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INQUIRY INTO GROWING QUEENSLAND'S RENEWABLE ENERGY ELECTRICITY SECTOR

TRANSCRIPT OF PROCEEDINGS

FRIDAY, 17 SEPTEMBER 2010

Brisbane

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Committee met at 9.01 am

SCHUCK, Dr Stephen, Manager, Bioenergy Australia

BERRILL, Mr Trevor, Sustainable Energy Policy Queensland

GURGENCI, Professor Halim, Member, Australian Geothermal Energy Association; and Director, Queensland Geothermal Energy Centre of Excellence

WYBORN, Dr Doone, Member, Australian Geothermal Energy Association; and Chief Scientist, Geodynamics Ltd

YOUSSEF, Mr Jon Arkel, Convenor, Northern Territory and New South Wales Chapters, and Member, Australian Geothermal Energy Association

CHAIR: Good morning, ladies and gentlemen. It is really great to see such an interest in our second hearing for the Environment and Resources Committee. We have quite a lengthy schedule today. It is now nine o'clock so we should get started. We have our first panel of witnesses who are obviously keen to start the ball rolling this morning. We have an apology this morning from Susan Jeanes, who is the Chief Executive of the Australian Geothermal Energy Association. I believe that she is not well this morning and we have asked that you pass on our best wishes from the committee.

I am sure that everyone here is aware of the enormous potential to generate electricity from all of the various forms of renewable energy technologies that are available in this state. Our mission today, with everybody's help here, is to gain a better understanding of how much power your industries and technologies are generating in Queensland now and how much additional capacity we can bank on by 2020 and beyond based on the technology currently available.

Via teleconference we have two gentlemen who are unable to be here today: Dr Stephen Schuck, who is the Manager of Bioenergy Australia; and Mr Russell Marsh, who is the Policy Director of the Clean Energy Council.

The committee conducts this hearing pursuant to the resolution of the Legislative Assembly of 23 April 2009 that appointed it. The committee has resolved to examine and report on the opportunities and challenges for the Queensland government associated with increasing the proportion of electricity generated from renewable energy sources in Queensland. For this inquiry the committee will consider and make recommendations on, one, the value for money from the Queensland government's investments in renewable energy projects for electricity generation; two, whether the Queensland government should adopt a target for increasing the proportion of the state's electricity generated from renewable energy sources and, if so, what form the target should take; and, three, what actions the Queensland government should take to encourage investment by government owned energy companies and the private sector in producing more electricity from renewable energy sources.

This is the second inquiry by the committee focused on energy policy, and reflects the importance of reducing the state's energy consumption and overall dependence on fossil fuels to environmental and economic outcomes. If anybody is interested, we have a number of copies available of our first report which has been tabled and is now a public document titled *Energy efficiency: Queensland's first energy resource*. We have a number of copies of that report available here today.

Energy use in Queensland has trebled over the past 30 years, and Queensland's per capita energy demand is the nation's highest. Moving to a more sustainable energy base also holds the key for the government to meet its commitment to reduce greenhouse gas emission levels by 60 per cent from 2000 levels by 2050. This target is in line with international moves to mitigate global emissions and climate change risks needed to avoid the most damaging effects of climate change.

I would like to introduce my committee to you this morning. We have Chris Foley, who is the member for Maryborough; Mr Peter Dowling, who is the member for Redlands; and Mr Simon Finn, who is the member for Yeerongpilly. We have a couple of apologies today. Mr Jeff Seeney, our deputy chair and member for Callide, is unable to attend. Ms Julie Attwood, the member for Mount Ommaney, is also unable to be here. This is a bipartisan committee that the government has formulated. We have members of the opposition and we have Chris Foley, who is an Independent. We are working very well as a committee, and I am very pleased to report that we have come up with quite a number of recommendations to the government that we are hoping it will take up.

The proceedings here today are lawful proceedings and are subject to the Legislative Assembly's standing rules and orders. Witnesses should have been provided with instructions to committees regarding witnesses adopted by the Legislative Assembly which the committee is bound to follow. Gentlemen, have you read those guidelines?

Prof. Gurgenci: Yes.

Mr Youssef: Yes.

Dr Wyborn: Yes.

CHAIR: Could I ask the gentlemen on the phone if they have also read the guidelines?

Dr Schuck: Yes, I have.

Mr Hansen: I still don't think we have Russell on the line.

CHAIR: Okay. Remind me to ask him later. Hansard will note that the witnesses have read the guidelines.

Under the guidelines, you may object to answering any question put to you on the grounds that the question is personal and not relevant or that the question may incriminate you. The committee will not require you to take an oath or affirmation. However, we do expect that witnesses will respect the proceedings. Recording of today's proceedings except by Hansard will not be permitted.

It is our intention to keep to the times on the hearing program, and we will finish at three o'clock if not before. We have a lot to get through today, as I have said, so to avoid the need for a further hearing I ask all witnesses who are giving evidence today to be brief and succinct with your answers. If you take any questions on notice, we ask that you provide your answers by Friday, 24 September.

CHAIR: I welcome Mr Trevor Berrill. How are you?

Mr Berrill: Good, thank you.

CHAIR: Our hearing today begins with a panel of representatives from peak bodies representing the renewable energy sector. Gentlemen, would any of you like to begin with an opening statement?

Mr Youssef: Madam Chair, I might start. First, I must apologise on behalf of Ms Jeanes, who was to deliver this opening statement. The Australian Geothermal Energy Association appreciates the opportunity to present its views on growing Queensland's renewable energy sector. In doing so, AGEA notes that a number of geothermal energy companies and one of the leading national research centres, the University of Queensland's Geothermal Energy Centre of Excellence, are all based here in Brisbane. This critical mass presents the opportunity to be a leader in the development of geothermal energy projects in Australia and to export that expertise and technology to a world where geothermal energy will be an increasingly important part of the global energy supply mix into the future.

AGEA's view is that domestic capabilities and expertise are often undervalued, and it is concerned to ensure that this does not become the case for Australia's current globally prominent position in the development of geothermal energy expertise and component technologies. AGEA understands that the key current geothermal initiatives in Queensland are a government commitment of $5 million in the Coastal Geothermal Energy Initiative for shallow well drilling along the coast of Queensland; a government commitment of $4.3 million to Ergon Energy for the new Birdsville geothermal power station; and a $15 million fund to the Queensland Geothermal Energy Centre of Excellence at the University of Queensland.

Further, the Queensland Renewable Energy Plan contains a number of aspirational goals that could benefit geothermal energy including to leverage $3.5 billion of national investment triggered by the renewable energy target and to build 2½ thousand megawatts of installed generation capacity here; to work in partnership with industry to seek to commence deployment of a large scale geothermal demonstration project by 2014; and for government owned generators to partner with industry to identify renewable energy solutions.

AGEA notes that, while a number of geothermal exploration licences have been issued in Queensland, the national industry focus has been in other states and, in particular, South Australia, Victoria and Western Australia. The reasons for this include a greater understanding of the resource potential and location, more encouraging and timely state legislative and regulatory regimes, funding support for projects from the states, particularly Victoria, and a local champion in the state government, in particular in South Australia.

The earlier development of projects in these states has enabled companies to successfully apply for Commonwealth funds totalling more than $200 million to commence proof of concept and demonstration projects. Queensland projects have not been supported as they were not far enough advanced to apply for funding available through the Commonwealth's Renewable Energy Demonstration Program, the REDP, and the Geothermal Drilling Program. This funding has now been fully committed, and the industry is not clear on what funds will be available through the Australian Centre for Renewable Energy, or ACRE as it is otherwise known, nor is it clear on whether such funds will be available for project development in Queensland in the near future.

If Queensland intends to achieve the aspirational goals set out in its Renewable Energy Plan, and if it intends that geothermal will play a significant role within this plan and beyond, AGEA believes that the Queensland government needs to appreciate the significant and unique benefits of geothermal energy including its future low-cost predictions; that the geothermal energy industry's cost structure, research needs and development time lines are different from those of other renewable energy technologies; the view of the private investment sector of geothermal energy in Australia; the need for effective policy initiatives developed in conjunction with industry to address barriers to upfront investment in the sector; and that stronger initiatives by government are needed to demonstrate the precompetitive understanding of Queensland's geothermal potential.

AGEA believes that these initiatives could include: requiring government owned generators to develop projects in partnership with the industry where suitable resources exist; funding to assist with the upfront high cost of drilling of the earlier wells; a feed-in tariff for geothermal energy; and, lastly, a competitive funding program to develop one or more demonstration projects. Again, AGEA expresses its appreciation for the opportunity to present its views to the committee today.

Mr Berrill: My name is Trevor Berrill. I am representing a policy group called Sustainable Energy Policy Queensland. We are a coalition of industry based people and researchers who have been putting together policy statements to the Queensland government for a number of years now to promote the uptake of renewable energy technologies in this state.

In our submission we have recommended that the Queensland government set a 40 per cent renewable energy target for electricity generation by 2020. Our submission is based on an analysis of climate science and the need to respond quickly to this challenge. We have already delayed action long enough. We also recognise that all fossil fuels are inherently polluting on many levels and that clean renewable energy solutions are available. In our analysis, neither clean coal nor nuclear power can be scaled up quickly enough to prevent catastrophic climate change impacts that are already happening in developing countries. By comparison, renewable energy technologies are modular and can be mass-produced quickly, and this is now occurring in China and the EU. In fact, the biggest growth in electricity systems in the world is in the renewable energy sector now, not in the fossil fuel sector or the nuclear sector.

Our suggested target is realistic and achievable, given the massive renewable energy resources and material resource base that Australia has, for example for the production of steel and mirrors, and also our technological expertise. We have led in many of these fields for many years. Our target is in line with the requirements to reduce greenhouse gas emissions to safe levels in line with leading EU country policy and targets.

Our target is based on a review of scenario analyses for Australian renewable energy targets by reputable consultants and think tanks. The most ambitious and most recent of these scenario analyses demonstrates that Australia could achieve a reliable electricity system based on 100 per cent renewable energy supply within 10 years with an expenditure of three per cent of GDP over that time. All of these scenarios include strong energy efficiency policy and targets to support the uptake of renewable energy. The combination of energy efficiency targets and renewable energy targets means that there is no net cost to most consumers because the energy efficiency measures offset the higher costs of generation from renewable energy sources.

This proposed renewable energy target, together with energy efficiency, would position Queensland as a leader in the fight against climate change and set an example to other states and other countries. It would provide a large number of jobs across regional areas. There have been a number of economic studies done over time which have demonstrated these facts. It would provide stable and cheaper energy costs in the long run compared to the alternatives, and this is due to the reduction in costs which will occur through the modular nature of these technologies and their mass production. We have already seen, for example, a dramatic reduction in the cost of photovoltaics in the last few years as the scale-up of the photovoltaic industry in China has taken place.

By implementing a renewable energy scenario we include the full external costs of those technologies which are currently avoided under our use of fossil fuels. We simply continue to pass those external costs—the social and environmental costs—on to future generations. We would provide a renewable energy knowledge base, skills and technology that could be exported to offset coal royalties, which is a fundamental problem that Queensland faces. And the Queensland public have been calling for energy supply to come from renewable energy and energy efficiency for many years. Public surveys as far back as the early nineties from the electricity commission showed that 95 per cent of respondents to surveys supported renewable energy, solar in particular, and energy efficiency as their preferred options for future energy supply. And more recent results from CSIRO attitudinal surveys show the same thing. Also, we have seen a very strong uptake of solar water heaters and solar PV, given the right incentives. I think this is a testament to Queenslanders' belief in these technologies, that this is the pathway forward.

There is a range of renewable energy technologies which are in various stages of development. Some are very mature. Solar water heating, for example, is a mature technology. It has been here since the 1950s. Wind energy technology now is very mature. Solar thermal electric, where we generate steam from concentrating collectors, is a very rapidly developing technology. It has been proven over many years in large scale plants, in California for example. Then we have other areas such as geothermal biomass

technology. Geothermal is coming online, developing fairly quickly, and biomass is really based around already proven steam driven technologies. So there is a mix of technologies there which we are going to eventually see as part of our electricity system.

The SEPQ believes that it is time to act and we are calling on the state government to take a bold step—to set a strong target for renewable energy and to start a transition away from the fossil fuel era to a truly sustainable energy era.

CHAIR: We have had over 30,000 people access our Solar Bonus Scheme which is a tremendous effort on the part of Queenslanders. We really appreciate their input.

