIAMS: Obviously New South Wales is in a transition phase with regard to the separation of retail and generating capacity and that will result in change. Will you be looking at profit centring both aspects of vertical integration in respect of identifying the need to run a profitable generating operation and a profitable retail operation?

Mr EDWARDS: Yes. When we look to make additions to the portfolio, whether it be incremental retail customers or incremental generation, it must stand on its own two feet as an investment. We have a sustainable market only if there is sufficient profit to justify the risk in both steps of the energy value chain.

Mr JOHN WILLIAMS: Based on that, do you see change as we emerge out of this transition phase? Do you see a reduction in retail margins?

Mr EDWARDS: Retail margins are a function of competition in the retail marketplace. There is a natural level of margin based on how much you are prepared to pay to win new customers given the margin available. It probably depends on where the policy and pricing ends up. We will certainly see strong competition in New South Wales. We have had a lower level of competition historically in this State largely because the level of the retail tariff never provided enough head room to justify discounting or because of the amount it cost to attract new customers. You need a certain amount of head room to ensure that people have a reason to change retailer. From our experience in Victoria, once that has occurred it can get very competitive. To be honest, we spend a lot of money standing still in terms of customer numbers every year. We have about 2.8 million customers and we probably lose 25 per cent every year, but we win them back.

Miss STOCKMAN: A lot of money is spent—

Mr EDWARDS: Just churning. That is a trade off with the competition in the market. That is justified and helps to provide lower prices for consumers to the extent that there is margin available.

Mr JOHN WILLIAMS: With the expansion of your retail business will you be territorial? Unfortunately there have been some boundaries in retail in New South Wales historically. Do you see unlimited opportunities throughout the State or will you concentrate on those areas that have a large population?

Mr EDWARDS: Where we target the retail side of the business is a function of the value of the customer and the cost to acquire that customer. It depends where they are, how much energy they use and what tariffs they are on at the moment. We will systematically examine the customer base and the opportunities and look to create value out of that equation. If the population is sparse, some of the more effective acquisition channels are not commercially viable. It does not make financial sense to drive from door to door in a rural district. We can also look at different ways and different channels such as online and telephone approaches. It is a balance depending on the assessment of how much it will cost to win the customer, how long they will be with us once we have won them and the margin over the life of that relationship.

Miss STOCKMAN: We have looked at Tasmania, but we are not presently active there. There are some wholesale issues in that market that prohibit entry at this time. That is not an area in which we have a strong presence, but we are happy to go there. One of the issues with rural electricity customers is that they are sticky, or very loyal, to the established provider. In my experience in New Zealand—which has a much higher proportion of the customer base spread across the country—the customers are very parochial, they value the local supplier and it is hard to get them to switch. It can be done, but you must be smart in the way you market and innovate to them and not treat them like an apartment dweller in Sydney. They are very specific customers and you need to treat them appropriately.

Mr JOHN WILLIAMS: I totally agree. Am I correct in my understanding that you are highly geared in the generation and retail businesses? You were talking about capital costs and some of those things. Do you believe the industry is highly geared?

Mr EDWARDS: In terms of the three key players in the market—Origin Energy, AGL and ourselves—I would say no. To operate in the market you need to have an ongoing, stable credit position. You need an investment-grade credit rating, which is triple-B minus or above based on Standard and Poor's ratings. Most of the players have gearing between 20 per cent and 40 per cent. If the standalone generators have had long-term vesting contracts and if wind farms have a long-term locked in revenue stream they can sometimes support gearing up to 60 per cent or 70 per cent.

Miss STOCKMAN: It also depends on the ownership—whether it is publicly or privately owned. That will have an impact on how they have been funded depending on government policy at the time.

Mr JOHN WILLIAMS: We will see this move in New South Wales to a takeover. There is obviously a concern about security. It puts them in a vulnerable position in maintaining a constant supply.

Mr EDWARDS: For anyone looking to acquire those assets it will be a function of the certainty of the revenue streams and the risk profile. Historically, when the market was a bit younger, banks overstated the certainty of merchant revenues, which is why a lot of the existing generators that have had long-term arrangements in place are over-gearred. However, the major players are not over-gearred.

Miss STOCKMAN: The credit worthiness of retailers in particular is important for the renewable energy scheme. If a renewable energy developer wants to sell a long-term, off-the-track contract to a retailer with a good credit rating, it will help to fund that particular project immensely. Credit is a very important issue, particularly for retailers.

Dr GEOFF LEE: Can you tell the Committee about TRUenergy's current generation development projects?

Mr EDWARDS: Just in New South Wales?

Dr GEOFF LEE: Mainly in New South Wales, but I am interested in any that will affect supply in New South Wales.

Mr EDWARDS: We look to have a portfolio of development opportunities. As a result, in New South Wales we have one baseload energy opportunity—Tallawarra B near Wollongong, which is a gas-fired site—and we picked up the Marulan site out of the privatisation process. The Marulan site is an open-cycle opportunity to help meet peak demand. They are our two sites for thermal.

On the renewable side, we have a few sites in the region at various stages of development—wind sites—and we will be looking ideally to commit to wind projects in New South Wales in the next year or so. For us, generation is around meeting our customer requirements, so to help with that balanced portfolio, with us now having such a substantial share of the retail market here in New South Wales, we are looking to solidify that and complement it with generation in New South Wales.

Dr GEOFF LEE: Through renewables?

Mr EDWARDS: With both, so for renewables—it is best if you can align them with where your mass retail loads are.

Miss STOCKMAN: We are also not 100 per cent committed to building it all ourselves. If other participants in the market can build better than what we can, we are open to interim and long-term arrangements. We currently do that with EcoGen, and obviously the gentrader contracts are an example of that, so the most flexible option that is reducing overall costs would be our preferred approach.

Dr GEOFF LEE: What is the status of the Mallee Solar Park project, and is the project viable?

Mr EDWARDS: Mallee Solar Park is part of the Solar Flagships Program. We are one of four shortlisted parties and the Federal Government is currently reviewing the revised applications at the moment. It will be viable if we get the support of both the State and Federal governments or reconfirmed support of the State Government and the Federal Government.

Mr BART BASSETT: In your submission you refer to approximately two-thirds of New South Wales energy requirements coming from interstate by 2021.

Miss STOCKMAN: That is probably incorrect, it is an error in the graph, but there is a reliance on interstate energy. The generation capacity for New South Wales is not forecast to increase, according to the Australian Energy Market Operator [AEMO], but demand has been forecast to increase, so you do have a reliance on interstate generation, particularly over summer periods when it can be quite hot, and we will quite

frequently see the interconnectors between Queensland and New South Wales and Queensland and Victoria constrained, which indicates that the demand in New South Wales—particularly Sydney—gets very high.

Mr BART BASSETT: And it does not matter what the graph shows, you are suggesting that we are going to reach capacity with regard to transferring power across the borders?

Miss STOCKMAN: It depends on what happens in other states, and this is the point—you are reliant on interconnectors. If the resources boom in Queensland takes off again, with surplus capacity, potentially New South Wales could be required to export. If the Government's contract for closure program happens in the Latrobe Valley, a deficit of generation may occur in Victoria, which again limits what can happen in New South Wales. The issue is that you have a national market and the role of transmission elements of interconnectors are critical, but we do not know what is going to happen in the future other than that we expect demand to increase within the State. We are not seeing a lot of generation projects being committed in New South Wales—mind you, AGL just announced a wind farm today—but there are things happening in other states that could impact here. That is the point that we are trying to make—it is a national thing.

Dr GEOFF LEE: What do you think the State Government should do to ensure long-term energy security in New South Wales? That probably follows on from something you were just saying, but do you want to expand in that area?

Miss STOCKMAN: In terms of policy development, we are not arguing for the status quo. We do not want you to freeze it and not make any changes. We will talk about certainty and say we want certainty. "Certainty" does not mean the status quo, but it probably means engaging with stakeholders such as ourselves and other participants in the sector in discussions and not providing shock announcements or sudden reversals. We have a change process, but managing well and communicating well to all participants is important, as well as a lot of engagement by the New South Wales energy policy people with the states and the Federal Government. It is of absolutely critical importance to have that cohesive environment moving forward.

Mr BART BASSETT: Based on your own projections and a bit of crystal-balling, what do you think will be the main sources of energy production in New South Wales in 20 or 30 years time?

Miss STOCKMAN: The reality is that your natural resources are coal and gas. Yes, there is wind and stuff, but that is better in South Australia. I would say in South Australia go to wind. If you look at what you have as a natural resource—and not that I would want to be in on this, because it is a crystal ball exercise—would you not sort of think the odds were a little bit more tilted to that? Look at what has happened overseas. In Norway there is hydro, because it is the natural resource. The Texas market is all gas because that is what the natural resource is. In New Zealand there is a lot of hydro. If you had to estimate, you would have to look at what you have to begin with. It does not look like New South Wales has any tidal power, so I would not be betting on that. I think if you have to come up with policy you have to think about what are the basic elements you already have, that you know you have, and at least tilt your policies in favour of those, as opposed to saying that we are going to spend X billion dollars in investing in some technology and we do not know if it works or if it would work in this particular State.

Mr MICHAEL DALEY: Mr Edwards, I refer to a comment you made about carbon tax, which I think was something along the lines of, "It is going to be a long time before anyone makes an investment off the back of it". I do not know how you do business at the moment with the uncertainty around the carbon tax because it could change in 18 months, but assuming that the carbon tax is here to stay, what do you think will be the impact of the carbon tax on your company? What will be your company's approach if the carbon tax is removed in the event of a change of Government in 18 months?

Mr EDWARDS: At the moment, the things we focus on within the market for development are wind to help meet our target and peaking generation to help manage our wholesale risk and meet rising demand. Our market is fundamentally oversupplied base load. In terms of a mix of generation, we have a lot of coal-fired base load power stations, which is why in recent times what has added to it has been peaking generation. A lot of those additions have been from retailers and others who are looking at ways to help manage their risk. Our team at the moment is focusing on those two things, which do not rely heavily on a carbon price to make work. I think if the carbon price is not there at all, the renewable energy target price, the LGC price, should be proportionally higher or equal and opposite, and we are actually seeing quite a drop-off in demand in recent times.

This year, as I have mentioned, we had very low wholesale prices. That has been a function of a number of things seemingly all happening together. We have had economic slowdown with the exchange rate and the dollar impacting plants like Port Kembla and others. They are major energy users that come out of the market, and unless an equal and opposite amount of supply comes out of the market you end up with an oversupplied market. We are seeing a lot of pressure on those manufacturing and major energy users, so that is a consideration—a lot of solar PV in New South Wales. Also the temperature in recent times. We have seen a real change. It is the first time in 30 years where we have had demand falling. We do not see that being it for energy demand and it is on a downhill slope from here, I think it is just a bit of a blip, but we will wait and see how that pans out. We are not planning any real energy plant. The statement of opportunities does not think you need any new energy plant in New South Wales for another eight years.

Miss STOCKMAN: Historically we have had a surplus of baseload plant in the country and that has enabled the carbon debate to take its time. If we were running short of baseload plant and we were taking a long time to discuss carbon we probably could have a significant issue with energy security because who would want to invest in that uncertain environment? But there has not been a real big need to make those large investments. If that had occurred in that case the State governments would have had to help.

Mr EDWARDS: Possibly.

Mr MICHAEL DALEY: So around 2020 then if the carbon price stays where it is the next baseload built in New South Wales will be closed cycle gas?

Mr EDWARDS: Yes, I would imagine. The dynamic is what are the relative fuel costs as well? It all comes down to gas prices and carbon prices and how that compares with coal prices. As a player in the market we do not have any plans whatsoever to build a new coal-fired power station at this point. Whilst you could see a combination of gas and carbon prices which say it is actually still better to build coal, no-one is really confident enough in that to actually put a couple of billion dollars behind it. For us it is most likely to be gas, and that would be the highest new energy source in the market.

Mr MICHAEL DALEY: If the carbon tax were to hit the wall would that change the game for you in terms of coal-fired baseload?

Mr EDWARDS: We still do not actually have a significant requirement for baseload at the moment.

Mr MICHAEL DALEY: In 2020 I mean.

Mr EDWARDS: In 2020, we are not looking quite that far ahead of baseload investment yet. It would at the time. I am not looking at baseload decisions and I think a lot would have to change before we start thinking about developing coal for generation.

Miss STOCKMAN: The other point also is that if you do not have a carbon tax or it goes away what do you have instead? We can imagine that there would be a huge amount of lobbying by certain groups to maybe introduce emissions performance standards, which would then preclude the use of coal. It is not a case of carbon tax, no carbon tax. It is carbon tax and what else could it be, that would impact those investment decisions.

Mr MICHAEL DALEY: You might just have to go and plant a lot of trees instead.

Mr BART BASSETT: My question follows on from what you have said about demand and that it is not as yet justified for any other investment. An earlier witness spoke of the need to better educate our communities better about energy production. Would you also add to that education about trying to drive down energy consumption in the same way as we have tried to do it with water?

Miss STOCKMAN: I think there is a huge role for that in educating consumers, and I think it needs to be a joint effort between government and industry. It is a very tricky issue and there are a lot of social issues that need to be taken into account. In New Zealand I have been through a couple of public conservation campaigns where we wanted people to restrict usage, and you would have some terrible cases where elderly people at home would be forgoing heating and stuff because the campaign had scared them so much. Those are really unfortunate outcomes. That is not what we would want to see. The problem is that the people who typically could reduce the demand are those that probably can afford to pay the bills. So there is a bit of a chicken and

egg problem. You need to appeal to them on a different level. The marketing messages need to be very clear and targeted at the people you want to make the changes, and not impact the people who should not be making the changes.

CHAIR: In your view what should government be doing along those lines to assist in managing demand perhaps in cooperation with organisations such as yours?

Miss STOCKMAN: There are a whole range of options. Some of the stuff I have been involved with is that the New Zealand Government has a Conservation Authority that works with manufacturers and brokers relationships. They may negotiate on behalf of a large number of manufacturers with certain industry participants to install things; for example, machine rewinding. Machines use a lot of power and if they are not optimally tuned they can chew up a lot of energy and increase the cost of distribution networks quite considerably. One of the programs I was partially involved with in New Zealand looked at targeting those participants but the Government got involved and brokered those relationships to make sure it was all fair and above board, but also to kind of legitimise it—it was not that retailers were out to hurt manufacturers—and to facilitate a two-way conversation I guess.

CHAIR: Given time constraints I will flag one series of questions that the Committee will ask you to take on notice. I take it you would be happy to reply to these questions on notice and any further questions the Committee might have?

Mr EDWARDS: Sure.

Miss STOCKMAN: What are the questions first?

CHAIR: The questions relate in the main to alternative forms of energy. I note that you made some comments along the lines that perhaps New South Wales should focus on where it has a competitive advantage or natural resources. Should New South Wales take a lead in developing alternative energies or leave it to other States? How can the New South Wales Government appropriately encourage investment in alternative forms of energy generation? Are there regulatory impediments to investment in new generation projects? What do you think are the most successful examples of emerging electricity generation projects?

Miss STOCKMAN: Does that also include demand side?

CHAIR: Whatever you would like it to include, but it can. Finally, you mentioned the need for certainty and long-term planning and the Independent Pricing and Regulatory Authority's policy on pricing and how that enables you to recoup in a reasonable way over a longer term. Do you have any comments as to retail price deregulation in New South Wales that you want to put on the record?

Miss STOCKMAN: We would like to see retail price deregulation in New South Wales.

CHAIR: You would like to?

Miss STOCKMAN: Yes, please.

Mr EDWARDS: Yes.

CHAIR: On that note, I thank you both for appearing before the Committee today. As I have said, in addition to the questions already flagged by the Committee, there may be some further questions in writing. Your responses to questions taken on notice will also form part of your evidence, which will be made public.

(The witnesses withdrew)

(Luncheon adjournment)

CLARE SAVAGE, Executive General Manager, Energy Supply Association of Australia, sworn and examined:

CHAIR: Before we proceed do you have any questions concerning the procedural information sent to you in relation to witnesses and the hearing process?

Ms SAVAGE: No, I do not have any questions.

CHAIR: Would you like to make a brief opening statement before the commencement of questions?

Ms SAVAGE: I will; I have prepared a short statement. For the benefit of the Committee, the Energy Supply Association of Australia is the peak industry body for the stationary energy sector in Australia and represents the positions of the chief executives of 38 electricity and downstream natural gas businesses. These businesses own and operate \$120 billion worth of assets, employ 61,000 people and contribute \$19.3 billion to Australia's GDP. I am not here today to advocate for or against any particular electricity generation technology. We are a fuel and technology neutral association and represent all forms of generation, including coal, gas and renewables. What is important for New South Wales and for the national electricity market and for consumers of electricity is that it means that electricity is produced at the lowest possible cost while meeting our greenhouse gas abatement objectives.

The New South Wales electricity generation sector is currently dominated by black coal generation. Black coal is the fuel source for more than 90 per cent of electricity that is generated in New South Wales. The predominance of black coal reflects the fact that it is currently the lowest cost source of power generation in the State. However, this may not always be the case. Cost drivers such as labour, fuel, carbon, along with commodity prices such as steel, will influence the long-run marginal cost of electricity generation. Financial factors such as the cost of debt will also have an impact. The relativities between the costs of different forms of generation, particularly between coal and gas, will be heavily influenced by this range of factors. Based on committed generation projects, the Australian Energy Market Operator estimates that New South Wales will not meet its low reserve condition until 2018-19. That means there is currently adequate supply in New South Wales of generation until at least the end of this decade.

The electricity industry is also one of the most capital intensive in the world and is characterised by long-lived assets. According to a recent speech by the Hon. Martin Ferguson, the Federal Minister for Resources and Energy, between \$72 billion and \$82 billion will need to be invested in new electricity generation across Australia before 2030. If you include investment in distribution networks, electricity transmission, gas pipelines and associated infrastructure, that number is actually about \$220 billion. The size of the existing industry is about \$120 billion, so it represents a doubling in the size. To make efficient and commercially viable investments in the stationary energy sector, an open market where a portfolio of fuels and technologies are available is vital. It is important that cumbersome planning restrictions or other forms of regulation do not result in fuels and technologies being unavailable to businesses wanting to invest in generation or access fuel sources in New South Wales.

Remaining an efficient market that is capable of delivering a portfolio of generation technologies at lowest cost will minimise price impacts for New South Wales customers. Where emerging technologies do require government support, this is best achieved through funding the research, development and demonstration of a range of technologies. However, at the other end of the spectrum, funding the widespread deployment of high-cost technologies can be counterproductive and ultimately hurt consumers. The premium feed-in tariff in New South Wales is a case in point. In fact, we strongly support the recent report by the Independent Pricing and Regulatory Tribunal, which recommends winding back this regressive cross-subsidy. Investing in the future grid, which will enable things like increased distributed generation, smart meters and even electric vehicles, will also play a critical role in ensuring we use energy in a smarter way and minimise the need for any unnecessary investment in costly infrastructure.

Demand side management can be a legitimate and cost-effective alternative to new generation, and the Australian Energy Market Commission has recently shown that \$11 billion worth of electricity infrastructure is currently used for only 100 hours a year. The association supports the development of open and competitive energy markets, free from distortions such as retail price regulation. Competition in retail electricity markets, as in other sectors of the Australian economy, provides incentives for businesses to improve service, develop products that meet consumer demands, and find ways to lower costs and pass those costs onto customers. The Australian Energy Market Commission is scheduled to conduct a review into the New South Wales retail

electricity market in 2012. Should the AEMC recommend the removal of retail price regulation, then we consider the New South Wales Government, as a matter of urgency, should act on this to promote a dynamic electricity market in New South Wales. New South Wales needs a market that sends timely price signals for new generation, whether that is centralised or distributed, ensures consumers are incentivised to use energy in smarter ways and ensures electricity is sold to customers at the lowest possible cost. However, it is only governments that can ensure this happens by removing inefficient regulation. Thank you.

CHAIR: What do you think is the impact of a carbon tax on the electricity market?

Ms SAVAGE: The Energy Supply Association of Australia has actually long advocated for a carbon price so our position has been since February 2007 that a well designed emissions trading scheme is actually very critical to the future investment in particular in base load generation.

CHAIR: Emissions trading scheme or carbon tax?

Ms SAVAGE: Emissions trading scheme, so from our perspective we would have liked to have seen it commenced as an emissions trading scheme. We are accepting that it will be a fixed price in the first few years but we do think the move to trading as soon as possible is important. Depending on what the price ultimately ends up being, it will obviously have some impact on the electricity market; it will increase prices. One of the things we are actually most concerned about at the moment is some of the detailed design of the scheme. For example, liable entities are required to pay for their permits up-front; that is even if they are buying permits three to five years in advance. Now when you contract for fuel such as coal or gas, you will often do a five, 10 or maybe even longer than that contract but you do not pay for the coal or gas until you take receipt of it. So from our perspective requiring our industry to pay for carbon permits up-front—and we will hold in excess of \$10 billion worth of permits—is significant and something that will be very difficult for the industry to manage.

CHAIR: You touched on the issue of regulation before and some of the planning frustrations perhaps. Are there particular regulatory impediments to investment in new generation projects?

Ms SAVAGE: I think certainly getting some clarity around carbon is important. If you are trying to make a big investment decision between coal and gas probably at the moment you are tending to make investments in peak load. They are just investments you need to make to get past that next level of demand. As TRUenergy presented earlier today, the demand for energy is reasonably flat at the moment and as the statement of opportunity shows by the Australian Energy Market operator, there is not a need for new investment other than that which has already been committed in New South Wales until later this decade.

There is not necessarily a particular regulatory hurdle but there are things that can improve the investment environment and some of those things are, for example, giving clear signals around whether the Government intends to commit to continuing to invest in the market or whether it is saying privatisation of the assets. There are things like that which certainly help.

CHAIR: And recognising that at the Federal level there is a political divide over carbon tax and the certainty of that, but perhaps putting that aside, various submissions have referred to the need for certainty in government policy to promote investment. What do you think the Government can do, particularly at the New South Wales level, to provide certainty to investors in the electricity market?

Ms SAVAGE: I think the role of government is most important to provide an enabling policy framework. From our perspective, if you look at it from a price and go back, you cannot continue to regulate retail prices because for as long as you sit on that end price signal that runs through to customers, the ability of prices to actually reflect cost is in the hands of someone other than the business. So from the perspective of a market, if you have a competitive market, which the review will look at this year in New South Wales, there is no reason why you need to continue to regulate retail prices.

That is the very first and most important thing that the New South Wales Government can do to make sure you actually get dynamic, responsive market right through the supply chain. And then beyond that it is about making sure that any planning and permit arrangement are not overly cumbersome; ensuring that you have a supply of a different range of fuels, so gas supply in New South Wales is an important source of domestic gas going forward; the arrangements around as the new coal contracts are negotiated in the middle of this year; in terms of the things around privatisation being clear and once you exit the market, not having that

threat that the Government could re-enter the market. Those kind of predictable, stable regulatory frameworks are really important.

CHAIR: Picking up on some of your earlier comments, in your submission you acknowledge that there are market failures to energy efficiency. Where in particular would you highlight these failures as being in the market and how should they be addressed?

Ms SAVAGE: The Energy Supply Association has the view that there are five key barriers to energy efficiency in the market. The first and foremost one is price, so the fact that you do not actually have price signals that reflect the cost of energy at any particular time of the day so there is no incentive to use energy efficiently from that perspective. The second one comes down to information asymmetry. Often people do not know how to conserve energy so there is some education that needs to happen. You get problems like what we would call split incentives, for example, a landlord-tenant problem; if you are renting, you cannot actually invest in a property because you do not own it. Low-income households often have difficulty accessing capital. Some of the technological inputs that need to happen to houses might actually require some up-front capital, so from our perspective there is that issue with low-income households in particular.

I am an economist and there is something that we like to call bounded rationality but that actually means that in the past energy has been fairly relatively cheap in terms of the basket of goods that households have and often people just do not care. They might know how to save energy; they might know that they need to turn their lights off but the energy it would require them to go and turn the light off is just something they are not willing to expend. From our perspective when you find solutions to energy efficiency problems, they need to be in one of those five spaces.

CHAIR: Do you have some suggestions for solutions?

Ms SAVAGE: Actually we do. We actually believe that at the moment if you look across the Commonwealth, State and Territory governments there is a lot of "wasted energy" on energy efficiency issues; there is a lot of piecemeal activity; there are a lot of funds, with \$5 million thrown here or \$10 million there. From our perspective you actually need to get a central agency that is responsible for energy efficiency advice. You could call it Energy Efficiency Australia—I think that is what we suggested but I do not think we are wedded to the name—but it should be staffed and resourced in such a way that you get all the energy efficiency expertise, you pull all the funding into one place, you look across the industry, you look across what is happening because sometimes you can even have incompatible schemes even within jurisdictions, let alone between jurisdictions and try to harness all of that into a single set of policies. We would see a body like that advising something like the Council of Australian Governments on what is the most effective source of energy efficiency.

CHAIR: What is your sense of the reception from the various State entities that you might have floated that with?

Ms SAVAGE: We did a lot of work on this a few years ago before the Prime Minister's task group was established and there was a fair degree of reception in different jurisdictions. It would be fair to say that nobody likes ceding power anywhere and some of these kinds of initiatives can make good announcements but from the perspective of good policy, I think there was definitely some interest and it is something we will continue to pursue with governments.

Dr GEOFF LEE: In your submission you talked a little about research and development and the importance of the Government in not distorting the market through artificial interventions and not picking winners in terms of technologies. What is your opinion on the current research and development situation in New South Wales with respect to energy?

Ms SAVAGE: Research and development in this country in the energy space, whether you are in New South Wales or anywhere else, face similar challenges in that we have got lots of small funding arrangements that are going towards different projects. One of the things we would like to see is a clear articulation of what our challenges are in this space. Some of the things we support as an industry is accepting that Australia is, for example, a fast follower rather than a leader in certain things; looking at what are our technology-specific circumstances; so where you actually do need to know something in an Australian context to be able to promote it rather than being able to adopt it; being able to target research and development solutions into that space is fairly important.

As I said with the energy efficiency measures, I think the general feeling is it is a little bit piecemeal in that you tend to have the Commonwealth and the States overlap; sometimes they overlap well and can support a single project but sometimes they can be at cross-purposes. From our perspective there is big funding challenge in terms of research and development for our industry, and not just in generation—some of the network technologies as well around the smarter grid are really important too, so having a comprehensive look at what is required and working cooperatively with the Commonwealth Government is important.

Dr GEOFF LEE: You advocate the pooling of the understanding and the moneys into a larger pool?

Ms SAVAGE: Yes.

Dr GEOFF LEE: And following overseas and just be early adopters?

Ms SAVAGE: No, not always following overseas. It is about looking at what technologies are on the horizon and understanding which ones have local conditions. For example, if you are fracturing granite that is 4½ kilometres into Australia's core, that probably is something that has got fairly Australia-specific requirements. If you are looking at drying a particularly sort of coal in the Latrobe Valley, that also has fairly specific local conditions. If you are looking at putting photovoltaics on a roof, that is a technology that we import from China and it is something that does not necessarily have an Australian-specific context. It is about making decisions across the portfolio, not picking winners on a particular technology—not saying, "We're going to have renewable over gas over coal." You would probably want to have a spread of technologies across the different types of fuel sources but then look at what we can influence and where we are better to be a fast follower. It is not always going to be a case of being a fast follower.

Dr GEOFF LEE: Carbon capture and storage is obviously a big issue for the coal industry. What is your view of the current research and development, not only at Commonwealth level but at the New South Wales level?

Ms SAVAGE: There have been a range of quite successful projects. There is one in New South Wales where they have been partnering with the CSIRO on a post-combustion capture and storage project. There have been some successes in the carbon capture and storage space. One of the challenges carbon capture and storage has faced globally and not just in Australia is getting the big up-front commitment to funding a demonstration plant. We are still at the point where each of the phases of the supply chain is seen to be understood but how it actually comes together has not been demonstrated at scale. You can look at a one megawatt plant in New South Wales but that does not demonstrate how it is done when you have an 800 megawatt plant. From that perspective it is unfortunately about big licks of capital.

Mr MICHAEL DALEY: Do you think there is sufficient competition in the wholesale and retail electricity markets in New South Wales at present?

Ms SAVAGE: Absolutely.

Mr MICHAEL DALEY: It has been put to this Committee that given that there is no retail book left and the future of stand-alone generators is bleak, there is probably no capability for another entrant into retail or wholesale markets in New South Wales in respect of the privatisation of the rest of the Government generation book. Do you agree with that?

Ms SAVAGE: I think it will depend on a number of things. Your first question was whether I think the wholesale and retail markets are competitive. The wholesale market is a gross wholesale market, which is managed by the Australian Energy Market Operator, and generators bid into that market. There is a high degree of transparency around those prices. We have actually seen falling prices in recent years. If you talk to some of the generation businesses they are crying poor these days.

Mr MICHAEL DALEY: They are indeed.

Ms SAVAGE: It is a fairly cut-throat business and from my perspective I would say it is highly competitive. The retail market, at the other end, is the same. TRUenergy presented before and I think after TRUenergy won the EnergyAustralia customers AGL said they would make it their life's work to win every single one of them off TRUenergy. I do not know how they are going but it certainly is a fairly vicious sort of

market. I think that from some perspectives customers find the door-to-door sales techniques and some of the other things difficult, so as an industry we have to look at how we manage that. It is definitely a very competitive market. Your question is also a little bit about market structure. From the perspective of the sorts of assets you are selling, certainly the Australian Competition and Consumer Commission will look at any proposed acquisitions and make a judgement about whether or not they can proceed. Provided the commission is satisfied those acquisitions can proceed there is not any particular concern about competition in the energy market from that perspective. Whether you have three, five or seven players the most important thing is that they are competing vigorously with each other.

Mr MICHAEL DALEY: In your submission you say the New South Wales Government should remove retail price regulation and you stressed it again today. Would that have an immediate downward effect on prices?

Ms SAVAGE: It is hard to know what the impact of removing retail price regulation would be. Probably in the long run you would say it would be a downward pressure on prices. In terms of the experience in Victoria, some reports say that up to 75 per cent of customers are on market offers, which means most Victorian customers have switched from the standing offer. If you look at where the standing offer is currently, the discounts available in the Victorian market are at least 15 per cent off the standing offer. International studies have been done on churn rates and Victoria has one of the most competitive markets in the world.

Mr MICHAEL DALEY: We heard this morning the churn rate is 25 per cent.

Ms SAVAGE: I am not sure of the exact figure but I know it is one of the highest churn rates in the world. When you have a dynamic electricity market and you give participants the opportunity to compete vigorously, and also when they put their offerings—one of the mistakes that Victoria has made is there is a moratorium on time-of-use tariffs. I am not sure whether you are aware they have had a mandatory roll-out of smart meters in the last year and it has just begun. That is an important technology but they are actually blocking the reform that is needed to unlock many of those benefits. Enabling retailers to start offering their customers different types of products—whether or not they want to stay on fixed prices, which some customers may want to do, or whether they want to be rewarded for using energy at different times of the day—is when you will see dynamic performance in our retail markets; when you stop regulating price.

Mr MICHAEL DALEY: On page 5 of your submission you talk about the interstate connectors and state:

These are all regulated interconnectors where the operators receive a fixed annual revenue based on the value of the asset as set by the AER, regardless of actual usage. The revenue is collected as part of the network charges included in the accounts of electricity endusers.

Could you hazard a guess as to what percentage of the average family's household bill is attributable to the interconnectors?

Ms SAVAGE: It would be very small. Transmission itself is usually about 8 to 10 per cent of a bill and that is for all transmission assets including interconnectors.

Mr MICHAEL DALEY: Just domestic bills?

Ms SAVAGE: Yes. If it is 10 per cent for all transmission I would have thought interconnectors would be a very small component of that. I can take it on notice if you want; I do not know the answer.

Mr MICHAEL DALEY: No, that is fine.

Mr JOHN WILLIAMS: In your submission you suggest that New South Wales would be an exporter of energy. That is in direct contradiction of a statement made by TRUenergy, so I am confused.

Ms SAVAGE: What we have said there is you could be; it can go either way. At the moment some would say we have seen over-investment in generation capacity in Queensland which has been driven by Queensland Government policy over the years, so often you will see Queensland exporting into New South Wales. It depends on where the different demand-supply balance happens. Another aspect is that some New South Wales assets are underutilised so there is capacity to increase their generation output. If you had lower

demand conditions in New South Wales and increased demand in Queensland there is no reason why you would not see New South Wales exporting to Queensland.

Mr JOHN WILLIAMS: Does the market have the capacity to recognise that? Based on what we have seen, currently in New South Wales if a generator does not have an alignment with a retailer they are in serious trouble as regards their ability to sell their product at a profit or break even. It sort of excludes them even from participation until demand gets to a level that brings them back in. This is going to be a real challenge in the future.

Ms SAVAGE: Wholesale prices are suppressed at the moment for a range of reasons. Part of it might be a slight overhang of capacity in Queensland. Some of it may be to do with the renewable energy target, which means that you see suppression of wholesale prices because there is some revenue being generated in alternative markets. This is having an impact, particularly on base load generators and their revenues at the moment. It has also been a cool summer and it was a pretty mild winter last year so from that perspective it will always have an impact. If you cast your mind back three years when there was a drought, pool revenues looked very different. It is a cyclical thing. I do not think it is as much to do with the relationship between generators and retailers as it is just the general wholesale market conditions at the moment.

Mr JOHN WILLIAMS: Looking at the way the industry is structured and talking about the national grid there seem to be advocates for all parts of the network—generation, distribution, retail. Obviously New South Wales is going to cut itself adrift from involvement in the market and regulating it. Are there enough people in the structure of the industry to provide national security for electricity supply?

Ms SAVAGE: I think governments will always be concerned about energy security and they should be. Even when New South Wales decides to privatise its assets New South Wales will remain a member of the Standing Council on Energy and Resources and that is the oversight body for the energy market. The Australian Energy Market Commission makes the rules and the Australian Energy Regulator basically makes decisions on how the network assets receive revenues and also monitors compliance with the rules.