Dr Schuck: My name is Stephen Schuck, and I am the manager of Bioenergy Australia. Bioenergy Australia is an alliance of government and industry organisations. We have about 88 member organisations including people from both federal and state jurisdictions. We are also the vehicle for Australia's participation in the International Energy Agency's bioenergy program. We participate in four parts of that program.

I provided a submission to the inquiry—a 14-page submission—mainly to profile bioenergy and to alert the committee basically to the very mature and large scale nature of bioenergy globally. Globally, modern bioelectricity provides about 52 gigawatts of installed capacity. This compares to Australia's total coal fired industry of about 45 gigawatts. So it is a large, mature industry, as noted in the submission and also in the Queensland reports. I do not have the actual title with me. There are about 415 megawatts of the bagasse fired generation in Queensland.

What I have tried to do in the submission is basically show what others have done in other parts of the world—the large scale nature. One of the things I tried to profile was the opportunities for co-firing biomass with coal. This basically would be a very low cost renewable energy option providing baseload power basically using existing infrastructure. So that was highlighted in the submission. I also suggested that it would be very useful if Queensland set a target and that it be no less than the nationwide target of 20 per cent renewable energy by 2020.

I also pointed out in the submission I guess two elements which make bioenergy successful. At one end you have the feedstock side. I basically profiled what some other countries are doing. I mentioned the US Biomass Crop Assistance Program, where there is basically dollar-for-dollar support for biomass supplies. Bioenergy, because of the ongoing nature of fuel requirements, basically has some very impressive economic multipliers and job creation potential in rural and remote areas. So that is another thing I mention in the submission.

I mentioned the sale of off-take for the electricity. I also profiled feed-in tariffs. There are some feed-in tariffs around Australia, but they are generally geared for solar cells and they generally are capped at about 1½ kilowatts, which is a total mismatch with bioenergy. In the submission I gave an example of the feed-in tariff in Ontario, Canada which basically provides certainty and long-term contracts for the industry and which stimulates it and really gets bioenergy going.

I also mentioned that within our federal government mandate, and also I guess as implemented through the states, solar hot-water systems fit into the target. I notice that this inquiry is essentially about the electricity sector. Although there has been mention this morning already about solar hot-water systems, one of the things I mention is that co-generation, which is the combined generation of electricity and heat, would provide for very efficient use of fuel and it would possibly be of use to consider adding a bioheat or renewable heat type program in conjunction with any electricity programs. This would stimulate co-generation. I also note that the UK is set to implement a bioheat or renewable heat program from 2011.

It is my opinion that Queensland is well endowed with natural resources which could support bioenergy. Some of you may know that there are very large infestations of Acacia nilotica in parts of Queensland. That weed clearing would also provide for very substantial bioenergy feedstocks. In conclusion, some of the projections for Queensland seem to indicate that bioenergy would only be able to provide about a quarter of the electricity capacity by 2020. It is my opinion that it could be well in excess of that with appropriate stimulus measures.

CHAIR: Just on your comments about co-generation, the Queensland government has contributed about $9 million to a project recently to develop Mackay Sugar's energy co-generation project. Are you aware of that?

Dr Schuck: Yes, I am. The point I was trying to make is that under the federal government's renewable energy target it is only the renewable electricity component that gets an incentive for electricity cells. It is only with electricity, not the heat side.

Prof. Gurgenci: I am the director of the Queensland Geothermal Energy Centre of Excellence. This centre was set up by a $15 million grant from the Queensland government. It was established last year. That investment is the largest investment in geothermal energy research in Australia and certainly one of the largest in the world in its research area. Our research focuses on increasing the power conversion efficiency, assessing Queensland's geothermal research and issues of long-distance transmission of electricity from remote areas.

I want to add to what my colleague, Jon, said about geothermal energy. Over the last couple of years about $200 million was granted to different geothermal energy projects in Australia for industry demonstration and drilling projects. Queensland as a state missed out on that for various reasons. Probably the most important reason is that the investment went to places where there was lots of data from past oil and gas drilling. There was not much of that in Queensland. I think that was the primary reason.

Investment in the geothermal energy area is just starting. It is going to increase exponentially in the coming 10 years because it is the only serious baseload alternative to fossil fuel fired electricity. Last year close to half a million dollars was given out in the USA as part of their geothermal stimulus program.

What can we do in Queensland? It is our focus as a centre to assess the resource in Queensland. Part of our mission is to expedite the uptake of geothermal energy in Queensland and in the nation. If it is said that the primary reason for Queensland not getting as much attention as the other states is the lack of past oil and gas drilling data we need to provide more pre-competitive data on the Queensland resource.

We at the centre did geological surveys of Queensland. We have been doing some studies. There are a number of very promising areas. I am reluctant to name them at this stage. I can assure you that there are at least two very promising geothermal areas which may prove to be as big as reservoirs in other states.

We should provide more resources to the Geological Survey of Queensland. That is a Queensland government body which is responsible for those things. It is not part of the university. I am not talking on behalf of my organisation, I am talking on behalf of them. Providing them resources to generate pre-competitive data for Queensland's geothermal resources would be useful for a number of reasons. First it would reduce the risk and increase the likelihood of the next industry project hitting the geothermal resource. Less risk for the companies will mean more investment in Queensland. Knowing more about our geothermal resource will increase the value of the tenements that are going to be put out for release and that will mean more revenue for the governments. At this stage that is all I want to say.

CHAIR: Thank you very much gentleman. I think we are still having a bit of difficulty getting Russell on the phone. Hopefully he might come on line a little later. If it is all right we would like to ask you a few questions. I wanted to talk to you Professor Gurgenci about the Geothermal Energy Centre of Excellence that we have recently established. Obviously it is quite new. I am told that the Queensland government has put in another $5 million for some coastal exploration of hot rocks. Can you give the committee an update on that and whether that has started yet?

Prof. Gurgenci: The program has started in the sense that the locations have been set but the drilling has not started. I do not have exact information about when it is going to start. I understand it is going to start towards the end of this year. It is not being done by Geological Survey but we have four PhD students and one research fellow working with Geological Survey to interpret and analyse the results of that drilling. We are working as a team to bring those results together.

The purpose of that program is to identify the resource. Most of the holes are going to be closer to the coast but there are also some wells to be drilled in areas like the Galilee Basin or a couple of other areas in inland Queensland.

CHAIR: I am particularly interested in time frames. I might ask the other gentlemen on the panel this as well. Can you give us any idea of a typical time frame to develop any of these major RE projects in Queensland?

Prof. Gurgenci: In geothermal?

CHAIR: Sorry, in geothermal.

Prof. Gurgenci: I have in mind one of the areas we are looking it. I will take it from the start. The area has some data but we need about a year of pre-competitive assessment and probably another year of more indepth shallow drilling geophysics and other more indepth assessments. That is two years. Then you drill your hole and prove the potential. That is three years. After that you proceed to have pilot plants. In about four or five years from day one you move to a power plant. That is about the time scale. My colleagues may add to that if they want to.

Mr Youssef: It sounds about correct.

Dr Wyborn: I am the chief scientific officer for Geodynamics which is a company listed on the Australian Stock Exchange as a spin-off from university research at the ANU in Canberra. I would like to perhaps explain a little bit about the kind of geothermal potential that one can explore for.

There are effectively three different kinds and only two of those are potentially available in Queensland. You mentioned the term hot rocks. The term that is being used around the world now for this is 'enhanced geothermal systems'. My company is actually specialising in enhanced geothermal systems. Our work has mainly been in South Australia where we have actually gone through the proof of concept stage of drilling deep holes into high temperature rocks and circulating water between holes to bring the energy to the surface. Once we have established the basis of how to do this such a project is likely to take around about one to two years to bring on stream in a particular area—that is, once all of the pre-competitive research and understanding has taken place.

Our company currently has a $90 million grant from the Renewable Energy Development Fund to build a 25 megawatt power station in northern South Australia. We expect that that power station will come on line in early 2015.

CHAIR: Trevor, would you like to make a comment?

Mr Berrill: I would like to give an example of wind technology. The focus in our submission was on the technologies that are relative mature or very mature and can be rolled out right now. That is what is required to address climate change issues. The wind energy industry has the potential to rollout the knowledge and install large quantities of capacity in a relatively short space of time. Spain, for example, installed 2,400 megawatts of capacity from wind power in one year—in 2008-09—there are many such examples in other countries such as Germany and the United States.

There is the potential there to rollout those technologies. There is a planning stage that you have to go through which takes some time. It often takes a couple of years to get to that stage. Once that planning approval is through the process of rolling out the wind farm is quite quick.

Queensland, through a CSIRO study, has identified that 20 per cent of Queensland's electricity capacity could be provided at less than 10c per kilowatt hour from wind power. My assessment of all of the technologies that are available to us, including coal with carbon capture and storage and so on, is that we are likely to have electricity prices on the generator side of the equation level at about 8c to 10c per kilowatt hour when we include all of the full external costs, particularly of the fossil fuel technologies. Once we include those costs we see that wind already has a substantial potential to be cost competitive in Queensland and provide up to about 20 per cent of our capacity.

A similar rollout process is starting to occur now with the solar thermal technologies and to a lesser extent with PVs. The potential is there to rollout those technologies quickly.

CHAIR: We have a question from one of our members.

Mr FOLEY: Trevor, did you say that Spain had rolled out wind energy in one year of 2,400 megawatts?

Mr Berrill: Yes.

Mr FOLEY: That is half the capacity of the Snowy Mountain hydroelectric scheme?

Mr Berrill: It does not equate exactly to that in terms of energy production. If you take about a third of that figure that is the equivalent of something like a coal fired power station. It is equivalent to about 800 megawatts from a coal fired power station or something like a hydro station that can generate 24 hours.

Mr FOLEY: Is that commercial levels or residential levels?

Mr Berrill: We are talking about large-scale wind farms similar to what is being planned on the Darling Downs. There are two 300-megawatt wind farms being planned on the Darling Downs.

CHAIR: We have another question from one of our committee members.

Mr FINN: One of the issues I am grappling with as we go through this inquiry is that wind is a mature technology but we have to have it. We get different evidence presented to the committee about Queensland's wind capacity. Some people say we have plenty of it. Others say we have limited resources and the limited wind resources we have are in fairly sensitive areas that would require a whole range of other difficult issues to be dealt with. For example, some are in sensitive national parks or offshore. What is your assessment of Queensland's wind resources?

Mr Berrill: I am referring to a CSIRO study in 2007 which was done for the department of mines and energy at the time and which I was asked to review. That clearly demonstrates the figures that I have mentioned before. We do have a Queensland government wind map which shows the extent of the resource. It is not a particularly good map in my opinion. It does not assist the industry to the extent that it requires. There are always going to be some areas where it is more sensitive to put wind turbines.

If we look, for example, at the Darling Downs it is a high elevated plateau. It is about 600 metres above sea level. There is a lot of farming land there. Wind energy is compatible with most farming applications such as grain growing, cattle grazing and so on. Those are the sorts of areas that I would identify first. A number of those areas have been identified. The Atherton Tableland has land of that nature. There is already one small wind farm in that area.

Mr FINN: I think in your presentation you suggested Queensland should have a target of 40 per cent by 2020?

Mr Berrill: Yes.

Mr FINN: We are currently at 7½ per cent. I think it is 871 megawatts out of 12,000 which is our 2010 figure. We would have to find something like 4,800 megawatts to get up to 40 per cent in Queensland. I acknowledge that we have the smarts and the technology and those kinds of things but how do you see that mix? You have talked about wind. Where else could it come from in a realistic sense to be on stream by 2020?

Mr Berrill: I think it is a mix. Remember there is the energy efficiency side of the equation as well which needs to be applied very rigorously. We have stalled on that. We have been very slow to pick up on energy efficiency. We are just starting to push it harder now. That is a very important part of the equation. That starts to reduce demand by at least 30 per cent and potentially more.

The main technologies that I see that are available now are wind and solar photovoltaic and also the solar thermal concentrating systems which with thermal storage in malt salts provide baseload. Wind also provides some percentage of baseload when it is dispersed across large areas. So if we have large wind farms, for example, on the Atherton Tableland, in Central Queensland and in the southern part of the state on the Darling Downs, you have a smoothing effect based on the nature of how the weather patterns move across from the west to the east of the continent.