Ultimately it is energy Ministers who have oversight of both of those bodies. I would not say that New South Wales is ever going to cast itself adrift from the market. The sort of market that energy is, because of the fact that it is an essential services, means that it is never far away from government. They do not own the asset but the reason people like us get paid money and have jobs is because governments are very clearly focussed on energy security outcomes. I do not think there is any risk to energy security from any of the changes that are proposed in New South Wales.

CHAIR: Some submissions to this committee suggest that the structure of the existing grid presents a barrier to alternative forms of generation. What is your view?

Ms SAVAGE: Will you elaborate a little more on what they were getting at?

CHAIR: In essence my understanding is that the physical location of the grid, which is not necessarily connected or even nearby some of the alternate energy locations, provides another barrier, and the dynamics around that—I do not pretend to be an expert—but you may have some insights.

Ms SAVAGE: Lots of things have been said about the grid and I was trying to work out what part you were referring to. The grid was established historically obviously so you had big State-owned energy corporations—they were commissions then—that built the network in New South Wales mostly out to the Hunter and in Victoria mostly out to La Trobe valley. That was how we got a big centralised backbone to the grid and then it came in to feed Sydney and Melbourne and you saw similar things in Queensland as well. A lot of people would say "How do we get transmission out to places like Innamincka?" where there is, for example, geothermal resource which is thousands of kilometres away from major capital cities.

That question is basically dogging transmission policy, as we would call it, going forward. There have been suggestions of things of what they call scale efficient network extensions which means that, I like to refer to it as the *Field of Dreams* theory—I do not know whether you have seen that movie—but you build the baseball field in the view that people will come. You build the transmission grid in the view that people will come and invest. I have some sympathy with that approach but ultimately someone has to pay for those investments. What you end up doing is asking customers to pay for it in the hope that someone will come and build. It really is a trade off between trying to get the most efficient network today, and customers bearing the

risk of an overbuilt network as well. It is something the Australian Energy Market Commission is looking at. They are doing a transmission frameworks review which is sort of pulling together some of these issues. To be perfectly honest I have never met four people in the industry who would agree on what should happen with transmission policy so it is something on which we have not even been able to make a submission.

Mr BART BASSETT: The submission talks about government having some influence on the demand side rather than just decreasing generation. What is your view on how government can get involved, considering what was said earlier that it has been advertised elsewhere so the people who cannot afford, tend to stop using electricity for heating where, on the other end, where people can afford they are the ones who do not care?

Ms SAVAGE: I know it sounds as if I am harping on about this but the most important thing you can do is deregulate the price. In terms of dealing with the most vulnerable in society that has absolutely got to happen but there are ways to do that. When you deregulate price, if you look at the investment that goes in the network, it is not the old woman down the street who has six reverse cycle air conditioners, a pool pump and three plasma televisions, but it is ultimately those people who run those things at 5 o'clock or 6 o'clock in the afternoon when they get home from work, and then pop on the dishwasher and the washing machine. That is what is driving up peak demand.

Peak demand is the single biggest cause of network investment in this State. The fact that you have rising peak demand, and falling average demand, means that you actually need to build the networks bigger and bigger to charge them over a smaller number of hours because you actually charge over average use not over maximum demand. The analogy that I find useful is it would be like building the Sydney Harbour Bridge big enough that no car ever had to pause in peak hour. That is essentially what we have to do with the network. So getting a price signal into a home is the most important way of making sure people start to use energy more effectively.

Mr BART BASSETT: I refer to the use of electric vehicles in the future, what are your projections of what you think the take-up will be?

Ms SAVAGE: We have not as an association made a projection of electric vehicle take-up just yet. It is work that we have started to look at that we are considering ourselves. Certainly as sellers of electricity we would love to see electric vehicle take-up. One of the most important things about electric vehicle take-up will be the charging style. If you do still have a situation where time of use is not reflected charging electric vehicle could actually help the peak demand situation if people charged overnight. You would actually do what we call flatten the load profiles so you do not have those big jumps in peak demand and the cost of peak demand. But if you do not put the right charging mechanisms in you could actually end up with all these mini peaks or, at worst, people are charging their car as soon as they get home from work which makes the peak even worse. The sorts of things we are concentrating on at the moment is making sure that the policy settings that will surround electric vehicle uptake will actually mean that they are an asset to the system rather than the opposite.

Mr BART BASSETT: You talked about freeing up the retail market so that people can look at what is going to best suit them. What role do you think Government has in regard to promoting or assisting people to look at their demand and how they might be able to change their behaviours?

Ms SAVAGE: One of the things we have found, because prices have obviously been rising right across Australia in the past couple of years, so last year we did quite an extensive customer focussed research and started talking to customers about what their experience with the rising prices have been and how much they understand about how they are managing their energy use. One of the things that they consistently said in the focus groups was that they hate us, but apart from that, that they did want even more information about why prices have been rising and how they can use energy more efficiently. I think there is a big case for the industry and governments, both State and Federal, to work together in terms of educating customers around how they use energy, whether it is turning your air conditioner to 24° instead of 21° or something like that. There are lots of practical things people can be educated about which would make a big difference.

Mr JOHN WILLIAMS: You referred to building one basket for developing ways households could save electricity, if you had that basket today where would you concentrate your effort?

Ms SAVAGE: At the household level?

Mr JOHN WILLIAMS: Yes.

Ms SAVAGE: I would have to take that on notice but I think some of the things, home insulation, for example, makes a big difference as well as when you use your appliances. In terms of the biggest difference around cost to the system is peak demand. It is about educating people to use less between 3.00 p.m. and 8.00 p.m. is fairly important. The Western Australian Government through its utilities ran what they called the Beat the Peak campaign over about four years. It was purely and simply designed to educate customers about switching off through that period. You raised a question before about conservation in water and it was sort of a similar philosophy about getting people to appreciate that they can still run their air conditioner—we are not saying not to have the things that you need—but that is not the time also to put on a load of washing or pop on your dryer: do that at night time if you can. Getting people to switch is the most important thing.

Mr JOHN WILLIAMS: New South Wales has a spasmodic approach to the introduction of Smart meters. I noticed that your origins are Victoria where there was a big roll out of Smart meters. How effective has that been?

Ms SAVAGE: I would say to you that the industry could have, and us in particular, could have been better at talking to customers about the benefits of Smart meters before the roll out. I think one of the challenges in Victoria has been we have had a mandatory roll out but a lot of people do not understand why it is happening and so ensuring that customers understand the benefits, are able to access those benefits, so not having a moratorium on time-of-use tariffs when you roll out Smart meters is fairly important as well. In New South Wales it has been more of a voluntary approach to it but Energy Australia, which is now Ausgrid, has done quite a significant scale roll out of both Smart meters and time-of-use tariffs. My understanding is it has had a very positive reception.

One of the questions we did ask in that focus group research last year was about Smart meters and Smart technologies. Certainly in Victoria there was fairly negative feedback about it but in all other jurisdictions when it was explained to people that it would help them to manage energy use throughout the day the reception was very positive.

Mr JOHN WILLIAMS: That has to work in conjunction with de-regulated pricing?

Ms SAVAGE: Yes, absolutely.

CHAIR: I am still struggling to understand why they have banned time-of-use tariffs?

Ms SAVAGE: I cannot speak for the Victorian Government as to why it has decided to do that. It was a commitment of the previous Labor Government and the incoming Liberal Government continued with the policy. It is certainly something that we believe, having time-of-use tariffs is an important way to unlock the benefits of a smarter grid and of a Smart meter in particular.

CHAIR: I would understand it if you did not have a compulsory smart meter. It seems crazy to do one and then not the other.

Ms SAVAGE: It is not for me to speculate on the motives of the Victorian Government.

CHAIR: Did I call my Victorian colleagues crazy?

Mr BART BASSETT: I refer to the Beat the Peak campaign in Western Australia. Did you see a significant change in consumer behaviour over that period?

Ms SAVAGE: Initially they tested public understanding and when they were tested again they retained the message and understood. They have just started to see changes at peak time. I will have to provide the numbers on notice because I am not sure and I do not want to misquote them. They invest an enormous amount of money to deliver peak demand, so there are real benefits to be gained from spending a couple of million dollars on an education campaign.

Dr GEOFF LEE: Your submission states that there is very little certainty about which fuels and technologies may contribute to electricity generation in the future. What do you think will be the main source of electricity in New South Wales in 20 years?

Ms SAVAGE: I have the benefit of having heard that question asked earlier. It will be fundamentally determined by the gas price and the carbon price and the interaction between the two. Obviously coal prices are also important and renewables will always have a role to play. At least 20 per cent of our generation will come from renewables by 2030 and they will have an increasing share over time. Within the next 20 years thermal generation will have a significant role to play. As I said, the trade-off between coal and gas will come down to the changes between coal, gas and carbon prices. For example, if you had a gas price of \$8 or \$9 a gigajoule, you would need a carbon price well in excess of \$70 before you would make coal uncompetitive. We live in a world with gas prices of \$3 to \$4 a gigajoule. That enables gas and coal to compete vigorously, particularly with low carbon prices. As the price of gas increases—and we may see coal prices increase as the coal contracts unwind in New South Wales this decade—much of it will depend on the interaction between the three. However, I do not really know.

CHAIR: What are the most successful examples of emerging generation projects?

Ms SAVAGE: In the Australian context?

CHAIR: Or internationally.

Ms SAVAGE: There are many exciting things happening in emerging technologies. Some Australian companies are developing wave technology. The CETO wave energy technology developed by Carnegie is very interesting. The company has a successful pilot project at Fremantle. Geothermal technology is also interesting, but there is much work to be done to prove it up. Wind energy will continue to have a strong role to play because it is an established renewable technology. Some of the large-scale solar facilities offer good opportunities, particularly if they can be well located in terms of the solar peak and demand peak. There are obviously other technologies such as carbon capture and storage, which Australia will rely upon if we cannot find zero-emissions baseload technologies and we continue to have carbon constraints going forward. Governments may wish to consider nuclear energy in years to come. It is certainly not on the political agenda now, but if governments can satisfy themselves that it is safe and reliable it could be part of the mix.

CHAIR: What do you think the Government should do to ensure long-term energy security in New South Wales?

Ms SAVAGE: Without a doubt, it should deregulate the price.

Dr GEOFF LEE: It is a surprise to hear you say that!

Ms SAVAGE: I have done what I came here to do.

Mr JOHN WILLIAMS: There has been a common thread. The witnesses must have got together before giving evidence.

Ms SAVAGE: It is very hard. If you sit on the price at one end and want to ensure security of supply that is a risk strategy.

CHAIR: I attended a conference at which the Federal Minister Martin Ferguson gave the same advice.

Ms SAVAGE: It makes sense. I understand why governments are concerned to ensure that markets are competitive. However, when you have a fiercely competitive wholesale market and a regulated middle bit, there is not a heck of a lot—

Mr JOHN WILLIAMS: We have seen how that works. It can work to the benefit of the retail margin if it is regulated. Once you have set the price, it is there for someone to take advantage of to increase their margin. We have seen that demonstrated. With deregulation of pricing we see some of the advantages of smart meter technology in the true sense. Households can then start to enjoy some of the real benefits of reducing consumption.

Ms SAVAGE: Absolutely. We had a study undertaken by Charles River Associates a number of years ago that indicated that retail price regulation can actually dampen competition. We would expect to see increased competition.

Mr JOHN WILLIAMS: I can predict what our first recommendation will say.

Ms SAVAGE: I hope so.

CHAIR: Thank you for appearing before the Committee today. You have been very efficient in responding to questions and we thank you for that. However, the Committee may have some additional questions and they will be sent to you. The replies to those questions will form part of your evidence and will be made public. Would you be prepared to provide written replies to any such questions?

Ms SAVAGE: Of course. Thank you for your time and for listening.

(The witness withdrew)

RUSSELL MARSH, Policy Director, Clean Energy Council, affirmed and examined:

CHAIR: Thank you for appearing before the Committee today to give evidence. Do you have any questions concerning the procedural information sent to you about the witness and hearing process?

Mr MARSH: No.

CHAIR: Would you like to make a brief opening statement?

Mr MARSH: I thank the Committee for inviting the Clean Energy Council to appear. The council is the peak industry body representing Australia's renewable energy efficiency industry and it has more than 620 members. We commend the New South Wales Government for recognising the importance of addressing the long-term energy security of this State and acknowledging the important role that renewable energy will play in reducing greenhouse gas emissions to mitigate the effects of climate change.

Currently only 7 per cent of New South Wales's electricity comes from renewable energy sources and the remaining 93 per cent comes from fossil fuels. The majority of this renewable energy is generated using hydro technology and relatively small amounts of wind, solar and biomass technologies. Transforming the New South Wales economy to a low-carbon economy will require the accelerated deployment of proven clean energy technologies such as wind, solar and hydro. We believe that the deployment of clean energy will bring massive economic benefits to New South Wales. Up to \$10 billion of new investment and about 4,000 jobs could be created in the wind industry alone, and much of that investment would be in rural and regional areas.

CHAIR: In your submission you say that investment in energy generation requires consistent and effective regulatory and planning policies. Can you expand on that and tell the Committee which regulatory and planning policies are most important?

Mr MARSH: There are two answers to that question. First, there must be consistency in Federal policy. At the moment the renewable energy market is suffering from inconsistency at the Federal level. There has also been uncertainty about the carbon price, which we hope is now drawing to a close. There is also ongoing uncertainty about the future of the renewable energy target—that is, the main Federal mechanism that supports the deployment of renewable energy. Moving to the State level, I guess it is around certainty in planning policies. At the moment there is one thing in particular that the industry is concerned about, and that is the planning guidelines that have been drafted for wind energy in New South Wales, which we think place an unfair onus on development of wind energy facilities that is not put on other energy generation technologies in New South Wales. That creates uncertainty for the industry in terms of when and where they can deploy wind energy technologies in New South Wales. The other one is a minor one to do with some of the network planning to do with the deployment of household level photovoltaic systems in that it can be challenging to get the network connections you need to deploy a photovoltaic system on your house.

CHAIR: In your oral and written submissions you say that the wind industry could provide up to \$10 billion in investment and 4,000 jobs in New South Wales. What are those figures based on? I should point out that my understanding is that in the United States, where there is a significant wind industry, most of that investment was in wind turbines manufactured in China. So in that context could you give us the basis of your figures?

Mr MARSH: Sure. The figures are calculated on having an understanding of how many wind turbines could be deployed in New South Wales. We have an understanding of how many projects there are proposed for New South Wales and we can then work out how much investment will be needed to deploy those. In terms of that investment going into regional and rural areas, you are right. Some parts of the wind turbine will come from overseas—certainly the bit that goes on the top, what is called the nacelle, and the blades are usually manufactured overseas—but the majority of the rest of the wind turbine can be manufactured in Australia. We have three tower manufacturers in Australia. None of them are based in New South Wales, but there are three turbine tower manufacturers based in Australia, and obviously Australia has a good supply of steel.

A lot of the content of a wind turbine development could come from Australia itself, and obviously locally a lot of work goes into construction and deployment of a wind farm. The expectation is that most of that will be sourced locally, a lot of the balance of systems will be sourced locally, a lot of the labour will come locally, and also a lot of the investment ends up in the broader community. When you have a wind farm being

built, you get a lot of people travelling into the area, so things like local supermarkets, pubs and hotels benefit from the wind farm—not just in the short term but on a long-term basis. There is evidence in certain places where there are wind farms now that local pubs or hotels are really happy that the wind turbine is there because it can bring tourists into the area and people coming to visit the wind farm will stay and use the facilities in the local area.

CHAIR: Those figures really are based on the number of wind farms potentially over time, assuming they are built in Australia?

Mr MARSH: That is based on our expectation of the amount of turbines that could be deployed in New South Wales and the amount of investment that would then flow into New South Wales as a result of that deployment.

CHAIR: I do not have a predisposition to any type of technology, but I do try to read as much as I can in the area. One article which came up earlier this month was *Mail Online* in the United Kingdom, and I would be interested in your perspective on it because it is a fairly damning analysis of wind farms in the United Kingdom under the heading: "£120 billion gamble on wind turbines: Green energy 'ten times dearer than power stations'. It states:

... investment in wind farms will have to be backed up with the building of gas turbine power stations to ensure the lights stay on when there is no wind.

Professor Hughes, who is an established authority apparently, said:

There is nothing inherently good or bad about investing in renewable energy and green technology. The key problems with current policies for wind power are simple. They require a huge commitment of investment to a technology that is not very green but which is very expensive and inflexible.

I would like to hear why that is not agreed with.

Mr MARSH: Sure, and I guess there are a number of points.

CHAIR: Are you aware of the article?

Mr MARSH: I am aware of the article, but those arguments are not new. We know that renewable energy costs more than existing technologies. We do not shy away from that fact. If we put that in context, we know that the cost of renewable energy is getting cheaper—wind power is now the cheapest form of renewable energy we have across Australia and it is getting cheaper. That is to say, the deployment of wind is cheaper than it was. The analysis we have done in terms of cost to consumers, if you like, is that the cost of deploying wind in Australia is only going to be around a couple of per cent of people's household bills. We are not talking about a lot of money to deploy wind and renewables in Australia.