In terms of when each of those wind farm areas would be generating their maximum capacity, they do not all suddenly stop at the same time and therefore there is no wind output. So there is a smoothing effect once you roll it out on a large scale such as I am talking about. But I think the two biggest potential areas are both the wind area and the solar thermal electric for electricity generation, with PVs being used in large commercial applications such as shopping centres, large industrial centres and, to a lesser extent, on domestic.

Mr FINN: Thanks. To the geothermal reps then, what percentage of that 40 per cent can geothermal be by 2020? Let us not get bogged down depending on funding and those kinds of things, just in terms of capacity. I look at the coastal study and I see that that is a shot—we are having a look at that—but we have not necessarily established what its capacity might be. I look at Western Queensland and I think that that is so far away from the grid that we have a whole lot of issues out there. We have the energy retailers in here giving us evidence that it is a stab in the dark, that it is an untried science and we should not be putting any reliance in it. Where do you realistically think geothermal capacity can be by 2020?

Mr Youssef: That is a good question. I am a member of AGEA and also commercial manager with Granite Power, which was the first geothermal tenement holder here in the state. I can speak on behalf of Granite Power in respect of its inferred resource within its tenement in this state, and that resource at this stage appears to be about 60,000 petajoules which, assuming a number of variables or a number of factors, could amount up to 1,000 megawatts from that particular resource. That is a resource which, as we understand it at this stage, spans about 60 per cent of the tenement, and that is but one of the numerous tenements in the state. I may defer to my colleague Dr Wyborn for further clarification on the state's position.

Dr Wyborn: I have to admit that to get large amounts of geothermal energy up by 2020 is not going to be easy. It is actually potentially a longer term benefit that we are going to be looking at. If the state is hell-bent on getting up a certain amount by 2020, then I do not really expect that geothermal will contribute a large amount. What I can say is that there is a proposal that has been put around, referring to the issue of remote sites for the best geothermal, that coal seam methane is being developed in Central Queensland and is going to be shipped via the existing pipelines through Western Queensland and South Australia to Sydney, Adelaide and to Brisbane, for that matter. But one way in which geothermal in Western Queensland can be looked at as a strong potential future resource is that in Western Queensland at a place called Ballera, where both geothermal potential is strong and where natural gas is also being delivered, a large natural gas power station be built at Ballera and a powerline be directed from there to Mount Isa. This would be instead of the currently proposed powerline from Townsville to Mount Isa which is going to be powered by coal fired power.

Natural gas generation is actually lower in terms of CO_2 emissions than coal and it is right where the geothermal potential of the state is greatest, and also natural gas power stations are very transportable. You can put them up and pull them down and move them relatively quickly. So it is worthwhile considering that the north-western mineral belt of Queensland, which has a crying need for electricity, could get that electricity from natural gas with geothermal coming in and progressively supplanting that power station at Ballera. Our company has the exploration licence over the Ballera area. We believe that the very large—in fact, the world's largest—EGS resources in South Australia extend into Queensland. We have an exploration program looking at that, although there are no wells being drilled at this stage but there is good geophysical evidence that a very large resource exists in the Ballera area that could supplant that natural gas production as it is brought onstream. I would imagine that several thousand megawatts of production could be initiated, certainly more than enough to provide all of the Mount Isa mineral belt.

CHAIR: Thank you very much. Before I ask if there are any other questions from the committee, I ask Dr Stephen Schuck if he would like to make a further comment at this stage.

Dr Schuck: Yes, thank you. I think the question was asked about time frames. If biomass resources are suitably located for instance, co-firing of biomassive coal could be implemented more or less immediately. Globally there are over 200 power station units that are co-firing biomass with coal. For the committee's information, Delta Electricity in New South Wales has just embarked on what could be a $200 million project which could see co-firing at some of its power stations as high as a 20 per cent level of biomass. That basically converts a 500 megawatt coal fired unit to provide 100 megawatts of renewable electricity. It is interesting to note that in Europe, since I was recently in Belgium, a coal fired power station unit was converted to run exclusively on wood energy pellets. Delta Electricity has actually done a trial at 20 per cent firing on something called wood pellets whereby the biomass is pre-processed into little pellets which enhances their energy value and they can be basically ground.

You asked also about other technologies and deployment. I mentioned earlier that there is about 52,000 megawatts of modern bioelectricity globally. A typical scientist would say 50 megawatts, which would be the same kind of technology as at Rocky Point sugar mill. Those kinds of projects can be implemented in about three years after their development approval and possibly under construction usually after about 18 months. If you are looking at landfill gas, which is another form of bioenergy, that is a mature technology. There are plants running at the moment at Oxley Creek and at Luggage Point in the Brisbane area. That technology only takes months to deploy if, basically, the resource is available in the landfill. Similarly, sewage gas is widely used. There are plants at—sorry, the landfill for sewage gas is at Oxley Creek and Luggage Point, if I can just correct that, and landfill gas basically has the methane drained off for use. As I mentioned in my submission, that has been done at Swanbank Power Station where gas is taken and co-fired in one of the furnaces, one of the power station units.

Those are the mature technologies. There is no leap of faith that the technology is going to work or not, just to note that bioenergy is essentially baseload. There are many power stations that run at what is known as a capacity factor in excess of 90 per cent which has basically taken its nameplate assuming that, if it were operating for the entire year and then working out what proportion is actually produced, you can get about 90 per cent. So it usually compares to around about 35 per cent for a typical wind farm. There are other technologies as well within bioenergy such as small scale gasifiers. There has been the development of little downdraft gasifiers which produce a combustible gas which can be used either in spark ignition engines or can be dual fuelled with diesel. So that would work in remote areas whereby they basically take this combustible gas, which is rich in carbon monoxide and hydrogen, and feed it through the air intake of the diesel gen sets for providing up to 80 per cent of a renewable energy component. So basically it runs on both diesel and producer gas at the same time. There is also newer technology coming through called pyrolysis and there are already plants operating. There are two plants running in Canada, for instance, running on that technology.

In answer to the time frame, it is more or less immediate. The technology is fully developed. The issues around bioenergy are much more around the fuel procurement and sourcing. I was a bit surprised at some comments a few moments ago about the Queensland generation mix. I did not hear the word 'bioenergy' mentioned. The International Energy Agency's bioenergy program produced a report I think since I put in my submission entitled *Bioenergy—a sustainable and reliable energy source*. It is about a 106-page document aimed at policymakers. They make the point that the planet's total primary energy supply at the moment is about 500 exajoules—that is, 10 to the power of 18 joules—and of that about 10 per cent, or about 500 exajoules, is biomass in its various forms, including thermal applications and so on. They estimate that by 2050 bioenergy could provide for about 250 exajoules, so about five times the current usage. That is more or less consistent with the Clean Energy Council, which produced a bioenergy road map for Australia—a national road map. It was conducted about two years ago and they estimated that bioenergy or bioelectricity could increase by 4½-fold by 2020. There have been other studies that have been conducted by various people from time to time showing quite impressive growth in bioenergy given the right support mechanisms.

CHAIR: Thank you very much, Stephen. Are there any other questions from the committee? If not, gentlemen, do you have any further comments before we round off this morning's panel?

Prof. Gurgenci: I just want to add to the question about the rollout of geothermal energy to the state. I want to take issue with the uncharted science. It is not uncharted science; it is uncharted engineering. First of all, there is a geothermal capacity around the world of 10,000 megawatts, or probably now at the moment 11,000 megawatts because it grows every year. Of the geothermal energy of the type you are talking about in Australia, admittedly there are not many but there are two plants operating in Germany—one in Landau and one in Unterhaching—without significant problems. In Australia the companies are going up a very steep learning curve of learning a difficult technology. It is not as much uncharted science as more like developing the learning and the know-how in the nation to tackle that problem. So I think my colleagues were a bit circumspect about the potential of geothermal energy. I believe if there were a transmission line from the Cooper Basin to the rest of Queensland, I think that you would see a very quick rollout of geothermal electricity in this state.

CHAIR: Gentlemen, there are a couple more questions. The member for Maryborough has a question.

Mr FOLEY: I have a question in general to the panel. How can the government make Queensland more attractive for renewable energy investors from other countries?

Mr Berrill: I would like to make a comment there. I think we need to start supporting the infrastructure that allows the renewable energy systems to be positioned in the right locations and, therefore, to feed their power into the grid. That system is a natural monopoly and government really needs to get behind the provision of that infrastructure. That is a key part to the provision of any of these technologies on a large scale.

CHAIR: Would anyone else like to make a comment on that?

Mr FOLEY: Can I just ask a quick further question on that? We hear a lot about the geothermal out in the backblocks and you were talking this morning about out in the ocean—coastal and so forth. Why is the eastern coastline, as in the land mass, where it is close to the grid not suitable when those other places are? What is the geological reasoning?

Dr Wyborn: I am a geologist and basically geothermal is rather similar to mineral deposits in that the most optimal locations are based on particularly certain geological conditions that have to exist. It just so happens that those geological conditions are most favourable in places in Central Australia and in Western Queensland rather than on along the coast. There may be some reasonably good places along the coast, and the geological surveys research drilling program will hopefully identify those, but it is a bit like a mineral deposit. We have a world-class mineral deposit at Mount Isa but not in Brisbane. It is the same thing.

Mr FOLEY: Is there a heat map like there is a wind map?

Dr Wyborn: There certainly is, yes, but it is only based on current knowledge, which mainly comes from a cursory understanding of the geology at depth across the continent and also on drilling. You cannot determine the temperature underground without drilling a hole. There is no remote geophysical technique to determine temperature. So you have to drill a hole and measure temperatures down a hole to know what the temperatures are going to be.

Mr Berrill: Can I just make a comment in response to that, too, please? Just in terms of both the solar and wind resource, we have an incredible solar resource whether you are on the coast or further inland, but it is clearly better inland because we have a higher percentage of clear-sky days and that increases as we get west of the Great Dividing Range as the rainfall drops off. We also have some coal fired power stations out there, which means that a large solar thermal plant can be positioned quite close to those large centralised coal fired power stations.

Mr FOLEY: And cofeed into the grid?

Mr Berrill: And the infrastructure—preheating the steam within the coal fired power station. With wind, it is a little bit more complex, because the wind speeds vary with elevation and also closeness to the coast. So the coastal areas are more sensitive, because we have higher population densities there. But we do have significant inland areas such as the Darling Downs, for example, where the wind speeds increase quite dramatically.

Mr Youssef: If I may just revert to Mr Foley's earlier question about inviting investment into the renewable sector in this state and if I may speak on behalf of the association in respect of geothermal? Much of the investment has been frozen over the last 18 months or so primarily because of what is perceived to be the risks associated with the front-end developments in the technology, exploration and development risks. Investors as we see them and as we understand them have been quite focused on a number of risks that appear at the early stages and investment for that reason has not been forthcoming.

In our opinion, the government will need to support the geothermal sector to overcome those front-end risks associated with identifying heat resources, which we are and have seen or will likely see with the onset of the geothermal drilling initiative, but also fracturing the rocks, the circulation and all the testing that follows, too. There is also the risks associated with power generation—or those perceived risks—and with no power generation in the country as yet, government support in that respect will be seen to alleviate those concerns. So the greater the support from government at the earlier stages, the less likely the need for ongoing investment as those risks are overcome or addressed.

Mr FINN: I just have one follow-up question. My question is to Trevor. I just want to give you an opportunity to comment on biomass and liquid natural gas as well because there have been comments by others about that. How do you see those fitting into the mix of your targets?

Mr Berrill: Sure. There is definitely a role for biomass. Our group believes that it should be based primarily on waste materials and to avoid the conflict between food production and biomass materials displacing good agricultural land. There are some good new technologies coming on line in the biomass area which overcome some of those issues. So it definitely has a role to play and historically in Queensland it has actually played quite a significant part in energy production if you look back through the figures over the years from the sugar cane industry in particular. The actual figure, I think, is in the order of probably a few thousand megawatts that is readily available but the biomass industry, I am sure, has a much better handle on those figures. The other question related to gas—

Mr FINN: I was giving you an opportunity to comment on what we have heard about the gas options.

Mr Berrill: I think with gas, it is still a fossil fuel. It is impacting now greatly on the farmers on the Darling Downs because of the coal seam gas mining activities that are out there. So it is starting to threaten some of our best agricultural land. We need to use any of the fossil fuels as efficiently as possible so that we get very high conversion rates, because they are very precious fuels. So the role that I see for the fossil fuel industry, and gas in particular, is as a backup to the renewable energy generation schemes and to be used at very high efficiency through cogeneration or trigeneration. Historically, we have put the fossil fuel generators a long way from industry and, therefore, we can only get 40 per cent conversion of the coal into useful energy as electricity at that point. We waste the rest of it, which is significantly a lot of energy—60 per cent or more—and then we lose more in the transmission system. So if we are going to continue to use fossil fuels, they need to be used as efficiently as possible so that we get the maximum conversion efficiency out of those fuels and, therefore, the minimum impacts environmentally.

CHAIR: Does anyone else have any closing remarks? If anyone is interested, we have a copy of the government submission to this inquiry. Would you like a copy? Just pass those out.

Mr FOLEY: Dr Wyborn, if heat cannot be measured from the surface but only by drilling, how accurate are the heat maps?

Dr Wyborn: Where there is drilling, they are quite accurate and there is quite a lot of drilling in the basinal areas of Queensland but not so much in the hard rock areas and also not a lot along the coast. Hence the coastal drilling program.

Mr FOLEY: So we do not necessarily know that there is not heat there; it seems that there is not.

Dr Wyborn: There are some anomalies that have been identified along the coast and they are being followed up by this program.

Mr FOLEY: Yes

CHAIR: Right. Gentlemen, can I thank you most sincerely for spending your valuable time with us today. You would understand that we are a fairly new committee. When we started we honestly did not know a lot about renewal energy but we have certainly learned an enormous amount over the past few months. We are very grateful that you have shared your knowledge with us today and we look forward to perhaps seeing you and talking with you further in the near future. Thank you very much for your attendance.

ARNOLD, Mr David, General Manager, Remote Area Planning and Development Board

McGUIRE, Ms Anna, Urban Sustainability Project Officer, Cairns and Far North Environment Centre Inc. and the Cairns Climate Action Network

REICHMAN, Mr Joe, RAPAD Consultant, Clean Energy Australasia

CHAIR: Hello, we have Mr David Arnold?

Mr Arnold: Yes.

CHAIR: You are the general manager of the Remote Area Planning and Development Board.

Mr Arnold: That is it.

CHAIR: Thank you very much for joining us today via teleconference. We also have Ms Anna McGuire, the urban sustainability project officer. Can you hear me, Anna?

Ms McGuire: Yes, I can.

CHAIR: And you are from the Cairns and Far North Environment Centre. Thank you very much for joining us today. As part of that panel this morning we also have Mr Joe Reichman, who is here with us today. He is the RAPAD consultant—Remote Area Planning and Development Board. On our committee today we have Mr Simon Finn, who is the member for Yeerongpilly; we have Mr Peter Dowling, who is the member for Redlands; and we also have Mr Chris Foley, who is the member for Maryborough. I am Carryn Sullivan, the chair of the Environment and Resource Committee. So thank you very much for joining us today. Would anyone like to make a brief opening statement and can I ask that you say your name for the Hansard record.

Mr Arnold: I will start. My opening statements really are that we have had an interest in this for well over seven or eight years. We see the potential for all renewable energy—but in this particular case geothermal energy—as holding benefits not only for our region but the state and the nation as the whole. We certainly welcome the government's enabling legislation over the past seven or eight years. We have had numerous meetings with several ministers through that time. We believe that there still needs to be targeted support if we are going to see the full potential of geothermal energy realised in this state and for the nation. Thank you

CHAIR: Anna?

Ms McGuire: We are really strongly advocating for a rapid transition to renewable energy, particularly for our region but across all of Australia. We are currently working with business lobby groups, the regional councils and cross-institutional sustainability groups to advocate for this transition and there is really strong support in our region for a number of reasons. Economically, it makes a lot of sense to be using renewable energy in our region. Given the uncertainty of pricing, the high transmission losses to our regions have meant that we have a lot of support from across the community for developing a renewable energy sector in our region and also for improving the energy security of our region, given the uncertainty of the future of energy. So, yes, basically, we see that there is huge potential for our region to be using renewable energy.

CHAIR: Thank you, Anna. Joe.

Mr Reichman: I would like to add to David Arnold's words and perhaps elaborate on the potential for geothermal in the RAPAD region, which is Western Queensland, including south-west, west and north-west Queensland. I would like to add that both Geoscience Australia and Queensland government geoscientists recognise the large potential for geothermal power in Western Queensland. In fact, in Western Queensland there are well over 1,000, and potentially 2,000 bores have been drilled. Many of those water bores—and those of you who have been to Western Queensland will attest to this—produce near boiling hot water, which attests to the high heat content that lies beneath the earth's surface, not just in south-west Queensland but also in Western Queensland and north-west Queensland, as part of the Great Artesian Basin.

Certainly in south-west Queensland hundreds of petroleum wells have been drilled. I might add that I am a petroleum engineer, and I have had a long association with the oil company Santos, which did the gas development in south-west Queensland. I have intimate knowledge of the drilling and the results of the drilling in that part of the state. I can assure the committee that there is a lot of data to support the geothermal resources, that heat map, of Western Queensland.

Just to elaborate perhaps a little more on geothermal, it is very important that it is baseload. As mentioned earlier by members of AGEA, there is now 11,000 megawatts of geothermal worldwide that would be sufficient to power all of Queensland. It is an industry that has over 100 years of history. So it is technologically proven. The challenge that is facing the geothermal industry in Queensland, and in eastern Australia in general, is to adapt that great success worldwide to the geology to the subsurface here in Australia and in Queensland in particular. The other important benefit of geothermal is that it does have a small footprint. Therefore, in terms of environmental impact on the region, it can coexist very, very easily with agriculture and other industries and with domestic and all the other activities in the west of the state.

Getting on to perhaps other issues about how do we progress geothermal power generation in Queensland, I believe strongly that we need a portfolio approach. We should not be trying to select winners, and in that manner I believe that the government should be supporting the industry. There is some concern that all of the funding that the Queensland government has provided to date to the industry has only gone to government owned corporations or to Queensland government affiliated corporations. None has gone to the industry, and we believe this is probably one of the major reasons why the federal government has chosen not to provide some of that $200 million of federal funding in geothermal drilling programs to REDP. Not only that, there was a question asked earlier about what would attract foreign investment. In this early stage there is undoubtedly a degree of risk to adapt the worldwide success of geothermal to the Queensland geological setting. To get over that risk or perceived risk, government funding is essential, and that starts with state government followed by federal government and then foreign capital will surely follow.

There is an important aspect also that we need to consider with regard to electricity prices in relation to geothermal. Geothermal has been labelled as a remote—it exists in remote areas. The RAPAD area councils are aware of where the geothermal energy potential is. In fact, there are geothermal tenements in central-western Queensland and quite close to the north-west Queensland minerals province, where there is a very high pent-up demand for electricity. Currently the electricity that is transmitted to these areas, in particular to the north-west Queensland minerals province—Mount Isa, Cannington and regional centres such as Longreach, Winton and so forth—comes through rather long transmission lines. There is a further proposal for a copper string to go from Townsville to Mount Isa, so that is another long transmission line.

When we look closely at the reason for the rise in electricity prices, it is not the power generation costs which are the cause for that rise. Again, geothermal would fit very neatly in that. Geothermal electricity generation costs in due course would be quite competitive with baseload coal or baseload gas. It is the cost of transmission—building those transmission lines, maintaining those transmission lines and the losses that accrue with those transmission lines. We believe that is the underlying reason for the increase in electricity prices and the need for the Queensland government to subsidise electricity in regional Queensland to the tune of $450 million in the last year. In Western Queensland we estimate that subsidy is of the order of $100 million to $150 million.

So there is an opportunity here to develop geothermal right at the end of the grid—at Longreach, Winton, Barcaldine and just south of the north-west minerals province. I can assure the committee that the geothermal resource potential extends right up to just south of the north-west Queensland minerals province. In fact, there are geothermal tenements, exploration tenements, located just 70 kilometres south of the Cannington mine, which is currently generating electricity from the gas pipeline that is coming from Ballera that was spoken of beforehand.

CHAIR: Thank you very much, Joe. We are very much aware of the escalating cost of electricity infrastructure and of course electricity price rises for Queenslanders. We are pretty keen to ask some questions of you and the others online. Do you want to start, Chris?

Mr FOLEY: Your submissions have commented on the CopperString project, which would develop a powerline to link the north-west minerals province with the national electricity grid. The transmission line will provide an opportunity for renewable energy suppliers located in the corridor between Townsville and Mount Isa to supply electricity to the national electricity market. Have you got any further comments on that?

Mr Reichman: We recognise for the RAPAD region, and generally for regional Queensland, that such a grid would be a positive development. As David Arnold, who is the GM for the RAPAD region, has stated, RAPAD supports both renewable and non-renewable energy developments. But, if I may add, initially that line would be basically bringing coal fired power to the region. It would be predominantly a non-renewable energy source initially, but certainly in due course there would be the opportunity for renewables to join into that line. Again, I repeat that there is already a renewable energy source—geothermal potentially—at the end of the line on the west of the line.

CHAIR: David, do you have any further comment on that?

Mr Arnold: No. I am content with Joe's feedback to that question.

CHAIR: Joe, you would be well aware of the recent announcement by the Queensland government of the proposed Wabo project. Obviously, the government has said that this may well be a huge investment in our renewable energy sector in the future. If the government were to pursue that and eventually put money into it—we are not at the moment saying that we are committed to doing that—what then is the potential for other RE projects in Far North Queensland?

Mr Reichman: I note from the maps that have been supplied that the PNG hydro power would be via a fairly long grid. I think the grid is over 1,000 kilometres long and it would be heading for Townsville. It would have probably no impact on Western Queensland, but it would obviously have a positive impact on the percentage of renewables in the electricity mix supply to Queensland. So that would be a positive development in that sense. But certainly it would not impact, I do not believe, on the situation in Western Queensland.

CHAIR: Anna, have you got anything further to add on that?

Ms McGuire: I think it is an interesting project. I would like to reiterate the fact that the electricity generated at Wabo would be transmitted over 1,000 kilometres. I think you would really need to consider the transmission losses over that distance, particularly when Australia does have abundant renewable energy sources that we can tap into and we can grow our domestic renewable energy industry by investing in Australian projects, rather than in projects in PNG. I think in the long term, investing in local projects in Australia would be far more beneficial for Australia. It would lead to employment opportunities in regional Australia particularly. It would develop the Australian renewable energy industry. It would bring investment in improving the skills base of Australian labour in the Australian industry. It would be, as I said, in the long run a much more beneficial way to go about getting renewable energy in Queensland.

CHAIR: David, do you have a comment?

Mr Arnold: I agree with Anna's comments there. The briefing note on that was sent to me yesterday. My concern would be that Queensland funding or Australian funding is going to support another country's economy development, and that is sited in this document that I am reading—that it certainly brings economic development to Papua New Guinea.

I would come back to agree with Anna that I think we have the potential to develop our own renewable energy supplies. That brings me back to geothermal in our region but also in certain other regions across Australia, and I suppose specifically I am parochial to central-western Queensland. I think we can see the continued development of renewable energy through geothermal in our area. My concern would be whether we are developing that particular scheme at the expense of Queensland and national renewable energy sources.

CHAIR: Thanks very much, David. I will make sure you and Anna get a copy of the Queensland government's submission to the ERC. Joe, I will pass a copy to you as well because it does highlight that new potential project.

Mr FOLEY: Mr Reichman, from what I have been able to gather that you have been saying this morning, the key is to place renewable energy resources close to existing electricity-producing assets, like the coal fired power stations or whatever, so they can piggyback into the grid. That is correct, isn't it?

Mr Reichman: I do not think I said that. What I did say is that where the geothermal resource lies at the moment in Western Queensland is close to the electricity grid in regional areas like Longreach. It is in fact at the other end of the grid. The coal fired power stations are in the east, and in the west we have the end of the grid. That is I guess the tremendous benefit of having the geothermal resource at the end of the grid, so you do not necessarily need those long transmission lines at least initially to provide geothermal.

Mr FOLEY: I guess what I am getting at here is that the principle still remains the same though. Rather than running a great big extension lead from Papua New Guinea down to Townsville, you can piggyback as an entry point into the grid where electricity is already being produced. Could that transmission line coming down from New Guinea piggyback anywhere into an entry point in the grid, rather than building the whole wire network to Townsville? Is there any other place? If electricity is being generated in place A and it is being fed into the grid, then there is already the existing infrastructure to feed electricity into the grid. Why couldn't that be piggybacked somewhere along the way? Is there any reason you would have to build a line right down to Townsville?