To pick up the point about reliability, saying if you build a wind farm you have to build other generation to back it up, it is not the case that if you build a wind farm you have to have another power station built next to it with exactly the same capacity because when the wind does not blow you need that power. Across our network we have flexibility and fluctuations of demand and generation, and our network is designed to do that. As far as I am aware—and the market operator backs this up—we have never had to build a power station purely on the basis of having wind generation in the system. In some places—and South Australia is an example—we are putting more wind in and deploying less gas and coal than we were. In some places you can say that actually deploying wind means you can deploy less of other technologies, so yes, it is variable. That variability is easily managed, it can be forecast to a certain extent, and certainly at the moment our market operator is not concerned about the need to have back-up sitting there just because a wind farm may go down. They have back-ups sitting there for a whole host of reasons. If coal-fired power generation unexpectedly goes down, that is a bigger problem than a wind farm not working at any particular time.

Dr GEOFF LEE: Your organisation commissioned a report on the financing of clean technologies called "Navigating the valley of death". What were the findings of the report and what can governments do to encourage investment in alternate energy projects?

Mr MARSH: "Navigating the valley of death" was to look at how you might bring forward emerging technologies. It was effectively saying that we have great ideas for a whole load of technologies, some of which

we have heard about like marine, geothermal, some of the larger scale solar technologies, which get very good research and development money. We have great universities for research, certainly in solar PV—some world-leading universities—but as you try to move those technologies from the lab bench to the market it gets increasingly more difficult to get those technologies on the market. The valley of death is effectively how you move them through that market.

We have suggested a number of things that governments can do at a Federal and State level. Some of them involve putting up money, so looking at what is it in terms of market stimulation that governments can do to bring those technologies forward. We are looking at where those technologies are suitable for particular states, looking at how we can, as a State, help fund those technologies forward. It can be a range of things. It could be grants, it could be some other form of subsidy, but not only money, it could be things like setting up centres of excellence for helping companies work out how they develop in the market, almost providing them with office facilities and business management support.

A lot of these technologies come from guys in universities who are great at inventing technologies but probably do not really know much about running a business, and often one of the biggest barriers can be that they have a great technology but no idea how to market it. I think there are some non-market subsidy mechanisms that governments can look at that can stimulate those technologies and help them get along that curve, but ultimately it does come down to what the cost of that technology is compared to other technologies in the market, which often means some form of revenue support, be that through a feed-in tariff or, as we have at a Federal level, the renewable energy target.

Dr GEOFF LEE: You briefly mentioned government assistance. There are a number of green energy schemes operating at a State and Federal level. How effective are the New South Wales schemes?

Mr MARSH: It depends which one you pick. To pick one that I think everyone knows about would be the solar bonus scheme in New South Wales, which started off at 60¢ under the previous Government, was reduced to 20¢ and has now been removed. Putting aside whether you think that was a good idea or not, it certainly ensured that a lot of solar PV was deployed across New South Wales. In terms of it setting out to achieve its objective, I think you can certainly say there was a lot of solar PV deployed in New South Wales as a result of that policy.

Dr GEOFF LEE: I do not think there is an argument by anyone on that one.

Mr MARSH: Sure. Looking at the numbers obviously it has helped bring the cost down. That policy not only helped householders install PV, it also helped bring the cost down. So actually the cost of PV is a lot lower than it was and it means that we are getting to a point now where solar PV is almost able to stand on its own; it is almost at a point where it does not need additional government subsidy to make it viable. I think that is an example of policy that whilst on the one hand may not have been well designed initially, it has actually brought some benefit both to the industry and to householders. Householders who now have solar PV systems on their roofs will be able to reduce their electricity bills by some margin, obviously by how much depends on the size of the system and their actual energy use. It certainly was a policy that may not have been designed in the best way but it did bring some benefits to New South Wales householders.

Mr MICHAEL DALEY: In your submission you say that the transmission system can present a challenge to connecting alternative forms of energy generation to the grid.

Mr MARSH: Yes.

Mr MICHAEL DALEY: Can you give me an example of one of those? What are the barriers that emerging forms of energy generation face? I think you have answered that in part. How can governments better facilitate access to the grid?

Mr MARSH: Sure. My answer is similar to the answer given by the previous speaker. Most of the renewable energy resource, be that geothermal wind or even solar—leaving aside household solar for the moment—is in areas where there either is not a grid at all or is in areas where the grid is quite weak. Whilst you may be able to go out and build a wind farm in some of these areas at the moment there may be a constraint on the grid, so you may not be able to get the power back to the demand centre. As part of that development either a gridline has to be built or the existing gridline has to be expanded and enhanced. Obviously that can add cost to the project and, as the previous speaker said, it is a question of who pays for that.

Our network has been built up over many decades and largely that has come from the public purse but we are moving to a point where there is almost an expectation that new generation has to pay for that and it is question of whether that is fair to impose that on—in this case—renewable energy technologies. As was mentioned, there is this proposal that is going through the Standing Council on Energy and Resources [SCER] at the moment for scale-efficient network extension, which was to try and get over that problem and allow for grids to be built in areas where there was a large amount of renewable energy resource and where you would expect to see a number of projects deployed, and then the energy would be transported to the demand centre. Was there another part to your question?

Mr MICHAEL DALEY: Do you have a specific example of one particular project that you think might be a priority for that sort of intervention by government? What is a pet project you would like to see connected?

Mr MARSH: I cannot give you one example. I cannot say there is one project that is suffering from that problem so it should be that project that is focused on. It is more looking at where the resources are in New South Wales. For example, we know where the resources are in terms of wind and solar. So how can you actually help any number of projects coming to that area to get connection to the grid? New South Wales already has a renewable energy precincts program and we know that those are the areas at the moment that are the focus for wind. I think it is looking at those areas and saying: Are there particular constraints that all projects are facing—not just particular projects—and what can the State Government do to help unlock some of those issues, particularly in terms of grid connection?

Mr JOHN WILLIAMS: The long term reality of renewable energy is a big concern. Renewable energy is currently dependent on subsidies by government. Each of the devices, whether wind or solar, has a life expectancy of x amount of years. When we get to the time that those wind farms need to be renewed—I am told it just does not stop at the head; they have to pull the whole lot out, put new foundations down and put a whole new structure in—is there currently capacity within the wind generators for that renewal process to take place? Are they providing for the future where they are going to replace those items or will this just be a white elephant for the future?

Mr MARSH: I assume you are talking about when a project comes to the end of its life and it may have to be decommissioned and is there a capacity to do that? With wind farms there are two things. First, when the wind farm gets to the end of its life it is not necessarily the case that it will be taken away and will stop working. It is possible that the developer may decide that they want to extend the life of the wind farm for a whole host of reasons. If they do decide that the wind farm needs to be decommissioned, in most cases the developer will be taking responsibility for ensuring that that happens, but at the moment in Australia we have not got to the point—because it is so new—where a wind farm, for example, has reached the end of its life, to know whether it is common for that to be completely decommissioned or whether it is common for the site to continue to be used to generate renewable energy.

Mr JOHN WILLIAMS: If we are to have a long-term future in renewable energy it must be self sustainable and there is clear evidence that that is not the case. If this was beneficial and cost-effective we would not have to encourage anyone to get involved in it—and that is what we want. At the end of the day the consumer wants to see price levels maintained or reduced. We are not here to subsidise a brave new frontier with no guarantees.

Mr MARSH: What we know is that the cost of these technologies is getting cheaper. Wind power is now a lot cheaper than it was and it is only going to get cheaper. Our view is that we do not want to be seeing clean energy technologies with a government subsidy forever. The idea is that these technologies are going to get cheaper. As I have indicated with household solar PV, for example, we are a few years away from the point where that makes sense to a householder on its own merit; it does not need a government subsidy to support it. Wind power is some way from that but I think the expectation is, depending on things like where carbon prices, gas prices and electricity prices more generally go in Australia, we will continue to see the cost of renewable energy coming down so at some point in the future we would hope that some, if not all, of the technologies will not need a subsidy.

Mr BART BASSETT: Do you see a role for measures to manage demand for electricity more effectively and how can governments assist and manage demand? You heard some of the answers given previously but I am wondering if you have a different approach from alternative energy?

Mr MARSH: I think we would have a similar approach. From our point of view it is looking at energy efficiency in its broadest sense. For example, things like putting a solar PV system on your house or installing solar hot water is a form of energy efficiency because what you are doing is reducing demand on the grid. So thinking about energy efficiency and demand reduction in its broadest sense actually means that you do start to see some interesting things, such as solar PV and solar hot water becoming part of that question. Our view is that—as we are doing—having some form of energy efficiency scheme, as you have in New South Wales, that has incentive for the energy efficiency industry to go out and install energy-efficient equipment in houses and industry across the State is the right way to go. We are supporting that being expanded on a national level because our view is that it is economy of scale. If you have a larger market then the cost of this stuff will come down. If you move towards a more national market for energy efficiency the chances are we can deliver energy efficiency more efficiently than if it was done on an individual State-by-State basis.

Mr BART BASSETT: What do you think are the most successful examples of emerging electricity generation projects? Based on that, what do you think the main sources of electricity in New South Wales will be in 20 years time?

Mr MARSH: I think the most promising or the most exciting so far has been solar PV in terms of the dramatic cost reduction that we have seen. Even a couple of years ago no-one would have expected to see the amount of solar panels we have installed on people's houses today. It has certainly outstripped any expectations that the market had of how that would develop, and that is down to a whole lot of things but innovation in technology has come down, people have found more efficient ways of deploying it. So I think to answer the other question, I again have a similar answer to your previous person in that it will largely depend on where the market goes, but I think our view is that certainly we have the Federal 20 per cent target, which we have no doubt we will meet. Obviously New South Wales has a 20 per cent target as well. Our view is that we can certainly get beyond there. When it gets to 2020 we expect the 20 per cent target to be met and we can certainly go beyond 2020. Which technologies that will be is, I think, almost an unknown question because there are so many different technologies in the renewable energy space.

It could be wind. We expect wind to be deployed at scale and largely the technology that makes up most of the 20 per cent target, be that both Federally and New South Wales, clearly solar, given the costs where household solar is coming down, we see that bit playing a big role. There are also other technologies that are yet to be deployed at scale that over the next few years we think will start to come through. Those are things like the larger-scale solar projects. There is a project proposed out at Moree, which is a large-scale PV project. There are projects for what they call large-scale solar thermal and then you start looking at those technologies, you start to be looking at renewable energy technology that can start to provide so-called base load power and that changes a lot of the energy market in terms of actually beginning to have a base load power source that is renewable. Then there are marine technologies, et cetera. There is a long list of technologies that could come through to the market and be deployed both in New South Wales and across Australia.

CHAIR: In terms of the pricing of wind and solar—I am conscious that these figures are changing all the time—the official figures that I have seen still suggest that wind and solar are noticeably more expensive. What you are saying is suggesting that they are perhaps closer to competitive than I had expected or thought. Have you got any official figures that you could provide to us that backs what you are saying?

Mr MARSH: I have not with me. I can certainly provide them separately after.

CHAIR: I think that would be useful, and as much as possible referring to established independent bodies.

Mr MARSH: Certainly we know that household solar panels are coming down in cost close to what they call grid parity. Wind is not that close yet but it is coming down in cost. It is certainly cheaper now; wind is cheaper today than it was even 12 or 18 months ago.

CHAIR: If you could provide both that trend information and the most current information, well sourced and referenced, we would appreciate it if you would do that on notice.

Mr MARSH: I can do that for you.

Mr JOHN WILLIAMS: In your submission you say that the pricing of electricity needs to allow for the benefits of distributed generation to be properly recognised. What do you mean by that? How would the pricing of electricity need to change to allow this?

Mr MARSH: To take the first point in terms of what we mean, if you are locating generation close to where it is needed, so your generation is close to where the demand is, there are some savings to be made because you do not have to transport the electricity that far. The further you have to transport the electricity, the more you lose in costs. So putting generation closer to the form of demand makes a number of savings. At the moment the way the energy market prices energy does not take account of that. As an example, where they are trying to do that is in New South Wales the recent IPART decision on solar was exactly them trying to look at what is the fair value for solar. What are the benefits that solar brings to the network from a whole host of regions, but one being because it is close to the source of demand? Then what does that mean? Can you then put a fair value on the output that comes from a PV system? Our view is that while we have issues with the methodology and the number that IPART came out with, that is certainly the way we need to be looking at going down, looking at what are the benefits that generation technologies bring to the market in terms of if you have distributed generation close to demand the chances are there will be some benefits in that and should be reflected in the price that is paid for that energy.

Mr JOHN WILLIAMS: Just on that, I probably challenge it with the view that some of those household solar inputs are causing a bigger dilemma for the network than if they were not there.

Mr MARSH: I think it works both ways. We know that there are some places where there are some impacts from having PV on the network and those need to be worked through and addressed. But also there are definitely places where PV can bring some benefits to the network because they are closer to where the demand is and that those benefits should be better reflected in the pricing of energy.

CHAIR: If that did flow through in terms of pricing, then would it be true that something like solar would then be more appealing than wind? Which technologies would you see in a real sense as more cost competitive?

Mr MARSH: That is a difficult question because it is difficult to compare household solar with wind because you are talking about two completely different types of technologies. They are doing two completely different things. Effectively, household solar is sitting within the network and is actually effectively offsetting demand from the grid, whereas wind is connected to the transmission network and is contributing to supply. So it is difficult to compare those two things. But certainly if you look at some of the analysis that we have done and others have done, there is a strong benefit from having solar PV located in certain places on the distribution network, as opposed to the transmission network, because it can offset the need to augment that network. You had a discussion earlier about peak demand. There are certain points on the network where you can locate solar PV where it can help to offset the huge spikes in peak demand. I guess we are saying it is just about having a more sophisticated way of looking at how energy is priced and accounted for and also looking at where it is located. We think you can have a much more intelligent way of deploying solar PV on households around the State and federally in terms of looking at places where PV will really bring benefits to the network as opposed to putting it in places where it may not bring so much benefit.

Mr BART BASSETT: This question is a bit out of left field and I am just curious as to your view on this. Co-generation plants are being talked about in some areas. I know of one which was unsuccessful, and other people say they are successful in buildings. Because of the price of gas, the argument is that co-generation plants are not as competitive as they were promoted to be some five, six years ago. Do you have a view on the co-generation plant and its place in the system?

Mr MARSH: Certainly I think it is true that co-generation is not as attractive now as it was. It is something we are looking at. There is a range of reasons why co-generation is not being rolled out as much as it has been in the past. Some of it is largely to do with this whole thing about whether it is best suited to some of the office blocks you are thinking about in Sydney. It is kind of, who pays the electricity bill and who is responsible for the energy generation? If you are paying the electricity bill, if you are tenancing that building you may not get any benefit from having a co-generation plant installed but someone has to pay for that co-generation plant to be installed. It is less to do with the relative price of the fuel and more to do with this landlord-tenant split where the person responsible for supplying energy to that building has no incentive to install a more efficient energy source, which co-generation would be, because the tenants are paying the bill. If you can get around some of those issues then co-generation does work if you can get through some of those

barriers. But if we are going to see, as a lot of people are predicting, gas prices going up, then you may see co-generation and tri-generation becoming more popular as it is a more efficient way of using the electricity and heat from that technology. So as gas prices go up, you might see co-generation becoming more popular again.

CHAIR: Do you have a view about retail price deregulation in New South Wales?

Mr MARSH: It is not something we particularly take a position on. We think it would be helpful. The more we move towards time of use pricing will help. To pick up the point about time of use pricing and particularly things like solar and some of the household technologies, if people are going to get strong signals as to when to use power and when not to use power, it could really make a difference to their usage. For example, going back to the point about household solar photovoltaics being close to grid parity, there were some examples in places in New South Wales where some people on time of use tariffs—there were times of the day when they were paying 45¢ a unit for their electricity and with the photovoltaics system on their roof they are able to offset that 45¢ a unit, so that is a very good benefit to having photovoltaics on the roof.

Our view is that moving to time of use pricing, with the right information and signals in place for the householder to respond to that, and saying, "There will be times when it is going to be expensive for you to use electricity but also there are going to be times when it is very good for you to use your own generation because you can offset an extremely high cost for power" is the way to go. Whether that can be done without fully deregulating the retail sector is another question. Certainly the move towards more efficient and time of use pricing for energy is something we certainly support.

CHAIR: One of the challenges, particularly with renewable energy and its intermittent power, is there are various initiatives on the storage front but none of them have really cracked it or made it commercially viable. The person who does will make a trillion dollars. Do you have any comments in that space?

Mr MARSH: I think we are agreed on it. There are two things. At the moment we do have some storage in the network in terms of hydro. Large-scale hydro is very much a storage technology in that with pump storage you can pump the water when the electricity cost is lower and let it out when it is higher but it can be used to back up renewables. Also, there is a lot of interest in storage going forward. It is something we are focusing a lot of our effort towards understanding the potential for storage. Storage can mean a lot of things. It is not just a set of batteries in a basement, as some people think it is.