Mr Reichman: The line from the PNG hydro scheme probably does not pass by too many renewable energy sources. As I mentioned before, the line from Townsville to Mount Isa will also be struggling, at least initially, to pick up a renewable energy source. It will be mainly coal fired power in its initial stages. I would like to re-emphasise that the benefit of the location of the geothermal resource in Western Queensland means that those regional centres are able to get power without it going through long transmission lines from the east, such as the one that is being proposed from Townsville to Mount Isa, and also the existing lines to Longreach, Winton, Barcaldine and so forth. We believe that will enable geothermal energy to be provided at a very competitive price because it will be generated locally. In relation to the cause for the electricity price increases and the cause for the community service obligations currently being funded by the Queensland taxpayer, we would be able to do away with those because we would not require those long transmission lines. We are right there at the end of the grid and right there where the electricity market is.

In particular, if you look at the north-west minerals province, the earlier discussion was about a grid from Ballera following the gas line. We believe in fact a geothermal resource is located in Western Queensland approximately 300 kilometres from Mount Isa, so if such a line was to be built from Ballera we would be able to build a much shorter line from Western Queensland just to the south of north-west Queensland.

CHAIR: Thank you, Joe. We are well and truly over time. I thank the second panel for their very valuable time this morning and for their assistance. Thank you, David and Anna. We will now have a short break.

Proceedings suspended from 10.34 am to 10.52 am

ANDERSON, Mr Kirby, Policy Leader—Energy Infrastructure, General Electric

HAYES-ST CLAIR, Mr Phil, General Manager, Corporate Affairs, Transfield Holdings

CHAIR: Before we get started with the third panel, I will introduce Mr Mark Ryan, the member for Morayfield, who is one of our committee members. He is a little late because he had another parliamentary committee to attend this morning. Unfortunately, Mr Simon Finn has had to leave to attend other government business. Welcome, Mark.

Mr RYAN: Thank you, Chair.

CHAIR: You have missed a fairly enlightening morning. I look forward to catching up with you with regard to what happened this morning. I welcome our next witnesses. Would you like to make some opening remarks?

Mr Anderson: Thank you, Chair, and I acknowledge the members of the committee. I am the policy leader for energy infrastructure for GE in Australia and New Zealand, and I am based here in Brisbane. On behalf of GE, I would like to commend the committee on the initiative to conduct this inquiry. GE has already participated via a written submission. Today I would like focus on three issues raised in our submission. Before doing that, it might be useful if I give the committee an introduction to General Electric and our interests in renewable energy and our interests here in Australia and in Queensland.

GE is a diversified global infrastructure, finance and media company, serving customers in more than 100 countries and employing more than 300,000 people worldwide. GE serves the energy sector by developing and deploying technologies to make efficient use of natural resources. More than a quarter of the world's electricity is generated using GE technology. GE is a world leader in clean energy technology. In terms of wind energy, GE has more than 13,500 wind turbine installations worldwide, comprising more than 200 million operating hours and more than 120,000 gigawatt hours of energy produced.

GE's involvement in Australia dates back to 1902—a year after Federation—when we installed one of the electric motors in Sydney to open the Pyrmont Bridge over Darling Harbour. In Australia, GE is working actively with partners and customers to deliver renewable, low emission and smart grid energy technologies. These technologies are helping to deliver secure, reliable and sustainable energy supplies. For instance, GE is in partnership with the Queensland government owned Stanwell Corporation, developing an integrated gasification combined cycle power plant that incorporates carbon capture and storage near Wandoan in the Surat Basin of south-west Queensland. The Queensland government nominated this project to the Australian government under its CCS Flagship Program. The project is one of four short-listed projects under this program.

Chair, I would like to return to the three issues I wish to highlight to the committee today that we raised in our written submission. Firstly, the committee's focus on 'growing' renewable energy in Queensland is to be commended, and there are measures the Queensland government can implement to promote and accelerate that growth. However, the prime driver for renewable energy in Australia is the national renewable energy target of 20 per cent by 2020. The impetus this target will have on investment in new large scale renewable energy projects will be enhanced by segregating the target and establishing a separate large scale renewable energy target from 1 January next year.

The discussion paper for this inquiry contemplates a Queensland renewable energy target. GE believes the national renewable energy target, particularly in its segregated form, is preferable to state based targets. Where possible, we should strive for energy and climate change policy that is clear, consistent and sustainable. The Wilkins review in 2008 found there were 62 Commonwealth climate change programs and 'in excess of 200 relevant programs around Australia in the States and Territories'. For instance, energy efficiency targets operate in Victoria, South Australia and New South Wales. We believe a national energy efficiency target should be adopted, and I note this was a recommendation of the committee's previous inquiry.

In terms of the proactive measures the Queensland government can implement, I refer the committee to the government's initiative in 2008 to seek renewable energy projects to provide '100 per cent neutral power' for the Tugun desalination plant. While this did not eventuate in a dedicated renewable energy project, this initiative should be revisited.

I note recent public comments from the Lord Mayor of Brisbane of his council's proposal to offer its green power purchases over 20 years for proponents of renewable energy projects. The Queensland government should be encouraged to do the same. The government has already committed to 'achieving carbon neutral government office buildings by 2020'. It has also recognised that 'as the builder, owner and operator of essential infrastructure, the government has an opportunity to use its significant purchasing power to promote resource efficiency and climate resilience'. The opportunity is for the Queensland government to translate its own electricity use—its own purchasing power—to support local renewable energy projects, which was envisaged for the Tugun desalination plant and is now proposed by the Brisbane City Council.

Secondly, in our submission we recommended that the committee encourage the Queensland government to consult the Australian government about prioritising the spending from the $652 million four-year Renewable Energy Future Fund announced in the federal budget in May. Specifically, we wanted

transmission connections to be prioritised. I am pleased to say this has been actioned already. During the recent federal election campaign, the Australian government committed $1 billion over 10 years for the Connecting Renewables initiative. This investment is significant; however, I note only $100 million will be committed for the first four years of the program. Therefore, our recommendation to the committee is that the importance of transmission connections, both new and upgraded, for renewable energy projects should continue to be prioritised by both the Queensland and the Australian governments.

Thirdly and finally, the terms of reference for the committee and the definition of renewable does not extend to low-emission technologies, such as carbon capture and storage, or CCS. In terms of carbon equivalency, CCS needs to be considered in the future energy mix in a carbon constrained world—that is, a high capture rate, such as 90 per cent, should be treated with preference in dispatch. Low CO_2 emission projects should be treated in line with renewables.

The Queensland government has previously recognised this when in the ClimateSmart 2050 strategy in 2007 it proposed a single renewable and low-emission energy target to demonstrate a 'commitment to bring clean coal technologies to market as soon as possible as future deployment of these technologies is essential to achieving deep cuts in carbon emissions'. The commitment of the Australian and Queensland governments, along with the black coal industry here in Australia, to CCS is globally significant. However, we are not alone. The G8 has committed to 20 CCS demonstration projects by 2020.

As I mentioned before, GE is working with the government owned Stanwell Corporation, and this consortium is in alliance with Xstrata to develop an integrated power plant and CCS project here in Queensland. When developed, the power plant would be able to capture 90 per cent of CO2 in the fuel stream for storage. This project and the broader deployment of CCS technologies can help secure the future for low-emission fossil fuel power generation here in Queensland, around the country and across the world.

GE believes CCS needs to be considered along with energy efficiency and renewable energy in a comprehensive approach to energy and climate change policy. We urge the committee to consider CCS in a basket with other low-emission technologies in this inquiry or in future inquiries. The bipartisan membership of this committee is also important, particularly to provide policy longevity and greater certainty for project developers and investors. Clear, consistent comprehensive policy will best deliver secure, reliable and sustainable energy supplies. I would like to thank the committee again for the opportunity to appear today.

CHAIR: Phil, would you like to make an opening statement?

Mr Hayes-St Clair: Sure. Madam Chair and committee members, thank you for your time and the opportunity for Transfield to present our views this morning. I think we come with a unique perspective on a number of different aspects which this committee is considering. The first is that we are a private investor in solar renewable energy. I suppose with that comes a number of different insights in relation to why we think there is a lot of opportunity in this space. The other thing to keep in mind is that we have not only experience in investing in this technology; we also have experience in growing businesses which are producing this technology. So we understand the hurdles and the challenges that come with implementing this in different parts of the world.

I will start by saying that most of our investment is in solar thermal technology in Europe. We have invested since late 2006 in a company called Novatec Biosol, which has developed some Linear Fresnel technology which we think is quite powerful. This technology was short-listed in the solar flagships bid earlier this year, and we are going to full submission for that by 15 December.

There have been a number of comments made this morning about co-generation and stand-alone power sources. I think it is important to realise that there are a number of steps, at least from our perspective, for renewable energy to take. We are not sure that jumping to a greenfields situation is the best way to go to start. We think that providing solar boosts, as we call it, or as a fuel saver, the technology that we have at least and a number of other renewable energies will play well in that space in the medium term. For someone to say that it makes good economic sense to put a greenfields site in the middle of nowhere connected to a grid and hope that will provide baseload power I think at this point is unrealistic. That said, we believe we will get there in the future. It is just not something that is going to happen in the next 10 years.

Can I also say that we expected the number of submissions to be presented to this committee to be in the range of 20 to 30.

CHAIR: So did we.

Mr Hayes-St Clair: For 60-plus to come through is an indictment on how interested people are in this space now. I think the committee should take that as a very positive general position of the community.

There were five points that we raised in our submission to the committee which detailed how the committee can recommend to the government further investment in this space moving forward. I would like to quickly cover those top five points, and this is from our experience not just in Australia but also in Germany, Spain and the United States.

The first point that we would suggest the group consider is that there must be some incentive to commercialise technology. The reason that we took our technology in Germany to Spain was that there were a number of incentives which allowed us to trial, test and build larger scale plants.

The second point, taking this a little further in terms of incentives, is that a feed in tariff is an important component of that incentive. I know that the Victorian government is taking some steps forward in that space, but it will be problematic if every state goes down a separate path if you are considering large scale renewable energy investment in Australia. It has to be something which all states agree on so that all the administration and all the different decisions that need to be made can be consistent across borders.

We would like to see a streamlining of the process to get approvals for projects. As you can imagine, going between different federal and state jurisdictions there are a number of different perspectives that are taken. Whilst we are happy to go through that process now, we would welcome the opportunity to work with the federal and state governments to make sure this is a streamlined process. As I am sure you can imagine, we would like to get projects in play and operating as opposed to spending months and years trying to work out the process and following that process.

The fourth point is that the grid as it currently sits—and by 'the grid' I mean the general way that people receive electricity and plug into the grid now—needs to have some kind of enhancement to support an increased load of renewable energy going into the grid now. We understand through our experience internationally that in many cases there is an overriding assumption that the grid can take a higher level of power going through it from renewable energy sources until it is plugged in and people realise very quickly that is not the case. Investment needs to focus on what this new revamped grid needs to look like.

The final point is that capital really needs to be freed up so that renewable energy can take off. When we look at the way that banks lend—and I guess after the GFC we saw that banks were a lot more conservative in the way they were lending—there needs to be some facility that allows banks to have a level of comfort in the way that renewable energy projects are put forward. Obviously the solar flagships bid goes a long way towards doing that from a solar point of view, but that is just one technology.

In closing, I would say that there will be a number of technologies that will be presented to you. We believe that a mix is appropriate. We are certainly not here to champion solar thermal, because we know that there are other things out there that are working quite well and we have invested previously in other types of renewable energy. To that end, I am happy to take any questions from the panel.

CHAIR: Thank you very much, gentlemen. Phil, I have to say that we as a committee were overwhelmed by the number of submissions that we had. At this point I would like to thank my research director, Rob Hansen, to my right, and Rachelle Stacey, my assistant research director, to my left, who had to precis a number of the longer submissions. It was an extremely difficult task for us to try to come to terms with not only the amount but also the length of some of the submissions. As a new committee, we are not only grappling with the amount of work but also the amount of paperwork that we have had to read. I have to say that it was genuinely interesting reading and we certainly learnt a lot from those submissions. We appreciate the time taken by yourself and others to put in those submissions. We would like to ask both gentlemen a number of questions. Who would like to start?