There is a whole lot of other more industrial scale technologies that can actually be used to store energy and we are looking at what is the potential for that technology, how can it help in terms of giving a more consistent supply of renewable energy, helping in places where you might need to build some new network, can you actually avoid having to build network by investing in some strategic storage solutions and try to understand what the barriers are. Obviously one of the barriers is cost and the more we can actually get this technology built and deployed, the larger the cost will come down. As we see more renewable energy coming into the market, we will see a greater interest in storage from the proponents because I think they know that the more reliable they can make their technology, the more consistent price they are likely to be paid for it.

Dr GEOFF LEE: Just for clarification, your submission reported that by 2020 only 4 to 7 per cent of the household electricity bill increases will be due to the deployment of renewable energy. I think I know what that means, but I am asking you what it means? Is it going to go up another so many per cent?

Mr MARSH: Yes, it depends on what you talk about. Certainly all the analysis we have done shows two things: firstly, that the actual contribution of the householder's bill will be very low to support renewable energy, be that the large-scale renewable target at the Federal level, feed-in tariffs, or the small-scale renewable energy targets. You are talking about something a lot less than 10 per cent. The second question then relates to the contribution to the price rises. People talk about both the contribution to the bill and then the contribution to the price rises and both those numbers are very low. The number we quote is around 4 to 7 per cent. That includes things like feed-in tariffs, et cetera. I saw recently some work from the Australian Energy Market Commission saying that of price rises they are forecasting over the 12 months only about 3 per cent is down to renewables, so renewables is not the main driver for price rises, either today or going forward. It is other parts of the energy market, notably the network. Investment in networks is the main driver of price rises.

CHAIR: Thank you for appearing before the Committee today. The Committee may well ask you to provide some additional responses to questions in writing and that would form part of your evidence and be made public. Would you be happy to provide a written reply to further questions?

Mr MARSH: That is fine, yes.

CHAIR: Thank you very much. We appreciate your assistance to this inquiry.

(The witness withdrew)

(Short adjournment)

PETER MICHAEL McINTYRE, Managing Director, TransGrid, sworn and examined:

CHAIR: Thank you for appearing before the Public Accounts Committee to give evidence. Before we proceed, do you have any questions concerning the procedural information sent to you in relation to witnesses and the hearing process?

Mr McIntYRE: No.

CHAIR: Would you like to make an opening statement before we commence questions?

Mr McIntYRE: Yes. Thank you for the opportunity to speak to the Committee. TransGrid owns and operates electricity transmission grid in New South Wales. This network comprises some 12,600 kilometres of transmission lines and stretches across the State. It also connects with transmission networks in Queensland and Victoria. Our mission is to provide safe, reliable and efficient transmission services within New South Wales and the Australian Capital Territory and the National Electricity Market. Transmission services include a range of activities aimed at ensuring effective interaction between regulated transmission investment and market-driven investment in new generation. Put simply, new generation needs to be supported by appropriate transmission development if it is to meet the needs of the State and the wider national market.

I cannot emphasise enough that the reliability and security of New South Wales electricity supply, both now and in the future, depends upon New South Wales's transmission network. This network, including its prudent and economically efficient development, is crucial both for the people and the State of New South Wales. In terms of energy generation, New South Wales's transmission network is an efficient and secure platform to connect all forms of generation. TransGrid's interstate connections with Queensland and Victoria allow generators across five States to compete in the National Electricity Market.

By way of introduction I will mention five key elements that are crucial to developing the economics of energy generation in New South Wales, the first being the role of facilitating a competitive market. When managed effectively, transmission networks increase competition between generators and help reduce electricity prices. This is achieved by providing retailers and large consumers of energy with access to the cheapest and cleanest generation sources. Effective management of the complex processes for connecting new generators also assists newer, lower cost and cleaner generation options to enter the market. In the last four years TransGrid has facilitated the connection of 1,214 megawatts of new gas and wind generation in New South Wales. As part of this process, generators only pay the shallow cost of their connection, that is, the assets directly required to connect them to our network. However, despite our success, the connection process has proved challenging for all parties. It is a complex process involving numerous projects at various stages of development. The vast majority of projects do not eventuate, mostly because of commercial and other factors unrelated to transmission connection.

As a regulated monopoly transmission network service provider, TransGrid must process all proposals it receives as required by the National Electricity Rules. TransGrid does not favour any particular technology for generation. Our role is to provide open access to new generation connections and in doing so to be technology neutral. The connection process includes the development of physical connection requirements and commercial contracts as well as complex technical assessments relating to ensuring the performance standards of the interconnected transmission grid continue to be met. Failure to meet these standards can result in major widespread interruption of electricity supply.

The current charging regime for new generation connections gives economic incentives for generators to locate near to existing transmission grid where there is spare network capacity. This facilitates the least total cost for providing electricity. The Standing Council on Energy and Resources has tasked the Australian Energy Market Commission [AEMC] with reviewing the current transmission frameworks and TransGrid is strongly engaged in that process. That process will run through to about October this year when the commission will make its final recommendations to the Standing Council on Energy and Resources. The commission's review is aimed at ensuring the process for providing generator connection and access is aligned with supporting the competitive delivery of required new generating capacity, including within New South Wales.

Secondly, I would like to reinforce that the transmission planning arrangements in the National Electricity Market are working. In the past few years, new integrated transmission planning and investment frameworks have been progressively implemented in the National Electricity Market. These have been in

response to a series of inquiries commissioned by Federal governments. While in its early days, all indications are that the arrangements are working effectively. Central to these arrangements is the establishment of the national transmission planning function of the Australian Energy Market Operator [AEMO]. Each year the Australian Energy Market Operator is required to publish its assessment of the longer term planning needs and options for the major transmission flow paths. In doing so the operator is required to have regard for the nearer term transmission investment plans of the transmission companies, including TransGrid. Conversely, transmission companies in developing their investment plans must have regard for the Australian Energy Market Operator's longer term, national focused strategic network plan.

In practice there is a close interaction between the planning specialists in TransGrid and the Australian Energy Market Operator in developing both these plans. TransGrid does provide the market operator with information and advice that comes from the local knowledge that TransGrid has; for example, project delivery requires an intimate appreciation of State-based infrastructure planning arrangements. We require interaction with local distribution companies such as Ausgrid, Essential Energy and Endeavour Energy, and interaction with the community within which our assets reside for the rest of their lives. For its part, the Australian Energy Market Operator brings its natural advantage in understanding national generation supply and demand issues to the planning process. Some oversight of the effectiveness of the process is provided by the Australian Energy Market Commission's last resort planning power. This allows the Australian Energy Market Commission to direct a transmission company to carry out a full economic assessment of a transmission project. The power is exercised if it appears that an economic transmission development option has been identified that has not been pursued by transmission companies. Only late last year the Australia Energy Markets Commission found it had no cause to exercise this power. To put it another way, the planning process appears to be working.

The economic assessment applied to large transmission investment projects is called the regulatory investment test for transmission. The application of this test involves a well-defined process of consulting with interested parties. Accordingly TransGrid's large investments are already subject to a cost-benefit analysis in a very open and transparent fashion. All major transmission investments that increase the capacity of the network must go through this process, including Interconnector projects. Interconnectors between the transmission networks in each State, allow lower cost generation in one region to meet demand in another region, lowering the overall cost of meeting electricity demand. Of course, in some cases increasing interconnection capacity may not be economic when compared with encouraging local generation.

TransGrid decides whether or not to upgrade an interconnector by working together with other transmission networks within the Australian National Electricity Market and the Australian Energy Market Operator by undertaking extensive market modelling. This modelling determines whether investment would reduce the cost of generation to meet demand and whether the reduced cost of generation investments would otherwise occur by sharing between two regions. The regulatory investment test for transmission must then be performed to assess whether the economic benefits outweigh the costs. TransGrid, in conjunction with the transmission network service provider in Queensland, Powerlink, is about to begin consultation of an upgrade of the New South Wales to Queensland interconnector to increase its capacity by approximately 25 per cent.

I would now like to turn to demand side response. While TransGrid has a role to play in facilitating demand side response, the real potential must lie at the interface between the industry and end users. It is therefore primarily a matter between electricity retailers and electricity distributors. These businesses are best placed to provide the price signals to encourage efficient demand response and implement Smart metering controlled arrangements with customers. Despite this, TransGrid has been able to defer major projects that are required to cater for increasing peak demand growth, using demand side response. Regulatory incentives and other administrative arrangements encourage and support these activities.

Transmission networks must have sufficient capacity to meet the maximum demand placed on their network. Peak demand is a strong driver of the need to reinforce transmission networks. TransGrid actively considers network support from non-network options in better generation and load side curtailment to meet these peaks. TransGrid acquires its network support through competitive tenders, expressions of interest and requests for proposals. An assessment is then made against other options, such as network upgrades, to determine which option has the most merit in proceeding. It should be noted that the regulatory test for transmission explicitly requires transmission companies like TransGrid to demonstrate how they have considered on an even footing alternatives to network augmentation before network augmentation can be undertaken.

TransGrid is recognised as a leader in the National Electricity Market in the acquisition of non-network support. For a one year deferral of its Western 500 kV project approximately three years ago, TransGrid acquired 250 megawatts of support from a gas generator project in the Wollongong area, 50 megawatts of support from a load reduction of a major industrial load in Western Sydney and 50 megawatts of aggregated support of load reduction in the Newcastle, Sydney and Wollongong areas. To date these contracts remain the largest successful implementation of network support in the National Electricity Market. They provide an Australian benchmark for the tendering and contracting of network support in deferring major capital projects and, in this case, saved customers more than \$14 million that was returned to customers. TransGrid is also working with our distribution partners on innovative ways to encourage demand side in the market.

I would next like to highlight some changes that are occurring for TransGrid's role in forecasting demand. TransGrid has historically developed a statewide energy and peak demand forecast in New South Wales in conjunction with the Australian Energy Market Operator. It is intended from June this year that the Australian Energy Market Operator will take over responsibility for this role. TransGrid is working closely with the Australian Energy Market Operator to manage this changeover. Forecast for individual connection points will still be developed in close consultation with the relevant customers—most often New South Wales and the Australian Capital Territory electricity distribution companies.

From our latest 2011 forecast published in late June last year, we have seen a reduction in energy use in New South Wales, whilst peak demand in certain areas of the State continues to rise. This is in contrast to what we have seen which has been steady energy growth in New South Wales over the past 50 years. Key findings from our last forecast include: there has been observable changes to consumer behaviour in the aftermath of the 2008 global financial crisis; this has also reduced some economic activity; there has been a change in the electricity consumption patterns in response to increased electricity prices; and we have had to revise our projections upwards with the amount of smaller generation sources installed closer to the loads. It is clear that energy and demand forecasting over the coming years will be a very difficult process as we have identified the actual impact of these changes. It is clear they are occurring and it is far less clear to what degree we can forecast on the basis of the observed range in recent years.

Finally, I would like to mention the challenge of acquiring new routes for linear infrastructure, in our case routes for transmission lines. As set out in TransGrid's submission to this inquiry, the only network planning framework which is not assessed nationally is the line route approvals process. This is recognised as a challenging issue for all governments in First World countries. Competition for land use is inherently intense and transmission lines often impact on local communities, and often those communities that do not identify with the wider benefits to the broader community. TransGrid's experience in obtaining line route approvals from the New South Wales planning approval process is consistent with experience in other countries, that is, difficult and time-consuming.

We have experienced delays to several network upgrades as a result. Delays have the potential to degrade reliability of the power system. They can also encourage new generators to locate closer to existing transmission lines or even in other States when it might not be the most cost effective or efficient process to do so. This is one matter affecting electricity generation that may be able to be addressed at a State Government level without the need to work through Federal Government and COAG processes.

I would also like to note that the development time for major transmission lines projects exceeds the project development time for most renewable and gas generation developments and, as such, has the potential to become a critical element in the timing for delivery of those projects. To this end, TransGrid is working closely with the New South Wales Department of Planning to find ways to make the line routing approval process more efficient whilst maintaining the quality of the environmental assessment and community engagement.

In conclusion, transmission services play a vital role in the efficient, competitive and timely delivery of generation in New South Wales and the wider national electricity market. The arrangements in the national electricity market are generally working well. That includes arrangements for planning and investment and for connecting generation. Where there are processes and gaps have been identified they are the focus of current reviews run by the Productivity Commission and the Australian Energy Market Commission. TransGrid is a leader in the deployment of demand-side solutions to defer capital and there is capacity to further improve the process for improving transmission line and route approval to aid quick connection of new generators where transmission is required to support that.

CHAIR: Thank you, not only for your comprehensive oral submission but also for your comprehensive written submission. I note that you have provided a good overview of not only TransGrid but also the capacity and use of interconnectors in New South Wales and other States. In particular, you have referred to some processes whereby upgrades have been considered, including a report due this year about the Queensland link. Do all those reports assume, or indeed take into account, the fact that renewable energy in New South Wales will increase by 20 per cent by 2020 and might there be, as has been suggested by others, a push to upgrade interconnectors too quickly and thereby impact on electricity prices unnecessarily?

Mr McINTYRE: That is a very complex question and there are many views. For a company like TransGrid to make an investment and to receive a return on that investment it needs to complete the regulatory test process, which is a public economic test. That test requires the company to demonstrate through comprehensive market modelling the benefits that are said to flow from increased interconnection. We can account for a number benefits, but the principal benefit is the dispatch of lower-cost generation in lieu of high-cost generation. To do that you have to look at what generation is currently installed and what is committed and the generation you anticipate over a number of years. From that point of view we have access to the connection inquiries and applications from companies dealing with us and wishing to connect to our network in New South Wales. We also have modelling from the Australian Energy Market Operator that indicates its scenarios for generation by wind, gas and the like. In that process, any person in the market, including the regulator, the Australian Energy Market Operator, and any market participant including existing and prospective generators, can comment on the modelling or the assumptions we have made. That can be refined through a process to reflect the best advice or knowledge on which to make those decisions.

CHAIR: It has been suggested to me—I cannot recall, but it may have been in the context of the distributors as opposed to TransGrid—that the process is not as transparent as you have suggested. Is yours a more transparent process than that of the distributors' with regard to their upgrades of networks and the consequent impact on prices?

Mr McINTYRE: Yes. The process is public and it takes many months to run through. For example, the upgrade we are proposing with Powerlink for the Queensland-New South Wales interconnector involves a number of options. The preferred option will probably cost about \$200 million and deliver benefits in excess of that. Other options of between \$1.5 billion to \$200 million are kicked around and tested and at different times, as appropriate, they are tested. These are very major investments that have an impact on new generation. They impact on company generators and they are potentially a major cost. So we need to test those investments very robustly.

CHAIR: It may be unfair to ask, but do you think the process whereby the distributors seek approval for upgrades should be more transparent like the process that you must go through?

Mr McINTYRE: I can comment only on the test that distribution companies run in conjunction with us. I am not privy to the detail, quality or depth of the processes that occur beyond that. Wherever an investment requires money to be spent on transmission and distribution—and many investments at the end user end of the supply chain as opposed to the generation end do require combined investment—we run joint tests with the distribution companies and they are jointly badged, developed and costed. Other than that, I cannot comment.

CHAIR: Could the integration of wind generators in the network require interconnectors to operate at lower limits to avoid overloads and hence reduce the total supply capacity available to the market?

Mr McINTYRE: That is unlikely in New South Wales because of the amount of wind penetration we have at the moment. The significant amount of wind generation in South Australia has caused some problems and has led to studies designed to increase the interconnection capability between Victoria and South Australia. The amount of wind generation installed in this State is so low as a percentage of our total supply generation plus interconnection that it will not be a material issue for some years.

CHAIR: At what threshold would you see that becoming an issue?

Mr McINTYRE: I am not a market operator so I can give only comparative figures. South Australia could have half of its load supplied by wind. The chief executive officer told me that in the past month about 40 per cent of its energy came from wind. That is a very high amount. They run that high because they are connected to a very large market that has alternative forms of generation and interconnection to Victoria. They could not do that as a standalone State.

CHAIR: What is the cost of connecting the transmission network to new generation such as wind farms?

Mr McIntyre: First, the cost of that is borne by the proponent. That is an appropriate mechanism in my view, but that is not a view shared by the proponents. That drives an efficient connection in that the proponent needs to look at the cost of the fuel, the capital cost of the project and the cost of transmission and must minimise that overall cost to get connected. Were other parties to pay those costs, there would be an incentive to locate where it suits and have others bear the burden. There is a locational impact.

The cost of connection then depends on how close the wind farm is to the transmission network. We are seeing quite a few applications from proponents who wish to connect relatively close to our network. The costs include building a switching station at the point where you jump into the existing network. If a new station is required, it would cost between \$15 million to \$20 million for a 132kV connection up to \$25 million to \$30 million for a 330kV connection. At 330kV you have high capacity. If it is a large wind farm or gas turbine, it would be a higher voltage. The cost impacts of the higher voltage are higher. It is akin to running a road into a motorway versus a two-lane road; it is a higher cost connection.

If a transmission line is also required from the wind farm or gas turbine, that cost must also be covered, including the easement compensation costs. Depending on the voltage, that could be as low as \$500,000 to \$1 million per kilometre for 132kV or it could easily be up to \$1.5 million for a 330kV connection. With wind farms that are tens of kilometres away from the transmission lines, those costs become material.

Dr Geoff Lee: My understanding is that TransGrid is the interconnector agency for the whole of New South Wales, so you are responsible for the major interconnection transmission?

Mr McIntyre: Correct.

Dr Geoff Lee: Your costs are borne ultimately by the consumer?

Mr McIntyre: Correct.

Dr Geoff Lee: And the Independent Pricing and Regulatory Tribunal [IPART] has some determination of your maintenance and upgrade costs?

Mr McIntyre: No, in transmission, we have been in a national framework now for a considerable number of years, so the regulation of our regulated revenues is done by the Australian Energy Regulator [AER]. The Australian Energy Regulator has also taken over network regulation for distribution companies from 2009.

Dr Geoff Lee: How do you signal to the national regulator that your costs have gone up, or do they just take an average? What is the process?

Mr McIntyre: It is quite an extensive process. Every five years we provide a submission for our required revenues. Those revenues will contain operating costs and forecast capital programs. The regulator looks through the efficiency and prudence of both OpEx and CapEx and determines, linked up with the rate of return on our assets, the revenues for the company. They do that by having regard to a forensic evaluation of certain projects, they will look at the governance arrangements in the company, they will benchmark us against other companies and do quite a range of analyses. That process takes something like 13 months from commencement to completion. It also involves public hearings and submissions from interested parties, both end users, consumer groups and the like, on our proposal, a draft determination, a response from ourselves, a response from other interested parties, and a final determination by the regulator.

Dr Geoff Lee: That is the national regulator's measure of your efficiency with maintenance of the network and upgrading of the network?

Mr McIntyre: Yes, they provide ex ante an amount of money that should be sufficient to run the business and let it pay commercial return. They do not do any economic oversight of the company. The arrangement we work in is an incentive-based arrangement where they determine an efficient cost path for the business and the incentive of the business is then to outperform that cost path.

Dr GEOFF LEE: What sort of contribution does that cost the final consumer of your part of the process?

Mr McINTYRE: In New South Wales, for the average end user, probably around 7 to 8 per cent of their user bill is transmission costs.

Mr MICHAEL DALEY: In your submission you note that TransGrid is currently the jurisdictional forecaster for New South Wales. Can you comment on the factors that have caused projections of electricity demand to be consistently revised down over the past few years? Do you believe that this trend of lower than expected growth in demand is a short-term anomaly, or should forecasting models and assumptions be evaluated?

Mr McINTYRE: Yes. I mentioned in my introductory speech that there are probably two major drivers. The first is reduced economic activity post-global financial crisis [GFC]. It is clear that the entire economy, including New South Wales, took a fairly heavy hit from the GFC—both industry and consumer confidence. That has been reflected in economic forecasts, and our consultants advised us and we used it to run through our model. We believe the second major issue is demand elasticity to price. Over a number of years, price has grown at about CPI or thereabouts, electricity being a relatively cheap commodity for what was provided. I do not think there has been any great focus by the community at large around careful use of electricity.

With several years of price increase well beyond the Consumer Price Index [CPI], largely to fund network investment but also future projections around carbon tax—and those things will also feed into the price path for coming years—I believe we are seeing a reduction in energy and consequently peak demand by people being very frugal because of the price of electricity. What we do not yet know definitively is exactly how that will track out over time. One scenario is that people, after a bit of pain, get used to that being the price of electricity and provide an assessment of its value as still being very valuable and relatively cheap by comparison to other things in life, and demand comes back. It may be that it remains a longer-term suppression because of price. At this stage we just do not know. Unfortunately, since our last forecast in 2011, the weather has been incredibly mild and the use of electricity on the system so low, and peak demand so low, that no data from the last 12 months would be very useful in informing our modelling.

Mr MICHAEL DALEY: In relation to price increases, we have in New South Wales one of the most reliable electricity sectors in the world. Reliability traditionally over the last 20 years has been over 99 per cent and I think a lot of good mums and dads would be surprised to learn that a large proportion of their increased electricity bill is going to the distribution sector. Are we gold-plating a Rolls Royce or are we playing catch-up on work that should have been done over the last decade or so and was not, or is it a bit of both? What is your explanation?

Mr McINTYRE: I can only talk on transmission; I have not run a distribution company. The transmission sector has developed a network. It has been maintained prudently and has never had costs cut out of it to the point where it was of concern, and it is now investing what is required. On transmission only, you have to appreciate that these assets are long-life assets that last 50 years. When you build major transmissions, like if you build a freeway, it would be incredibly incompetent to build a freeway that was very slow and very narrow. When you build a major transmission, you naturally get a lot of capacity and that takes a number of years to be fully utilised. Most of the transmission network in New South Wales was built in the 1960s, on the back of the Snowy Mountains scheme, coming up from the Snowy into Sydney and around Sydney. It was built through the 1970s to connect generation in the Hunter Valley and western Sydney. That network provided a lot of capacity for a number of years and over several decades you have not needed to invest or have not just poured money in, you have had a lot of capacity. That capacity gets eroded as loads increase and there comes a time when that capacity is eroded and you need to make your next cycle of investment. Transmission people talk very much around investments being large and lumpy, and we are at the stage of doing some large investments. They are necessarily lumpy investments, but when they are completed we will go back to a far lower investment cycle again for some years.

Mr MICHAEL DALEY: How many years?

Mr McINTYRE: Subject to load growth, the investment cycle could go out to 2020. It may finish earlier. My guess is that you will then have a decade or more when you will be doing investments here and

there, not to the same degree as you are currently doing. For distribution, you would need to ask distribution companies for their view on their business case.

Mr JOHN WILLIAMS: With interstate interconnectors, are we seeing an offset of transmission losses by inputs into the New South Wales network?

Mr McINTYRE: Yes, when you do transmit electricity a long way you lose power, so you have to be satisfied from an investment point of view that you model those losses correctly. On our network, on average over a year we are probably going to lose about 3 per cent or so in transmission losses. At times of high load, when you are importing from south-east Queensland to Sydney, those losses would probably be closer to 10 per cent. They are real.

Mr JOHN WILLIAMS: You have an interconnector in south-western New South Wales that comes from the Victorian grid. Is that correct?

Mr McINTYRE: We interconnect to Victoria, yes.

Mr JOHN WILLIAMS: Is that through Buronga?

Mr McINTYRE: We have a number of points from Buronga across to the Snowy. There are a number of points so we connect across the border at 220,000 volts and 330,000 volts.

Mr JOHN WILLIAMS: One of the issues that is pretty well localised in western New South Wales, and one of the frustrating factors for residents there, is that they say they are not contestable in the market because of distribution restraints and because of factors such as transmission losses. When you start looking at an interconnector that is providing the majority of electricity out of Victoria to western New South Wales, it makes it very hard to justify an argument that we cannot contest electricity prices in that area.

Mr McINTYRE: Yes. I am not aware of the detail of that one specifically, but what I would observe is that the development networks in both New South Wales and Victoria should be least cost to all people, not to any given consumer and not to the benefit of any particular generator. When we test investment, we do so against Victorians looking at their network as well. If there is a reliability issue, we look at the least-cost solution, which could in fact be building from Victoria rather than New South Wales although it is closer. There was a discussion some time ago as an example of increased wind generation at Broken Hill.

Mr JOHN WILLIAMS: Yes.

Mr McINTYRE: The cost to connect to the network was going to be high. Although we did not tell the proponent what it should or should not do, it was clear to us that they should also have been costing a connection back to Adelaide. Maybe it is that, with the amount of wind generation since then, we have reached the point of saturation and that now would not be technically possible.

Mr JOHN WILLIAMS: That is right.

Mr McINTYRE: But they should be looking at generators only being dispatched if it is efficient to do so—I am sorry, if it is being built only to load under the least-cost approach, despite State boundaries and borders.

Mr JOHN WILLIAMS: The determination was set by the Independent Pricing and Regulatory Authority [IPART] in respect to transmission losses 16 years ago. Would you say in 16 years the network has been changed by a national grid? Has that seen an effective change?

Mr McINTYRE: In relation to?

Mr JOHN WILLIAMS: Transmission losses.

Mr McINTYRE: Transmission losses will increase over time with increased load. Just having a load growth itself over 16 years would increase losses because you are serving a larger load. The network has also been developed in recent years. For example, I mentioned we had a project that we deferred for 12 months. We upgraded some 330kV lines to 500kV. That reduced losses on the network by running at higher voltage. As you

build more and higher voltage through the big kV lines in place of 132—500kV as an upgrade from 330—you reduce the losses because the transmission lines provide a more effective flow path of electricity at those higher voltages. Overall, building our network decreases losses; but, conversely, the amount of load that gets transmitted will cause an increase in losses.

Mr BART BASSETT: In your view, how can the State Government ensure long-term energy security of the State?

Mr McIntyre: I think the current arrangements in the national market are working fairly well. They are arrangements between transmission, the market operator, the Australian Energy Market Commission that overviews the effectiveness of those arrangements, and then there is the Ministerial Council on Energy or the Standing Council on Energy and Resources. One of the greatest risks to energy security is uncertainty. Uncertainty comes from fundamentally changed regimes outside the structure above the change that should be there. For example, if the regime sets up an arrangement where you have a markets commission to set the rules for how the market operates—and everyone knows that they are the body that does those reviews and does them diligently—left with that process, people have confidence that the structure of the market will be sensible.

If the process is changed when people intervene and bring in, like, policy-on-the-run and start tweaking those arrangements, you start creating a lot of investment uncertainty. I know from a transmission point of view and from talking to my private sector counterparts in other States that a conservative transmission investment is that you get appropriate returns on the investment over the life of the asset—we are talking 40 years or 50 years—so, poorly conceived approaches to wind back rates of return can create issues of confidence in investment. I know from talking to my generation colleagues, with whom I interact from time to time, that certainty around regulatory structure and sovereign risk are really major issues around investment.

I think if the framework is established, it is sound and it is working, monitoring it and tweaking it—not in fundamentally unpredictable ways and altering the arrangement—allows the players to make those investments. It is a very capital-intensive industry, both transmission and generation. Australia is looking at tens of billions of investment in the coming decade or so. There is a significant investment there. In a market where you have capital scarcity and capital rationing across the world, people will only place capital in a country where they are confident about getting returns on those investments. I would have thought that stability of that regime is absolutely paramount.

Mr JOHN WILLIAMS: Within TransGrid's revenue, have provisions been made for future renewals? Obviously what we have just gone through is the consumer virtually subsidising the future. Will this happen again, or will TransGrid within its capacity provide for future upgrades?

Mr McIntyre: While a business will put forward a proposal each and every five years on its needs, it will not put proposals for money it does not need in the future. It is clear, as a company, that outside the CapEx required to strengthen its work, we have had an asset replacement program in the company for as long as I can recall, and I have been there for a significant period of time. So the company does actually constantly renew and upgrade its assets. In the current five-year regulatory control period, which applies from 2009 to 2014, we are spending in the order of \$500 million or \$600 million on replacing old assets. Some of those assets were built back in the sixties and seventies and are now due for replacement. They are being turned over to get a new crop of assets that will last into the future.

We will need to fund that work. Our asset base is probably worth approximately \$10 billion in replacement value and it has an average life of, say, 50 years. You can do the maths yourself. It is about \$200 million a year, or perhaps over \$200 million a year, that you need to spend to maintain an asset. And there is an ongoing need to maintain investment. We are doing that, as a company.

Mr JOHN WILLIAMS: What you are proposing with this upgrade will be funded directly by consumers of electricity in New South Wales.

Mr McIntyre: The current upgrade, that is correct. There are some pinch points on the network in the Far North, the Mid North Coast and in western Sydney and they are fairly expensive projects. We have a considerable number of projects on the books. It would be well over 100 projects currently running and probably three of those projects would be worth maybe 40 or 50 per cent of our total CapEx this period—just because of the size of those projects. As you mentioned earlier, the good thing with those projects is that, once delivered, they provide material benefits for decades.

Mr JOHN WILLIAMS: What you are suggesting is that in 50 years time those consumers who currently exist in the electricity market might have to put their hand in their pocket again to renew those assets?

Mr McINTYRE: In so much as transmission is required to move generation to load, yes. In 50 years time, I do not pretend to know what the structure of the industry is going to look like in terms of the amount of remote renewables, remote base load and embedded generation, et cetera. But it is certainly true that assets only last for a certain time—whether it is transmission networks or a motor car. You cannot buy one and think that that capital investment will last you forever. There will be a period of time—in our networks, it is around 40 or 50 years, depending on what type of asset—when those assets will need to be replaced.

Mr JOHN WILLIAMS: Within your TransGrid's revenues, you cannot provide for that? It will always be taken up by the existing consumers at the time?

Mr McINTYRE: TransGrid is a commercial State-owned corporation. It does not fund activities from the State's balance sheet. It derives its revenues through a process where we justify its OpEx and its CapEx. It gets a return on those investments and it pays appropriate dividends to the Government as well—so, yes, under that model.

Mr JOHN WILLIAMS: So it all goes into a big black hole at Treasury.

Mr McINTYRE: We operate it effectively to cover our costs.

Mr JOHN WILLIAMS: You cover your costs?

Mr McINTYRE: But we certainly do not draw from Treasury; nor do we cross the boundary. I mean, we are a commercial organisation that functions as such, and we function in a way that is comparable to, say, the privately owned SP AusNet in Victoria, or ElectraNet in South Australia. The rules are the same, the drivers are the same; the only difference is the ownership structure.

CHAIR: I want to drill down a little bit more into a couple of your earlier responses to some questions. You talked about the importance of certainty in government policy to promote investment. Is there anything in particular that you think the New South Wales Government should be doing to provide greater certainty to investors in the electricity market?

Mr McINTYRE: Again, speaking on behalf of transmission, I think the stability of the work regime is important. During this next year or so the Standing Council on Energy and Resources has commissioned a review of the so-called merits review process by which we can appeal our regulators' economic regulation decision. Having access to merits review is tremendously important for all transmission companies to make sure the regulator has a third umpire in the box who is oversighting their functioning.

CHAIR: Mr Daley asked you about current reliability requirements. I agree with Mr Daley that I do not think most consumers quite understand how much they pay for that last bit of reliability. Given the requirements in the national electricity market at the moment, might a small reduction in those requirements affect significant savings in network costs, and can you quantify that?

Mr McINTYRE: It is certainly true that the reliability standards on distribution have lead to other cost increases—that is seen from the Parry Duffy report, for example, and the Australian Energy Market Commission [AEMC] has also published material on that. It is open to the Government to look at that trade-off between reliability and cost. At the transmission level the trade-off is a bit more complex. The transmission network is planned and developed in accordance with standards that are generally regarded as best practice in first world countries. You can, of course, trade-off and aim for a lower reliability standard. The difficulty with transmission is that when you achieve it, if you do not like that standard it is a very long road back in terms of time and impact. Unlike distribution where if things happen you tend to take out a house or a street at a time, when transmission fails you can take out regions in the far west of the State or the far north, or periodically you can take out entire States or countries. That can happen within a matter of seconds. You can lose an entire network system on the eastern seaboard. It has happened in America, Finland, China and Brazil and a few others in recent times. You should play with transmission reliability carefully because the impacts and the risks are really quite profound.

The other issue is that one advantage of making investments in transmission is that by the network being more robust it does lower the congestion on a network. By "congestion" I mean where all generation at the cheapest cost can actually get dispatched to market. If you reduce the reliability of the transmission network and you build fewer assets, over time it will necessarily lead to generators not being able to access the market as freely. So from time to time you end up constraining off some cheaper generation. So you save a little bit on transmission investment but you pay the other way through increased energy prices because you are not getting cheaper generation dispatched. Unlike distribution, transmission does interact with the competitive market—that is very important. There is a cost for transmission and a benefit around reliability. There is also a benefit around getting lowest cost generation to the market by having a network robust enough to get that generation dispatched.

CHAIR: We had a few other potential questions that probably were not quite as relevant to you as to some other people, so we will let those go. I thank you for the significant effort you have put in today and also for your written submission. I remind you that there may be some questions that the Committee may send to you in due course by way of seeking further information. Any replies you give to those questions will also form part of your evidence and will be made public. Would you be happy to provide a written reply to any further written questions on that basis?

Mr McINTYRE: Most certainly.

(The witness withdrew)

JONATHON UPSON, Senior Development and Government Affairs Manager, Infigen Energy Limited, sworn and examined:

CHAIR: Welcome to the inquiry. Would you like to make a brief opening statement before the commencement of questions?

Mr UPSON: Yes, I would. First of all I would like to thank the Committee for inviting me to appear today. I will provide the Committee with a very brief overview of our submission and also give an example of what we can do by looking at what happened in South Australia last Friday. But I want to leave the Committee plenty of time to ask me questions because I would much rather hear what the Committee wants to talk about than have me go on. Infigen Energy is the largest non-government owned renewable energy generator in New South Wales, we are the largest wind farm owner in Australia and a top-10 wind farm owner in the United States of America. We have invested half a billion dollars in renewable energy generation facilities in New South Wales. We also have four solar photovoltaic facilities that we have planning approval for in New South Wales and we hope to be able to build some of those as part of the Solar Flagships Program.