Mr RYAN: I am happy to start. I am pleased we have both of you here together, because to some extent both of your submissions took slightly different twists. One of the things that this committee is interested in considering is whether or not governments should be in a position to pick winners by saying, 'This technology is the one that government is going to spend its money on, and we are going to spend all our money on that particular technology.'

From a Transfield point of view, I guess you would like to take the approach of 'let the market decide'. Provide the incentives, and whatever technology stacks up from a commercial point of view then those commercial opportunities should go forward. Kirby, I think you have suggested in your submission that government should identify those things that it prioritises and put money into. I guess I want both of you to expand on whether governments should be in the business of picking winners or whether the preferred position should be to provide the incentive generally and allow the market to decide which technology stacks up.

Mr Hayes-St Clair: I must declare that GE and Transfield—and I guess from Novatec's point of view—are doing business together at the moment. In particular, in one of our Spanish operations we are using GE turbines for the power block.

I suppose the real thing here is that, whilst renewable energy has come a long way in the last 20 or 30 years and beyond, it is still not a free market situation. When we look at new products that came to market 10 years ago from a technology point of view, there were certain incentives to get that up and running. From a systems point of view, we are still waiting for this to become a very mainstream situation. At that point, it will come down to the numbers really. Where it comes down to a number of government owned assets when we are talking about a highly contentious issue in terms of climate change, when we are talking about the way different components of the community have to come together in order to make this work, the government has a very important role in terms of its input into that situation. You should not think from our submission that we are all about the commercial side of things. That is very important—it

is—but, from the government's point of view to make sure that all the checks and balances are there and that the right outcome will eventuate, it is up to us as commercial people to put forward the best outcome which will produce the best output at the end of the project.

Mr Anderson: We certainly support an energy mix, and we can talk across the technologies. In terms of the renewable energy target, I think the real value, particularly in it being segregated, is that it is going to be segregated by size rather than by source of power, which had been previously proposed elsewhere. In terms of CCS, GE's interest in it was borne by the commitment of the black coal industry and the Queensland and Australian governments. Obviously coal is a significant producer of energy and also a significant export commodity for both Queensland and Australia. We are keen to support any energy objective. Our overarching message would be that, as long as policy is clear, consistent and sustainable both politically and fiscally, that gives companies like us a great deal of confidence in terms of investing.

Mr FOLEY: Kirby, in your submission you support a focus on solar, wind and biomass. It has been suggested by other submitters that by having policies favouring certain renewable energies the government is, in fact, picking winners, as Mark has already indicated. Spain has featured a little this morning and we are hearing of some fairly cutting-edge products coming out of other areas. For instance, we all agree that in Australia we have lots of sunshine, but solar is quite prohibitive in cost in its current form. Probably either of you could answer this question. Are you hearing much about any dramatic cost reductions in house by house or building by building type of renewable energy? I suppose this is especially for you, Phil, with your overseas context: are we likely to sea real cheap stuff in the future?

Mr Hayes-St Clair: Real cheap stuff? I think the thing we can expect is that the cost of establishing solar facilities will come down. As you might have read in the media recently, China has the resources and the means to throw a lot out there. So you can imagine from a commodity point of view that it will come down, but from a household point of view I cannot really comment because we do not have exposure to the PV space; we are really the utility scale side of things. I would say, though, that the capital cost required to establish these sites is substantial. It is not something which you can do on a wing and a prayer. It is one of those things where you have to have a lot of confidence in what is going to come out of that at the end of the time.

Just to talk about what Kirby said before, I think the biggest disincentive for us is always a lack of political stability or policy instability around this space. The reason a lot of organisations that are non-Spanish organisations in the solar space have gone to Spain is simply the incentives and the policy stability they are provided there.

Mr Anderson: We are in a similar position in terms of more utility scale, but we have energy efficiency lighting, LED lighting and so on. I think it is important that, as the energy policy develops—the committee has already dealt with energy efficiency—this moves together. Hopefully in this next parliament we will see the Prime Minister's energy efficiency task group report. I think moving energy efficiency, renewable energy and low-emission technologies together is a comprehensive approach that gives greater certainty about the future direction.

CHAIR: As I said before, we received I think 63 submissions to this inquiry and it was proposed in a number of them that the government should offer a feed-in tariff to renewable energy electricity generators to make projects more attractive or affordable to investors. What minimum tariff would be required to have a real input?

Mr Hayes-St Clair: That is a very interesting question and I am not in a position to give an answer to that.

CHAIR: We will take your answers on notice.

Mr Hayes-St Clair: We are happy to provide more insight; I just do not have the numbers in front of me now. I would hate to give you a different steer. I think, though, that the feed-in tariff, in principle, just gives investors stability that there will be some degree of safety in the return that they are going to get from the project. That is basically where it comes from.

Mr Anderson: I will take Phil's lead on not giving you a precise figure, but I think we have to be mindful that the grid is prepared for a feed-in tariff. It is similar to the onset of electric vehicles. It is similar to what we were saying about renewables—about connecting renewable energy. So when making those policy decisions you have to be mindful of the infrastructure demands to support those facilities. At the end of the day, if the government were to move in that direction we would want to see that that policy was sustainable and not reversed, because we would be predicating decisions on that.

Mr Hayes-St Clair: Might I just close on that statement by mentioning the experience of the Spanish government. Notwithstanding the economic challenges of the sovereign nation there, they started with some very positive feed-in tariff regulation and that has been wound back. The issue there is that, from a sustainability point of view, what you do not want to do is enter something which is so attractive that the world just descends on Australia, from a renewable energy point of view, and then have to withdraw it because you realise it is not sustainable. I would caution the committee just to keep that in mind.

CHAIR: Kirby, we have a gentleman from the electric car company here today. You might like to hang around and listen to what he has to say. He is a very interesting man. Gentlemen, thank you very much for attending this morning. We apologise that we are a little behind schedule. We do invite you to stay around for the rest of the hearing. We appreciate your time. Thank you very much.

DAVIS, Dr Georgina, Renewable Energy Workforce Planner, Energy Skills Queensland

Dr Davis: My name is Georgina Davis. I am here on behalf of Energy Skills Queensland. I would like to start by introducing Energy Skills Queensland and our mandate. Energy Skills Queensland was established in 2007 by the Queensland government to lead government and industry engagement on vocational education and training and skills development and labour force issues. It is the centre of excellence for strategic industry workforce planning and workforce development for the energy industry.

Just to note some of the key points from the submission that was made to the committee, the Queensland energy industry is currently experiencing an unprecedented demand for technically skilled workers across all occupational levels. Vacancies currently exist in the professional, paraprofessional and trade occupations across the industry sectors, with critical shortages within many of the technical trades. Skills supply issues are also exacerbating skill shortages across industry to the point where the number of new entrants is barely keeping up with industry attrition rates.

The range of technologies and skills across the renewable energy industry is diverse, reflecting the variety of industry subsectors. To ensure that the subsectors' workforce needs can be met locally—by locally I mean within Queensland—it is essential that a skilled and ready workforce is available for all of those industry subsectors. Clearly, training and educational pathways take time to develop and for students and employees to actually progress through those programs. For example, an engineering degree and an electrical apprenticeship are a minimum of four years in duration.

Research conducted by Energy Skills Queensland has identified a number of essential professions and skills which will be fundamental to the development of the renewable energy industry, taking into account the different subsectors. These professions and skills include both existing professionals and licensed trades and also new activities and knowledge. In most cases, existing professionals and trade workers may already have the required skill sets or can be easily upskilled following completion of their relevant degrees or trade qualifications while in some cases new knowledge and training is going to be required.

It is worth bearing in mind that many of Queensland's renewable energy resources—those natural resources that Queensland possesses—are co-located in mining and resource areas and potentially the new CSG-LNG industry areas, all of which will directly compete for trades, skills and professions with the renewable energy industry.

The amount of Australian content within many of the renewable energy technologies will also influence future job opportunities here in Queensland. Currently, a significant number of the renewable energy technologies, such as wind turbines, solar photovoltaic panels and inverters and solar-concentrating mirrors, are currently manufactured abroad and imported into Australia. This is a considerable loss to the domestic labour market at a time when the Australian and indeed the Queensland manufacturing industries are actually in decline. However, in order to encourage manufacturing to Queensland, producers will need to be confident that a skilled workforce exists or can be readily trained to meet their needs and that sufficient research potential and research support is accessible to further develop their technologies. That concludes my statement.

Mr FOLEY: You say that Queensland will have skilled labour shortages, based on current projections. You also talked about the need for manufacturing to happen in Queensland rather than buying all of these products overseas. Why are the two not mutually exclusive? If you do not have the workforce to do the skilling, how do you have the workforce, then, to build those resources rather than import them?

Dr Davis: This has been an ongoing issue. The global financial crisis certainly saw a considerable depletion in the number of apprentices. We also saw one in 12 apprentices being laid off from their current employment. Once an apprentice loses their position, It is very difficult to actually find the same position in another organisation. So the global financial crisis has further impacted on the electrical and a lot of the engineering trades. In addition to that, a lot of the workers within the electrical and engineering trades are already of a certain age group whereby a bulk of them will be retiring in the next 10 years. To date, the actual input into set degrees—science, engineering and technology degrees—and also into a lot of the technology trades, such as electricians, electrofitters and electromechanical fitters, has not actually been keeping up with the loss or potential loss from the industry.

Mr FOLEY: I am the member for Maryborough. We have EDI Rail up there and we lose a lot of tradesmen to the mines. Obviously, people in that context can get pretty big pay packets. That is not GFC; that is pay packet stuff.

Dr Davis: It is. That, again, is an ongoing issue. Certainly renewable energy employers in a lot of the regions, such as Gladstone and Mackay, frequently cite to us that they do lose a lot of skilled labour to the mining and resource industries. It also builds a reluctance in them in some cases to actually take on apprentices, because very often they spend four years training the apprentice and at the end of the qualification they actually lose that apprentice to the mining and resource industries. One of the issues out there is that renewable energy industry organisations may not have opportunity in future to compete with the pay packages and remuneration of some of the mining industries. Because there are skills shortages at the moment, the mining operators are prepared to pay higher labour costs and offer additional incentives in order to attract that labour.

Mr FOLEY: It requires a lot of altruism to work for half the money, doesn't it?

Dr Davis: It does.

CHAIR: We are passing you a copy of the government submission for your interest and information. That government submission talks about COAG enforcing the Green Skills Agreement to build the capacity of the vocational education and training sector. Can I ask you about the Premier's announcement recently on the Wabo project. What you are talking about now is a lack of skills in this area. If this project proceeds, what impact is it likely to have on the availability of skilled workers in Queensland to work on other renewable projects?

Dr Davis: There will certainly be a need to utilise existing Queensland knowledge and potentially knowledge from other states in the project, and they will obviously be a loss to whatever organisation they are currently working for. The project itself will also create a demand here in Queensland for professions such as power engineers and some of the electrical trades in order to manage the power coming in and its distribution. They will need to be sourced from somewhere. At the moment we are looking at what skills and how many numbers would be required for such a project. But depending on the availability of staff, they may be domestically sourced or they may be imported from overseas.

We have seen a significant drive by the federal government to increase skilled migration levels. One of those key industry sectors is the energy sector, where professions such as power engineering, electrical engineering and electricians and electrofitters are now priority trades.

Mr DOWLING: In relation to the shortage of trades, what is the difference between a conventional sparky and what is required in the industry? That is probably the first part of the question. How long would it take to upskill them to meet demands? Are there opportunities for shorter type courses—traineeships and things of that nature—to actually meet some of those shortfalls? If we were to ramp up an entire education regime to supply the needs for this industry, what is the continuity of work? What is the likelihood of long-term employment, or would it be a case of skilling everyone up, getting everything installed and then having a glut of skilled people with nothing to do? It is complicated, I know. I apologise for that.

Dr Davis: With regard to the first part of the question about upskilling to meet current demands, a lot of the feedback we get from industry is that tradesmen who finish their apprenticeships and are new perhaps to an industry and those people who are finishing a set degree very often do not have the skills to essentially hit the ground running and they do require further upskilling within the industry to understand the industry and the specific industry requirements. There is certainly a shortage of a lot of specific training covering the renewable energy sectors. For example, geothermal training here in Queensland does not exist. Employees would need to go to New Zealand or overseas for that sort of training. There is currently a shortage of continuing professional development and short courses in a lot of the technology subsectors.