Since this is an inquiry into the economics of energy I think the most important point in our submission is what exactly does wind energy and solar energy cost New South Wales customers? Well the organisation that knows best is the Independent Pricing and Regulatory Tribunal [IPART], which is the organisation that sets electricity prices in New South Wales. While opponents of renewable energy will often talk about the outrageous cost of the renewable energy target scheme, IPART assess the annual cost increase attributable to the Large-scale Renewable Energy Target scheme—that is the scheme that builds wind farms and large-scale facilities—at just \$19 per household per year. So 37¢ per week is the total cost of building large-scale renewable energy facilities in New South Wales.

It is important to point out that the Large-scale Renewable Energy Target scheme—which was started by the Howard Government and enjoys tripartisan support in Canberra—is a national scheme. So the costs that New South Wales customers bear are the same as customers in South Australia, Victoria and all the other States. It does not matter where the renewable energy facilities are built, the customers in New South Wales will stay the same amount—not very much: 37¢ per week—but that cost happens whether the wind farms are built in New South Wales, South Australia or other States. As the pie chart in our submission shows, even though New South Wales is the most populous State, it is about fourth in wind energy generation installations. It has been said by some people, and it is a fair statement, that New South Wales customers basically help fund wind farms being built in other States. Infigen Energy would like to see that turn around and have New South Wales customers actually fund renewable energy generation projects in their State.

The graph is data from the Australian Energy Market Operator, the people who run the market, and we can access that data as well. It shows the generation in South Australia for last Friday. The top line, the purple line, is wind energy generation as a percentage of South Australia's electricity demand. The grey line is the gas-fired generation and the maroon or brown line at the bottom is the coal-fired generation. I would like to think this graph would be a bit surprising to you in that wind energy by far was the leading electricity producer on that day in South Australia. There are a couple of reasons for that: half of Northern Power's power station and Playford brown coal power station, what some people call baseload power stations, were both offline. Of course, that allowed the wind energy to easily beat the coal-fired generation and, obviously, it was a windy day—that goes without saying. It is important to see what happened on Friday. Well over 50 per cent of the electricity in South Australia was generated with no particulate pollution and no greenhouse gas pollution from a completely renewable source.

It is important also to keep track as it points out there that the pool price, the wholesale price, for electricity, which changes every five minutes, was actually about half the long-term average in South Australia. We can go into, as my submission did a little bit, the merit order effect of wind farms and why it actually lowers wholesale prices. Basically, in one sentence, wind farms are very cheap to operate so we can underbid the coal- and gas-fired generators. If you look at the purple line you can see it is going up and down quite a bit and you might think that must be a bit tricky for the Australian Energy Market Operator to actually manage. I emailed this graph this morning and asked them, "Were there any problems on Friday?" I received a response saying, "No, no problems whatsoever; 70 per cent of the electricity was coming from wind. It's not a problem. No flickering light bulbs, no power outages." They were able to handle it just fine.

One of the reasons they can do that, and this is not widely known, is that the Australian Energy Market Operator has a very sophisticated wind energy forecasting system that has been operating for several years. All wind energy is variable; AEMO can actually forecast the generation from wind with 98 per cent accuracy one hour ahead of time. While the wind is going to go up and down in various places around the country, they know with 98 per cent accuracy how much wind is going to be generated one hour from now. If it looks like a front is coming through and a lot of wind energy is going to drop off, they can go out, have a cup of coffee, come back and then send some web messages to gas-fired generators and hydro generators to turn up their production to make up for it. It is not a drama at all because wind energy is so accurately forecasted.

I should point out that while Friday was obviously above average, it actually was not the record. The record in South Australia for wind energy penetration as a percentage of South Australia's electricity demand was actually set back in September where 83 per cent of South Australia's demand was satisfied by wind energy. Just to conclude, as the largest private investor in renewable energy in New South Wales we look forward to the opportunity to work with the New South Wales Government to help it achieve its target of 20 per cent renewable energy by 2020. I look forward now to answering your questions.

CHAIR: My understanding certainly in New South Wales is that when wind energy is being produced it takes priority over other types of energy so that it is automatically used. It may mean that the price is lower, as indeed this graph also suggests, but it will be used first before other, let us call them, baseload sources of energy. Is that the same in South Australia?

Mr UPSON: Actually, that is a common misconception. I am not sure exactly of the date, but it was true, say, around 2005. It was true that wind energy automatically had a free pass to generate into the grid. But since 2005 wind energy generators have been classified as semi-scheduled generators. We have to bid into the market just like everyone else. Our Capital and Woodlawn wind farms in Bungendore have to bid into the market like everyone else. Generators typically bid in at their marginal cost—the incremental cost of generating electricity. Obviously, for a solar or wind facility that incremental cost is near zero. So we can underbid the gas and coal-fired generators who have to bid in their gas and coal royalties, mining costs and pipeline costs et cetera. We easily underbid them and that is why we lower the wholesale price of electricity. But we do not have an automatic right to generate electricity. We have to underbid them.

CHAIR: Is that different in New South Wales?

Mr UPSON: No.

CHAIR: We have some fairly recent information suggesting that was the case. We might check that.

Mr JOHN WILLIAMS: The comments from quite a few people who provided submissions were that renewables were despatched first.

CHAIR: One authoritative source particularly.

Mr UPSON: The authoritative source might be very surprised that he said that because it is not.

CHAIR: For your information, it was from a New South Wales Government source. We are happy to be told it is wrong.

Mr JOHN WILLIAMS: Delta Energy made the same comment that renewables were despatched first.

Mr UPSON: In the sense that we underbid them, then we are despatched ahead of them. That is true, not because we are wind energy but because we underbid them.

CHAIR: Quite differently?

Mr UPSON: Yes.

CHAIR: I am glad you clarified that. We will double-check that. I am not taking what you are saying other than on face value.

Mr UPSON: I am absolutely certain that is correct.

CHAIR: How does the deployment of low carbon energy in New South Wales compare with other Australian States and other countries? I might then ask you about a particular country.

Mr UPSON: We actually addressed that in our submission. One thing that is easy to lose track of, pardon me for saying it, on the other side of the world from Europe and America is that wind energy has been an absolute phenomenal success story overseas. It has been growing over 25 per cent year on year every year for the past 15 years. I would challenge you to try to think of another industry that has had that sustained and rapid growth rise. That means that every three years the amount of wind energy worldwide is doubled and three years later it is doubled again and three years later it is doubled once again. New South Wales is by far well behind the rest of the country on installing renewable energy. Every country has a different penetration rate. Denmark leads at the moment with somewhat over 20 per cent market penetration. South Australia, if it was a separate country, would be second, which is a terrific accomplishment for it. For other countries, some are 12 per cent and 10 per cent, and other installed electricity generation is from renewable energy.

There is no significant amount of large-scale solar generation in Australia, so it is not worth talking about that. The amount of rooftop PV installations over 1 gigawatt, one million watts, of electricity is installed today at great expense. By worldwide standards that is still better than some countries and worse than others. It certainly is a lot less than Germany, which has a lot worse sun than we do, but better than some other countries. The blue pie chart, which is from the Clean Energy Council, shows, as I said before, that New South Wales is fourth amongst the States for wind energy generation. It certainly is a situation we would like to see improve.

CHAIR: Perhaps to give you the opportunity to respond and provide a more balanced perspective, South Australia has experienced problems with congestion from wind. At what point is there too much wind? You seem to be suggesting that there is no point at which wind is dangerously high. Do you have a view on that, particularly regarding South Australia where there are some transmission congestion problems?

Mr UPSON: You are exactly correct. There are some transmission constraint issues in South Australia. There are several of the wind energy projects. It has nothing to do with the fact that they are wind energy projects. If you had built a gas-fired generator in that part of the network it would suffer the same constraints. It has nothing to do with whether it is a wind farm or a solar facility or a gas-fired generator. If you put too many generators in an area of the transmission network where there is not adequate capacity you will end up with generation constraints. But it has nothing to do with wind farms. It is just that most of the generation built in the last six or seven years has been either wind farms or gas-fired generation.

So if you prefer a wind farm be built in a place and then be constrained off the network at times, it is likely to be a wind farm that suffers that because most of the new generation plants that have been built have been wind farms. But it is really not too much of an issue. The biggest impact to that is the owner of the wind farm because obviously they do not get paid while they are constrained and not generating. So it is a financial issue to the wind farm operator. As the previous person spoke about, it is not a good thing to have wind farms constrained off the network because we are underbidding the other generators. So if we are constrained off you will have higher wholesale electricity prices than you otherwise would have. It is an undesirable circumstance. It is one that the wind farm owners would like to see addressed. But it is not a tragic circumstance by any means.

CHAIR: The other example is an international example. You are probably aware of an article in *The Mail* online or at least similar articles emanating from Professor Gordon Hughes of Edinburgh university, where there was a study recently. Are you familiar with the study I am referring to?

Mr UPSON: I am sorry, I am not.

CHAIR: The report was published by the Global Warming Policy Foundation and essentially referred to wind farms as being 10 times dearer than power stations and requiring a commitment of investment to a technology that is not very green but which is very expensive in a flexible market. A spokesman for the Department of Energy and Climate Change said developing wind power will mean the United Kingdom is less reliant on imported gas, and that there was a need for new energy capacity. Against that there are apparently some significant academic views—as I said, it is published by the Global Warming Policy Foundation, a think tank devoted to challenging conventional wisdom about climate change, so it obviously has a perspective. But in the United Kingdom it is highlighting that perhaps there is a bit of a backlash against a \$120 billion investment in wind. I suppose I am trying to test some of these perceptions in jurisdictions which have gone ahead faster than New South Wales.

Mr UPSON: Now that you have described it, I did skim over it. To be quite honest, I started to read it and I just stopped because it just was so far off. There is no Australian data, study, report that would suggest that wind farms are even three times more expensive than coal-fired generation or gas-fired generation, let alone 10 times. In fact, the long run marginal cost is roughly twice a coal-fired generator without a carbon price and without other externalities. But again even that is very simplistic. To say that wind farms, okay, they are twice as expensive as a coal-fired generator and therefore they will cost twice as much to operate again ignores the issue that that is not how electricity is actually run in the wholesale market. The generators bid on their short run marginal costs, not the long run marginal cost. So the fact that while the wind farms are very expensive, the capital cost is expensive, once it is built it is the cheapest form of electricity and we actually underbid the coal- and gas-fired generators and that actually lowers the wholesale price of electricity. So in any case it is nowhere near 10 times. That is just patently absurd.

Dr GEOFF LEE: Some of the submissions have referred to the need for certainty in government policy to promote investment. What do you think the New South Wales Government can do to provide greater certainty to investors in the electricity market?

Mr UPSON: Thank you for that question.

Dr GEOFF LEE: That is a dorothea dixer I think we call it.

Mr UPSON: I have your New South Wales Solar and Renewable Energy Summit fact sheet, which I also presented at last year, and it says, "Developing New South Wales' abundant renewable resources requires a favourable investment environment and regulatory predictability". I could not agree more. The single most important thing the New South Wales Government could do is to not retrospectively apply the draft wind farm guidelines. If you have wind farm guidelines and then that applies to new greenfields developments, that is fine. Then before you start the development you know what the rules are and you can decide whether you want to play or not. But what is actually happening at the moment is the Department of Planning is going to retrospectively apply the draft wind farm guidelines to development projects that are in the development pipeline, that have their director general's requirements, they are in the middle of their environmental assessment, doing those studies, or in some cases they have finished their environmental assessment, it has been judged to be adequate and yet the Department of Planning is coming back and saying, "By the way, you can now start all over again and address these draft wind farm guidelines."

CHAIR: Is that mainly in relation to the two kilometre from residences rule?

Mr UPSON: That is one facet of the draft guidelines but there are many others. It is a 50-page document; there are a lot of other stipulations and regulations in there as well, and that is the single most important thing that the New South Wales Government could do because obviously from a planning system perspective, if you finish your environmental assessment and it is judged to be adequate, then they go back and say, "By the way, we have these new draft rules. Go back and start over again" does not exactly encourage investor confidence in the regulatory system.

Dr GEOFF LEE: One disadvantage of wind farms is their intermittency and you cannot guarantee that it will be windy all the time, so we have gas-fired generators. There has been some comment to say that because of the intermittency of wind turbines we also have to develop gas-fired ones to cope. Do you have any comments about that?

Mr UPSON: That is a very good question. I have one more handout I would like to provide to you.

Dr GEOFF LEE: We were not working in collaboration.

Mr UPSON: I was kind of ready for this one. That is one of the misconceptions about wind energy and unfortunately some of the market participants are propagating that, and I guess for their own reasons. This is a chart again using Australian Energy Market Operator data for the Liddell coal-fired power station, unit 3. There are several units there. The 500 megawatt capacity power station, and you can see here that what happened in September and October of last year is that this power plant actually dropped offline, 450 megawatts of generation. That is 450 million watts of generation went to zero five times in six and a half weeks for three days at a time. This is what some people call base load power. It is true that coal-fired stations are, in a sense, more scheduled than a wind farm, that is true. But you can imagine you are sitting here and all of a sudden 450

megawatts is gone like that. It could have happened just now and you would not know it because there is backup generation in the grid today.

There are backup facilities, there is spinning reserve, there is other equipment in the grid to compensate not for wind farms being intermittent but to compensate for 500 megawatt coal-fired generators snapping offline for whatever reason. So there does have to be backup generation but that backup generation exists today. It is already built; it is already there and it is built to backup the coal-fired power stations. You can imagine, say, the Capital wind farm is roughly 150 megawatts and maybe over a 10-minute period it might drift down to 120 megawatts if the wind was getting less. You can see that is just negligible. That is nothing for the electricity operator to compensate for that. Again, it is also actually forecast at 98 per cent accuracy. When Liddell unit 3 drops offline there is no forecast; it just happens. Something tripped off, something went wrong, the thing tripped offline and the electricity, the lights, still need to stay on and they do because the backup generation, the spinning reserve and other equipment necessary to keep the lights on is already present and in place. If we were to build wind farms, for example, in Antarctica, you would have to build backup right next to it because when the wind is not blowing you would not have any electricity. But the point is that in an established electricity market the backup generation already exists. You do not need to build new backup generation because you are building wind farms.

Dr GEOFF LEE: It seems to me that your position is when it is windy you are generating power but you will be the under bidder because you put in at the least marginal costs which is the lowest one of everybody but then you rely on others in the industry to pick up that back-up.

Mr UPSON: That is a competitive market place. They bid in at their price and we bid in at our price and the lowest bidders get despatched. In the graph I handed out earlier in South Australia when the wind drops off the coal and gas fire generator will then be despatched because their higher prices will be accepted. That is how the market works. The point is that all those other generators already exist, they are already built. They might make a little less money, they might lose a little market share, they might suffer lower wholesale prices, but that is not a detriment to the consumer. Lower wholesale prices are a good thing for consumers.

Dr GEOFF LEE: The difference is with the coal and gas we subsidise renewable energy through legislation: Federal or State. They are targets—that is the difference.

Mr UPSON: That is right. The purpose of the large-scale renewable energy scheme is to build large scale renewable energy and have it generate into the grid—that is the purpose. It has been, with a few hiccups, quite a successful scheme. That scheme allows large scale renewable energy facilities, mostly wind but there has been hydro, biomass and other schemes as well, and hopefully solar PV in the future, to be built and that scheme gets them built and once they are built they will bid into the market whatever their incremental cost is. That will displace gas and coal fire generation, as you see in the graph. The gas and coal fire generation did not generate very much on that last Friday, but that is good thing. You are making electricity with no pollution, no greenhouse gases and lower wholesale prices.

Dr GEOFF LEE: It is bad in the way that we are subsidising it to do that. The overall cost to the consumer is higher.

Mr UPSON: That is not clear either. In South Australia the Essential Services Commission of South Australia [ESCOSA] determines the prices in South Australia, just like the Independent Pricing and Regulatory Tribunal determine the prices in New South Wales. The Essential Services Commission of South Australia calculated the cost of the large-scale renewable energy target scheme [LRET] to be \$3.66 a megawatt hour. If you look at the reports referenced in our submission it is clear in that report that the wholesale prices in South Australia have been depressed by wind energy by at least \$5 a megawatt hour and probably more. Wind farms in South Australia have lowered the wholesale price of electricity by at least \$5 a megawatt hour. The impost of the large-scale renewable energy target scheme is \$3.66, as determined by the Essential Services Commission of South Australia. South Australia is getting 25 per cent of their electricity from wind at no cost to them because the wholesale price reduction is greater than the impost on the retailers. That is not happening in New South Wales because there is so little wind energy that the capital wind farm is not going to influence the price significantly but once New South Wales gets five or six per cent wind energy penetration you will see the same wholesale price reduction that South Australia has seen.

Mr JOHN WILLIAMS: Just based on those comments something concerned me, I do not know if you are aware of it, there was a news broadcast that South Australia is heading for the highest electricity costs in Australia: Are you aware of that?