With regard to short courses that would perhaps plug an immediate gap, it would very much depend on the gap you were trying to plug. For example, in order for a tradesman to get licensed, particularly in the electrical trade, they have to undertake a certain requirement under the national training package. They also have to fulfil the requirements set by the Electrical Safety Office. Unfortunately, there is not a quick fix to that. They have to be appropriately trained because of the nature of their work. There is probably not a quick fix for a lot of these tradespeople.

In terms of the higher education sector, I will reiterate that there is certainly a shortage of short courses and also undergraduate courses that do look at renewable energy technologies. In relation to the final part of that question about the long-term sustainability of training this sector, there will certainly be continuing ongoing work. As I said, the demographics of a lot of the engineering and electrical trades tends to be older. There will be an ongoing loss, ongoing attrition, as those people reach retirement age.

Additionally, renewable energy sectors tend to require their employees to be multiskilled. For example, they will take them on as a skilled electrician but then also further their education with electromechanical fitting or something like that. They do tend to have dual trades which allows them to then have the flexibility to work between several different industries.

Where we will see the majority of employment opportunities come up in the renewable energy industries is actually during the construction phase. Those workers have the flexibility to work on other projects as they become available.

Mr DOWLING: Is there any cross-compatibility? Would there need to be separate training for someone who is working with solar versus someone who is working with geothermal versus someone who is working with wind technology or biomass from electrical skill sets point of view.

Dr Davis: There is certainly a lot of overlap with a lot of the renewable energy energies. For example, you mentioned solar thermal technologies. For that high-pressure welding is required, boiler making is required and power electrical skills are required. They are the same skills that would be required in the geothermal industry. Those are the same skills that would be required for a lot of conventional energy technologies as well. There is an overlap of skills amongst a lot of the renewable energy sectors and also with the conventional sectors of mining and the incumbent energy industry.

Mr DOWLING: Having studied all this, from a skilling point of view which technology is the one most viable? For which industry type could you get most people up and trained to service? Is there one industry that is ahead of the game, be it solar, be it wind, be it geothermal or whatever?

Dr Davis: I do not believe there is currently in Queensland. As I said, the training for a lot of these renewable energy industries is still very much an emerging sector itself. With the range of skills some of them are generic. They all need electrofitters et cetera. I do not think, in response to that question, that there is a single technology at the moment that is more advanced than another.

CHAIR: Dr Georgina Davis thank you so very much for your time this morning. We appreciate it. You have obviously highlighted some of the challenges we face in getting a skilled workforce for all of these renewable energy projects in the future. We really appreciate your time. Thank you very much for attending.

Dr Davis: Thank you, Madam Chair.

CHAIR: The next witness is from RedFlow Technologies.

WINTER, Mr Christopher, Chief Technology Officer, RedFlow Technologies Ltd

CHAIR: Thank you very much for attending the hearing this morning. As I have said before, we apologise for running a little bit behind schedule. We appreciate your patience. Would you like to make a brief opening statement?

Mr Winter: I am the chief technology officer and one of the founders of RedFlow Technologies. RedFlow is a Brisbane based manufacturer and developer of advanced energy storage systems, with our facilities located at Seventeen Mile Rocks. We are recognised internationally as having world-class battery technology and also solutions. RedFlow is a rapidly growing company. Over the last three years we have gone from five to about 45 staff. We are deploying our battery systems with electricity utilities in Australia, in Queensland, as well as overseas.

Our battery systems are key enabling technologies that make intermittent energy generators such as PV solar systems or wind systems far more valuable to the electricity utilities and the electricity industry. It promotes the uptake of these technologies. Over the next nine months or so we are looking to quadruple our manufacturing capacity in Brisbane.

Currently, there are two things that our battery systems do that make the renewables more valuable. First it shifts the renewable energy by storing it, obviously. It shifts it to the period when it is most valuable, which is usually the peak demand period. The other thing that energy storage technologies, such as ours, do is reduce the issues caused by the intermittency of renewable energies. If you get clouds passing or all of a sudden the wind drops that actually influences the voltage and frequency on the distribution network and the utilities have to spend more money to deal with that than if there were no renewables on there at all.

These issues become a bit more acute when you start approaching about 20 per cent penetration of renewables in the grid. A lot of people think that we are not there yet. But in many places on the grid we are there right now. The electricity grid is not a homogenous system. There are areas where you have a problem and other areas where it has been upgraded recently so there is no problem. We have that problem in the grid at the moment.

I will outline the potential benefits of energy storage to the renewable energy industry is now being recognised globally. I understand that in Japan they have already mandated energy storage with renewable energy that is newly deployed. California is also in dialogue with the renewable energy industry basically telling them to come up with a solution to deal with the issues of intermittent renewables otherwise they will mandate a solution themselves.

There is already on Arnold Schwarzenegger's table—I do not know whether he has signed it yet—a bill to mandate that 2½ per cent of the peak demand has to be met with storage. There is a genuine realisation of the value of storage. They have another program called SGIP. They are already paying in dollars per watt hour of energy storage that you provide with a renewable energy system. They give you a rebate.

In Australia I am also seeing a lot more interest in energy storage. It is being discussed a lot more both by renewable energy companies and electricity utilities. There has been a dramatic increase in the number of inquiries we are getting. Numerous Australian and New Zealand utilities are approaching us because they understand that there is an issue and energy storage can well provide one of the main solutions. Numerous global renewable energy companies, especially PV solar companies, a couple of very large builders, the US military and numerous other companies are all interested. This interest has increased dramatically over the last six months.

I will make a couple of points with regard to the inquiry's purpose. Your first purpose is to provide value for Queensland. Clearly, supporting local equipment manufacturers is going to be a benefit for Queensland. From our perspective, we are not interested in getting support for the sake of doing a project somewhere. Everything has to have a commercial basis. We have no concerns about competing with global players. I think the support that we have received so far from the Queensland government through the QSEIF grant and the ISUS grant we have repaid very well. We have been quite successful as far as that is concerned.

With regard to adopting a target for increasing the proportion of the state's electricity generated from renewables, we see an opportunity to modify the feed-in tariff to reward renewable energy systems that are put in together with energy storage. A possible way of dealing with that would be to provide a feed-in based on dollars per kilowatt hour that is fed in during the peak demand period. That is really providing value to the electricity distribution utilities which is half of our electricity bill. It is not about generation; it is about getting the energy from where it is generated to you.

In terms of remunerating people who put in energy storage, with PV that is actually occurring in some places in Queensland right now—in areas where there is a problem. I am not saying we are flouting the current rules but the reality is that if you feed it in from energy storage or from renewables during the peak demand period it is going to have a dramatic effect on the need to upgrade the electricity grid and therefore hopefully reduce our electricity bills.

The final point is what the government could do with regard to the GOCs we have now. Encouraging GOCs to trial energy storage technologies would provide a significant benefit to Queensland in the long term. We are already in discussions with a number of GOCs. They are very open to that. However, with GOCs, in comparison with some of the privately owned companies, the rate of uptake of new technologies is not quite as fast. That concludes my opening statement.

CHAIR: Thank you very much, Mr Winter. Chris Foley has a question for you.

Mr FOLEY: From what you were saying then, if you look at the solar voltaic system and you have the units plus an inverter that will feed back into the grid if you can store the power, you could bring that on line during a peak period and have a split feed-in tariff or something like that?

Mr Winter: Yes.

Mr FOLEY: That is the opposite of how we buy power now? We pay for the more expensive times. If you can put your pool pump on at an off-peak time or whatever it is cheaper?

Mr Winter: That is right.

Mr FOLEY: In that light, when would an affordable and practical battery unit be available on the market for use by individual households?

Mr Winter: The benefit is not just to the individual householder. That is quite important. The most expensive problem is building the distribution network. What you must do when you put batteries onto the grid—say, at someone's home—is actually make it accessible to the electricity distribution utility. That is what the smart grid is all about. If you can do that you make the energy storage system much more valuable because now you can actually address the issue of peak demand.

A typical installation might be where you have a $19 million upgrade. If you deploy $2 million worth of energy storage systems then you can defer that upgrade for five years. Within two years you have paid that back. The question is: when is that going to be available? That is available now. That is why we are growing very quickly. Obviously in the more remote areas the business case is stronger because there are simply more wires and poles. As our volumes go up our costs come down. This is particularly so for us but it is the case for energy storage generally. Obviously we can then move closer into the population centres and still have a commercially viable solution out there.

Mr FOLEY: Where you already have a feedback to the grid—say you have a solar voltaic system that is connected up and you use your own power and sell any excess to the government—do you see that as marrying up with what you have got right now on that house-by-house basis?

Mr Winter: Yes, we can do it on a house-by-house basis. We are developing new technology all time. If we can develop our system to a state where for the homeowner who currently might pay $2,000 or $3,000 to have a PV system installed with an inverter if they had the PV system installed with an inverter with a battery—for example, our battery—it would actually cost the homeowner less.

The reason is that if you have a battery and you have SmartGrid technologies or even something as simple as the ripple control that controls our hot-water systems at the moment you will actually now provide a guaranteed benefit to electricity utilities. They can rely on that and they can therefore defer some of the upgrades that they are making right now. After all, they are upgrading everything based on our five kilowatt peak load from every house and the average load is one kilowatt, so it is very overbuilt and it is becoming more and more overbuilt.

CHAIR: You just said before that you have had a lot of inquiries, particularly recently, about your battery storage technology. Just how well recognised is it?

Mr Winter: I personally have been invited to conferences on energy storage in the US.

CHAIR: And Spain?

Mr Winter: No, not yet, but we do have one company that will be visiting us from Spain very shortly. As a rapidly growing small company we have to be careful that we do not suddenly go to too many places in the world. We have got our focus here on Australia and New Zealand obviously, but we have a lot of interest from Asia and from the US. Europe is also quite interesting. They do have a stronger electricity grid or electricity network and they also are a smaller place than Australia and the US, so the issues they have with actually building out the network now are reduced. So while there is a lot of interest from large PV installers and that, some of the other drivers are maybe not as strong.

Mr RYAN: Is there anyone else in the world working on this technology?

Mr Winter: Yes, there are two other companies in the world working on it. But my answer to that is always that what we are doing right now is we are changing the way the world generates electricity and the way the world distributes electricity to customers. That is a very big industry we are changing and no-one is going to make enough energy storage systems to dominate the market. It is just like no-one makes enough cars to dominate the market. This is just a very big industry. It is a very exciting time for us. That is why we find it very interesting.

Mr FOLEY: In layman's terms, how is your battery technology storage different than conventional?

Mr Winter: A conventional system would be a lead acid battery system for example, so ours uses a zinc bromine technology. It happens to be very good at cycling on a daily basis—for example, charging over a few hours and discharging over a few hours every day. Some of the characteristics of the technology make it approximately one-fifth of the weight of lead acid batteries. That one-fifth of the weight of lead acid batteries means the potential is there to manufacture it at a lower cost. So the cost that we can manufacture at has the potential to open up very large opportunities for us. One of the things that people also ask me—and I will add this just as another point—is how come this technology has not already been deployed in the field, and there are a couple of other companies.

My statement is that the market opportunity that suits our technology is only maybe four or five years old and what drove that was climate change. What climate change did was introduce demand for PV and wind, but those systems are very small compared to coal fired power stations. In order for them to be deployed, they get deployed close to homeowners' places. What that does then for the electricity utility is then they suddenly get the phone call from someone saying, 'I would like my 22c,' and it has changed their business model. Even in New Zealand one of the utilities is saying that they are changing from an energy supplier to a capacity supplier. So there is a fundamental shift going on there.

Mr DOWLING: Give me some idea: a battery for a domestic application in my home, how big would it be? What would it look like?

Mr Winter: For your home, it will be, let us say, 40 centimetres by 80 centimetres by 80 centimetres—so a box that would sit under the electricity meter.

Mr DOWLING: About the size of a suitcase?

Mr Winter: A large suitcase, but it would sit underneath your meter box for example.

Mr DOWLING: Thank you.

CHAIR: Thank you very much, Mr Winter. If you are able to stay around for the next witness, I think you will find him very interesting. He is from the electric car company and it is very keen on finding out a lot more about battery storage. But we do very much appreciate your time here this morning and we thank you very much for attending.

Mr Winter: Thank you.

SAXBY, Mr Don, Chairman, Brisbane Branch, Australian Electric Vehicle Association

CHAIR: Good morning, Mr Saxby. Once again, we apologise for being a little late, but we do very much appreciate your time and your patience to be here this morning. We very much appreciate your attendance. You are the current chairman of the Australian Electric Vehicle Association, a non-profit organisation founded in 1973. Mr Saxby, would you like to make a brief opening statement?