Mr UPSON: I did look at that report. It is based on a study by the Energy Users Association of Australia. It is addressing retail prices. You heard earlier today that the largest contributor to retail price increases is the networks, particularly distribution network cost. That is irrelevant of the generation cost in South Australia. I do know some organisations, I think you had one previously, ESAA, which had a different opinion about that report and had some comments about it. I have not looked at the report in great detail. The fact that South Australia historically had the highest wholesale price, as a generator retail prices are something that we do not control. We do not earn retail prices, we earn wholesale prices. The retail price is the wholesale or the generation cost, distribution cost, transmission cost and the retailer cost. What happens to the retail price, on top of those things, is out of our control because it largely involves the networks themselves. The wholesale price for electricity in South Australia was highest five years ago in the national electricity market [NEM]; we had the highest wholesale prices. Wholesale prices now have never been lower; they are half of what they were five years ago. What a terrific success story. As far as the wholesale price contributing to the high retail prices in South Australia, it is not the wholesale prices that are contributing to it; it is the network cost and other factors.

Mr JOHN WILLIAMS: I understand that. I also understand that the network is provided by private enterprise in South Australia, so within their pricing capacity they should be making provision for upgrades rather than passing it on to the consumer.

Mr UPSON: I am probably not the best one to comment on that.

Mr JOHN WILLIAMS: Do you foresee further expansion in South Australia with Leigh Creek having a limited life of coal supply? Do you see that creates further opportunity for expansion of wind generation?

Mr UPSON: There are a number of wind farms with planning approval in South Australia. There are quite a number in development as well. It is a fairly windy State. The planning system is fairly straightforward. It is through the local shire council, which we do not mind at all. We have had three wind farms approved in South Australia by the shire council and for the last stage of that wind farm we got zero objections—not one was lodged for that wind farm.

As far as the future in South Australia; it is uncertain at the moment. In a sense we are a victim of our own success. When it is windy in South Australia the wholesale price of electricity is roughly half of the average. This is again using Australian Energy Market Operator data, it is not our data. The average wholesale price when it is windy in South Australia is effectively \$22 a megawatt hour versus an average of about \$45. Each new wind farm you build increases the pressure on wholesale prices. If the wind farms were built over a wide area it might not be so bad but in South Australia the wind farms are close together. The economic case, as far as electricity prices, shows it is better to build one in New South Wales.

The electricity network is another issue. There are probably only a few other places in South Australia with the generation capacity in the network to connect the wind farm. I am actually not sure when the next wind farm will get built in South Australia. A couple of things would help: if the uranium mine were to go ahead that would provide a new electricity demand that would need to be satisfied by something. If there was a new interconnector built or augmented between South Australia and Victoria—I do not view that as a bad thing or something wind energy caused—what that will allow us to do is generate more cheap electricity in South Australia and export it to Victoria. That is a good thing for consumers because you are getting cheaper wholesale electricity prices without the pollution.

Mr JOHN WILLIAMS: When the end of life arrives for your current investment in South Australia what are your plans for replacing the units? Is that something you are foreseeing in the future?

Mr UPSON: Thank you for the question. It is absolutely our responsibility to remove the turbines when the wind farm is decommissioned, that is crystal clear in the contracts and it is in our planning development conditions as well. The history overseas is that when wind turbines get rather old, say 12, 15 years old, it has become economic to repower the site: in other words, to take out the old turbines and put fewer larger more efficient turbines in their place. You have a proven wind resource, which is good. The community, particularly after the wind farm is built, tend to think it is fine. It is a good spot to put a wind farm. I suspect in

Australia that is going to happen in the middle of the decade. Maybe a bit later you will see some of the older wind farms, for example the Blayney wind farm and the Codrington wind farm in Victoria, repowered by the owner of the project. For example, we take out maybe 18 small turbines and put in 12 large ones. In any case, if it turned out that for whatever reason repowering did not make sense we would simply bring in cranes and take the turbines away. The concrete foundations would typically get jackhammered down about a metre or so and then covered over with dirt. One of the big advantages of wind energy is that after the turbines are taken away you have no idea the wind farm was ever there; there is basically no evidence that there was ever a wind farm there.

Mr JOHN WILLIAMS: That leads me to one of the concerns about renewables. With base load generation there is always a commitment for renewables but with intermittent generators we have no security about the future; we cannot say that a wind farm operator is guaranteed to go and renew the assets and put another 20 years of life back into it. It creates a real quandary for the future. Governments need to know there has to be security for the future and if we are going to rely wholly on renewables and they are going to be fairly mobile, we have got a big problem.

Mr UPSON: Firstly, I am not advocating that New South Wales go 100 per cent renewable in the next eight years or anything like that. What will happen is that at some point—for example, the Blayney wind farm is a reasonable example—in the next 10 years the owner of that wind farm, which currently is the Government, will have to decide what they want to do, whether they want to repower the site or not. We cannot tell the future. The design life of a turbine, by the way, is at least 20 years, so 20 years from now, who knows, solar could be cheap as chips and it will not be effective to actually repower a site with wind turbines, you will just lay down solar panels may be. Twenty years from now you just do not know what the cost of different electricity generating technologies are going to be, but the fact that 20 years from now you need to remove turbines and maybe put new ones on, I do not see that as a risk. If it is still economic to put in wind turbines, people will be manufacturing them and we will be installing them.

CHAIR: But what if you do not have the same government subsidy though installing the capital cost, that is the question?

Mr UPSON: The renewable energy target scheme is scheduled to expire in 2030, so if it is not changed that would be the case. The idea is that the wholesale price of electricity will likely be much higher than it is today, which is not a good thing for consumers, but as a result of potentially carbon pricing and other things the wholesale price of electricity might be a lot higher, like it is in other countries and that might be enough to sustain wind farms in Australia. In New Zealand, for example, there is no renewable energy target scheme and they do have a small carbon price scheme but it is not all that significant. They basically build wind farms because their wholesale price of electricity is a lot more than ours and it is very windy so they can actually build them essentially without government subsidy.

Mr JOHN WILLIAMS: That is the point we have to get to. When we look at some of these base load generators we have to work outside of New South Wales but there have been decisions made to build them without any government assistance. They have seen an opportunity in the marketplace where they could cover their costs and get a return. That does not seem to be the case with renewables. Renewables are totally and utterly reliant on government subsidy, which has to be a concern for the future.

Mr UPSON: You are correct that they need a government subsidy or a renewable energy target scheme, which is an impost on electricity customers; there is no actual money given to us from the Government. That scheme is effectively a subsidy but as I have already said, in South Australia the magnitude of that subsidy is actually less than how much we are depressing the wholesale price for electricity so it is actually not costing customers in South Australia anything for the large-scale renewable energy target scheme.

Mr JOHN WILLIAMS: When South Australia gets totally and utterly reliant on the inputs from wind generation and then all of a sudden everyone packs up and goes home, we have got a huge problem.

Mr UPSON: Once you build a huge turbine you are going to keep running them basically until their design life is over. You have put in the money, you have paid the capital down, so there is no reason to stop operating the wind farm because the operation maintenance costs are very low compared to any other form of generation.

Mr JOHN WILLIAMS: Absolutely, but you still recognise that a decision will be made at some point in time whether you repower or walk away?

Mr UPSON: That is right, but if the economics are there you will repower and put up new turbines.

Mr BART BASSETT: Out of curiosity because there was a lot of discussion at the time regarding the desalination plant being powered by wind energy, does the Capital Wind Farm produce sufficient energy to supply the desalination plant and is there data to back that up?

Mr UPSON: Capital Wind Farm does have a power purchase agreement with the desalination plant. Capital Wind Farm does generate enough electricity to power the desalination plant. The purpose of the contract was for us to supply sufficient electricity to power the plant. There is some margin there; in other words, what we anticipated Capital Wind Farm was going to generate, ratcheted that down a little bit and then that is what the desalination plant actually needs so we actually do generate a bit of excess electricity to Capital Wind Farm that is not sold to the desalination plant to make sure that we can actually cover their electricity needs but the short answer to your question is, yes, we can supply all the electricity needs.

Mr BART BASSETT: What do you think will be the impact of the carbon tax on electricity generation in New South Wales?

Mr UPSON: I am not a member of an energy trading group, so I will qualify that to begin with. Certainly the purpose of the carbon price scheme is to raise the wholesale price of electricity; that is what it is supposed to do, so it will do that. As of 1 July the wholesale price of electricity in New South Wales will rise by some amount and that amount will then get passed through to the retailers and retail customers. The carbon intensity of electricity generation in New South Wales is roughly one tonne of carbon per megawatt hour of electricity and the carbon price is \$22 a tonne so you would anticipate the wholesale price should go up roughly 2.3¢ a kilowatt hour or \$23 a megawatt hour would be a very simplistic way of looking at it.

Mr BART BASSETT: You may have answered this in some of your other answers but so that we have it on the record: there have been a number of reports released in Australia and overseas about the levelised cost of electricity for different types of generation. In your experience, how well does this research reflect the actual costs of building and operating a wind farm?

Mr UPSON: I have seen some of those studies, most recently the Commonwealth's energy white paper, which has some estimates for 2030. Really that is crystal ball gazing. To come up with levelised cost of energy generation for 2030 is really almost dart to dart board kind of stuff. I can talk about that one. For example, the price for nuclear is highly optimistic, I would say. The price for wind energy, I think, was very overstated. It was over \$200 a megawatt hour. Why would it twice what it is today 20 years from now? It should get more efficient and therefore more cost effective not less. I know my friends who work in that industry also think the solar photovoltaics in that report also were very overestimated costs as well. I think it is much better to look at cost estimates for 2015; no further out than 2020 because anything beyond that you are just guessing as to what you think it is going to be.

Mr BART BASSETT: Based on your response where you felt the idea of wind generation is so significant in the report, do you think to 2020 your costs will go down with regard to producing energy through a wind farm, is that what you are saying?

Mr UPSON: The cost of wind turbines—and when I say "cost" I mean the cost for generation, of dollars per megawatt hour generated, which is what it really comes down to—has declined over the last couple of years. But that also is due to market forces. It is supply and demand, so with the global financial crisis and overseas orders slowing down a bit, there is a little bit of an oversupply of turbines so the prices have come down some. I would expect them to either continue to decrease slowly and maybe level off but I think it is an unusual circumstance where they would go up significantly because the technology is improving. We make the turbines more efficient, blade design and other things that they can extract more electricity and more energy from the wind and as that happens you would presume that the real cost of wind energy should decline by some amount over time and should not go up.

CHAIR: I am conscious of the time. I wonder whether or not that difference in cost analysis between some of the studies on levelised cost of electricity for different parts of generation and your own experience might in part be due to whether or not they include in the equation the cost of decommissioning wind farms.

I would invite a comment on that, if you wish to comment. Otherwise, what do you think are some of the most successful examples of emerging electricity generation projects in New South Wales?

Mr UPSON: I will address first your question about decommissioning. Decommissioning is going to happen after 20 years, and so if you put that in a financial model spreadsheet, with the current cost of money and everything, the cost of decommissioning will not be a significant impact on the project. A decommissioning bond ahead of time is a very significant cost to the project. But the actual decommissioning of the turbines will not cost very much, partly because it will be largely offset, if not entirely offset, by the value of the scrap metal in the turbine. There are thousands of tonnes of steel, aluminium and copper in the wind turbines, and that is very valuable, and in 20 years from now will probably be even more valuable. So actually the cost of the crane to come in and take it down will be largely offset, or maybe even completely offset, by the actual value of the turbines. That was not true of the older turbines built 30 years ago on trestle towers; there was not much metal in those, so there was not much value in them, and they were pretty small structures. But it is true of turbines today.

As far as successful renewable energy products in New South Wales, I guess without blowing our own horn, we happen to think we have the most successful ones, which are the Capital and Woodlawn windfarms, which are by far the largest windfarms in New South Wales. The windfarms were built with widespread community support. We have just terrific support in the community. I have spoken with the local member of Parliament, John Barilaro, who visited the site a few weeks ago. He is very happy with the Capital windfarm and its acceptance in the community, and does not consider there to be any controversy there. It was implemented on cost, on schedule. It is great to be able to power the desalination plant. Having a long-term power purchase agreement like that has actually helped us build projects, and so it was certainly great that the New South Wales Government at the time was able to arrange that. I think it is a good thing for desalination plants to be powered by renewable energy. If they are not, I think they tend to lose a bit of their social licence to operate because they do use a huge amount of electricity.

CHAIR: Given that we have a renewable energy target and at the Federal level a carbon tax, is there really a need for any New South Wales Government involvement in financial subsidies in the renewable energy market in New South Wales? Or do you think we are best standing back and letting those two Federal Government initiatives—if those initiatives are let operate—impact how the market plays out, recognising that there is a costing in of environmental impact?

Mr UPSON: I will answer that in a couple of different ways. As far as wind energy goes, we will always accept money from anyone, but I do not think it is really necessary or probably good policy for the New South Wales Government to contribute to windfarms in any economic way. I think with the large-scale renewable energy target scheme, I think we can get projects built with just that. Large-scale solar schemes, however, do require additional subsidy, because they are roughly speaking twice as expensive per kilowatt hour of generation than are windfarms. So, if you want to build a large-scale solar facility, it cannot compete with wind energy on a level playing field; it is more expensive. So it does need some sort of subsidy or grant program, and the Commonwealth Government has the Solar Flagship program. It is public knowledge that the New South Wales Government did support one of the Solar Flagship bids and was going to provide additional funding for that. I think that is a good policy for large-scale solar products, because they do need additional grants in order to be economic basically against wind energy.

The third area would be in research and development programs for more emerging technologies, and that is really a decision as to whether you want to encourage research and development activities for different emerging technologies, such as wave technology, solar thermal and things like that. It is really whether you want to encourage companies that are in New South Wales to continue their research and development. But that is not an area that our company really works in, so I do not have a recommendation there.

CHAIR: It might be more of an industry development focus rather than one of encouraging green energy.

Mr UPSON: That is right.

CHAIR: The national electricity market was designed when the vast majority of electricity in Australia was sourced from fuel-based generators. Does the structure of the market need to be reconsidered, in your view, in a scenario where unscheduled or semi-scheduled renewable energy plays a greater role?

Mr UPSON: That is a good question. Again, to clarify: every generation plant over 30 megawatts will either be a scheduled generator or a semi-scheduled generator. You cannot build a large unscheduled generator anymore; they basically cannot do that. We are actively participating in a number of electricity market papers and consultations. The Australian Energy Market Commission's transmission framework review is probably the most important one. Our view is that the electricity market operates pretty well today with the existing framework. There are some things that could be improved. Probably the one that is most important to us is the issue of connecting new generators. While the previous witness spoke about the need to pay our own costs of connection—and we certainly agree with that—there are some issues with regard to the negotiations of those connection costs and the transparency of the technical standards and the economic charges that we have to wear that could be improved. Basically, it comes down to the fact that if we want to connect a windfarm to a transmission network service provider, you can imagine the negotiations being quite difficult, because they do not need us at all and we need them or our project does not go ahead. So they have inherently a huge amount of negotiating power in those kinds of circumstances that could be better addressed.

Mr BART BASSETT: My question follows on from your previous answer. You said briefly that decommissioning costs could add to the long-term costs of wind generation. What did you mean by that? Do you sometimes get decommissioning costs payable upfront, so therefore it becomes a capital expense?

Mr UPSON: The draft New South Wales windfarm guidelines—which, of course, could change because they are still a draft—ask for a decommissioning plan. And if that decommissioning plan is seen as insufficient, then they will require an upfront decommissioning bond, so there will be an assessment of how much decommissioning will cost, and the owner of the windfarm would, presumably, have to put that money in the bank or put it away for the next 20 years and not have access to it, waiting for the decommissioning of the project.

What I was trying to clarify is that the actual decommissioning cost 20 years from now is not substantial in today's dollars. It is something we need to set aside money for; there is no question about that. So in the fifteenth year or so you will start setting aside money to make sure you have money for that. But in the actual spreadsheet analysis of the project, because it is in the out years 15 to 20 that you set aside the money, it is not a huge cost, probably because again it is offset by the scrap value of the turbines.

But if the government were to say, "Oh, by the way, if you want to start building that windfarm put a decommissioning bond down today," that does become a significant burden. While there are very few examples overseas of jurisdictions requiring that, it is very, very unusual to do that—because, at the end of the day, we are impacting a six-metre diameter bit of farmland with a turbine; there is not a lot of environmental damage caused by the turbines. And the impact of decommissioning is absolutely certain: it is simply a matter of taking the turbines down. It is not like you are going to find out that underneath the soil there are a bunch of chemicals you did not know about, and all of a sudden the decommissioning costs have blown out to \$100 million, and you need a super fund, or something like that. So you do not have the issue that there is actually a risk that the decommissioning costs are going to blow out to something outrageous. It is simply a matter of taking the turbines down and trucking them away for the scrap value.

CHAIR: Thank you, Mr Upson, for appearing before the Committee today. The Committee may wish to send you some additional questions in writing, the replies to which would form part of your evidence and be made public. Would you be happy to provide a written reply to any further questions should that be necessary?

Mr UPSON: Yes. I would welcome the opportunity.

CHAIR: Thank you. We certainly very much appreciate your input into our inquiry process. Thank you, as well as all members of the Committee, Hansard staff and Committee secretariat staff for being part of what I think has been a productive hearing today. We will also formally resolve, on the motion of Dr Lee, seconded by Mr Williams, that the Committee will accept the graphs and handouts that you have tabled today. I close the meeting, and note that we will be meeting again on Thursday at 9.30 a.m.

(The witness withdrew)

(The Committee adjourned at 4.50 p.m.)