Mr Saxby: Thank you. The Australian Electric Vehicle Association does not specifically pursue or promote any particular method of power generation. However, we do support and prefer those methods which are both most efficient and have the least environmental impact. The majority of our members who own and drive electric vehicles also tend to use 100 per cent green power to charge their vehicles and some also have solar power systems installed at their residence. Recent research in the USA has found that the primary driver for purchase of an electric vehicle is the desire to decrease one's carbon footprint. An electric vehicle that is recharged with 100 per cent green power has zero carbon emissions in its day-to-day running. However, if an EV is powered through the standard coal fired power stations in the Queensland power generation network, the carbon emissions of that vehicle will only be on a par with a small diesel powered vehicle. It would therefore be logical to assume that the requirement for 100 per cent green power will increase as the uptake of electric vehicles increases, and on current projections there will be at least three million electric vehicles in Australia by the year 2020.

As explained by the gentleman from RedFlow, the use of photovoltaic systems in the domestic situation requires that a power storage system be used to store the power generated by the system until the peak usage period of the grid. Electric vehicles can also play a significant part in the storage of this off-peak generated power. A smart grid and electric vehicle to grid interaction will allow the vehicle to charge only during the off-peak period, unless absolutely necessary, and current technology will also allow the energy stored in the electric vehicle battery to be fed back into the grid during peak periods. Therefore, solar generated power, which is mostly generated during the middle of the day, can be stored in the EV battery and then part of the stored power can be fed back into the grid in the evening and following morning periods. The intelligence in the storage system will ensure that the car has enough stored power to meet the owner's driving requirements for the following day.

Electric vehicle batteries are generally assumed to have reached the end of their life in the vehicle when they can only store 80 per cent of the power that they were capable of storing when they were first manufactured. At this time these batteries can be removed from the vehicle and repurposed as home power storage systems for those homes that have a solar power system. The batteries could then be used until their storage capacity goes down to approximately 50 per cent of their original, and this will extend their life and value further. Electric vehicle batteries are very expensive at the moment, so anything to do that will be very helpful. When the battery reaches end of life, lithium battery reclamation processes can retrieve most of the lithium and other elements for remanufacture of more batteries. Commercially available electric vehicles are in Australia now and their numbers will rapidly increase in the coming years. We need to implement policies now to ensure that the power grid can handle the additional requirement for renewable energy. Thank you.

CHAIR: Thank you very much, Mr Saxby. You have just said that it can take maybe six to eight hours to recharge your batteries from the electric vehicles, and I congratulate you and your group on your efforts to reduce your carbon footprint. Given that electric vehicles are often promoted as being emission free, would your association support the mandatory use of green power for electric vehicle owners considering you said that there may be a lot more of them in the near future.

Mr Saxby: I cannot speak for the national organisation, but mandatory may be a little bit difficult to enforce with our members. It may be a bit of a turn-off given that you pay a premium price for that green power. Most of our members do take that step themselves and pay for the green power, but we do not try to enforce it in any way.

Mr FOLEY: At our seminar on energy efficiency last year it was suggested in the future electric cars will not add to peak load but may in fact be able to discharge electricity back into the network via vehicle to grid transmission. Looking at the overseas experience, one of the things that I would see is that we are all mad on performance and there are electric cars like the Tessler which is real fast. How do you see the feasibility of electric cars in terms of satisfying that performance demand? Is it a question of, like RedFlow was saying with its batteries, providing that better storage? What do you see as the roadblocks I guess to a mass uptake of electric vehicles?

Mr Saxby: What we are seeing now is a great deal of interest from people who are green and the main roadblock to others is the fact that there is a restricted distance available to be travelled with an electric vehicle. With the new vehicles, around about 160 kilometres is the average for the smaller vehicles like the Mitsubishi i MiEV and the Nissan LEAF. As you said with the Tessler, that is catering to the performance vehicle. However, it is very expensive at the moment. It has extremely good performance and something like 400 kilometres range, which is almost what a petrol powered vehicle will do. But what is really driving everything in the electric vehicle industry is battery technology, and there is a great deal of research and money going into that in the US at the moment to promote that. Once we get that sort of development flowing through into production, I do not see there is going to be any real holdback for the introduction of electric vehicles.

Mr RYAN: The broad context for this inquiry of course is growing renewable energy generation in Queensland and of course how we facilitate that if we want that to happen. What incentive do you think would a transition to electric cars provide to the energy generation market to convert to renewables other than, I guess, the perception out there that if you drive an electric car you are more green power oriented so then that may have a mindset change—a societal change—about what the community demands from its electricity energy generators? I am just trying to get my head around the incentives that the electric car market may provide to energy generators to change from, say, coal fired power to a renewable energy source.

Mr Saxby: What electric vehicles will do to the grid is to provide additional loads probably in clusters to start with because of the fact that the initial take-up will be at a fairly high cost, so it will tend to be in the more affluent areas that we get a build-up of electric vehicles. So in that case what will happen is that the grid in those areas, unless that charging for those vehicles is controlled, will start tending to fail. So with the provision of storage and a photovoltaic system at individual houses, that can reinforce the grid locally rather than try to reinforce it back at the power station and all of the infrastructure right up to that local point.

Mr RYAN: So a RedFlow battery on wheels?

Mr Saxby: Yes. You could do both. It is definitely possible to have a home battery system and charge your car from that as well.

Mr RYAN: I have one other question. It is a technical question and it would be hard to answer, I think. A kilometre of emissions from a petrol powered car compared to a kilometre travelled by an electric car using the energy generated by a coal-fired power station, have you got some comparison between the carbon emissions of both?

Mr Saxby: The emissions from both? An electric vehicle is similar to a small diesel powered vehicle. The emissions are around about the same if you fill the electric vehicle from the coal-fired grid.

Mr RYAN: Thank you.

CHAIR: You are an engineer by profession, I understand.

Mr Saxby: Yes.

CHAIR: Are there any other problems that you have ever had except what you have just said this morning? Is it easy to register these vehicles? Are there any other problems or is it pretty easy once you have got one—you are up and running?

Mr Saxby: No, most of our members are working with conversions and the process of converting a vehicle from petrol to electric is long and arduous and then you come to the end of it and you have an approval process that you have to go through with Queensland Transport. In my case, that has taken three months to get approved.

CHAIR: Is there a reason for that?

Mr Saxby: None that I can fathom, no.

CHAIR: We might have to look into that for you, Mr Saxby.

Mr Saxby: Yes, that would be most appreciated.

CHAIR: That seems like an inordinate amount of time to get a vehicle registered.

Mr Saxby: Yes.

Mr FOLEY: One of the criticisms that I have heard of electric vehicles is that they are too quiet. So it is the Ninja effect—they sneak up on you. Does that mean that you have a CD or a V8 or something? That might appeal to the hoon market, too.

Mr Saxby: Yes, it is all possible. There is a national code of practice for electric vehicle conversions and there was a suggestion in the latest draft of that that there should be maybe some noise-making device when the vehicle is at a lower speed, especially in car parks and things like that because they do tend to creep up on you.

CHAIR: Does anyone else have any questions? Mr Saxby, we thank you so very much for attending this morning. We appreciate your very valuable time. I think we have learned a fair bit both from your submission that you have put to the inquiry and your attendance here today. We look forward to catching up with you in the near future. We thank you very much for attending.

Mr Saxby: Thanks, madam chair.

FLINT, Mr Andrew, Policy Manager, Energy Retailers Association of Australia

O'REILLY, Mr Cameron, Executive Director, Energy Retailers Association of Australia

CHAIR: Mr Cameron O'Reilly, do we have you on the line?

Mr O'Reilly: You have indeed. Can you hear me clearly?

CHAIR: We can hear you clearly.

Mr O'Reilly: I also have Andrew Flint, our policy manager on the line.

CHAIR: Hello Andrew. It is Carryn Sullivan here, the chair of the ERC. We do apologise. We are running a little bit late—probably about 15 minutes—but we have caught up a couple of minutes. We thank you for your patience and we would like you to please state your name for Hansard and maybe take a brief opening statement from one of you?

Mr O'Reilly: Yes, certainly. I am Cameron O'Reilly. I am the Executive Director of the Energy Retailers Association of Australia.

Mr Flint: I am Andrew Flint. I am the Policy Manager of the Energy Retailers Association of Australia.

Mr O'Reilly: I will make a brief opening statement. We have made a written submission but just as a little bit of background to the committee, the Energy Retailers Association is the peak representative body for retailers of electricity and gas operating in Australia's national markets. We have 14 full members and six associate members. It exists largely because retailing in energy has become a competitive industry in the last decade or so. In Queensland, all consumers were opened up to contestability and, therefore, choice of retailer from the middle of 2007. In that process, you have seen a number of retailers enter the Queensland market and by figures that have been collected for us by an international think-tank, around 15 per cent of Queenslanders switched their retailer of electricity in 2009.

From your committee's point of view, how are energy retailers relevant to the issue of renewable energy? We are the complying party for the mandatory renewal energy target administered by the federal government and implemented by the federal government. We also, as retailers, market green power products to consumers, which allow consumers to choose to purchase their electricity from renewable sources. The most recent figures that I was able to locate were, unfortunately, just at the end of 2008, by which time around 224,000 Queensland customers had signed up to green power, which amounted to around 122,000 megawatt hours of renewable generation.

My members are also in many cases generators as well. Given that they have to comply with the renewable target, many choose to get involved in renewable generation themselves in industries such as wind, geothermal and solar. As an association, we have advocated that the best approach to achieving economies of scale with renewables and also to get the most efficient lowest-cost way to achieve a growth of renewable energy in Australia has been to have a national renewable energy target. So we were pleased when the federal government, in implementing that, chose to absorb existing state based schemes such as the Victorian renewable energy target. So we are certainly not an advocate of state based targets in embarking on this challenge, but we do believe that there is an important role for governments in supporting renewables research and also looking at how renewables get linked to the market. In many respects, given that our transmission sector was built around our existing generation capacity, which is largely fossil fuels, the need to link renewable resources such as wind and solar and geothermal, which are in often remote locations to the national electricity grid, will in some ways be the biggest challenge of realising the federal government's target of 20 per cent renewables by 2020.

The other thing that is important for retailers is that we have a functioning market for renewable energy certificates and some certainty in regulation, which has really frankly not been apparent at a federal level for quite some time. But at least the target was implemented with bipartisan support earlier this year. We also have to be realistic that renewable energy is more expensive than current sources of generation and they ultimately do flow through into higher retail energy prices. The rule of thumb is that a retail energy price is about 40 to 45 per cent the wholesale cost of electricity generation, around about 45 per cent is the cost of transmission and distribution and the retail component is only about 10 per cent. In a large state like Queensland, obviously, distribution and transmission is sometimes a higher component of that cost.

From our point of view, the higher costs of the renewables ultimately, as I have said, have to flow through to retail energy prices and in many cases that requires regulators to set accurate prices, which is getting more difficult. If they do not do that accurately, then retailers get squeezed and the potential for investment in new generation is compromised. We have always argued, therefore, that the safest way to ensure that the costs are reflected in prices is to have a more deregulated market based on competition to discipline prices, which is the case in Victoria today. I appreciate the opportunity to talk to the committee and I would welcome any questions.

CHAIR: Thank you very much for that opening statement. I will just make sure that you get a copy of the Queensland submission to the inquiry today. That submission talks about a potentially new massive hydro project in New Guinea at Wabo. They are saying that it could potentially provide 1.2 megawatts of electricity to the grid as early as 2020. What impact will this have on Australia's electricity market and on the electricity price, do you think?

Mr O'Reilly: I know that that is a project that involves one of my members, Origin Energy, and they announced it to the stock exchange this week. I think it is certainly a bold step. I know that in announcing it Origin said that it was very important that the renewable energy target really was, I guess, willing to accept renewables—clean generation—that came from another country. So I think there is that aspect of it that would have to be addressed in terms of the design of the mandatory renewable energy target. But I guess I would say that in many respects in terms of the overall market it is not unprecedented. There is hydro-generation in Tasmania, obviously, which is linked to the national electricity market by way of an undersea cable. So technically, it has been done in another part of the country. Origin would not be committing to this if there were not some strong belief in the viability and the high quality of that hydro generation. So I think the scale of the project is such that it would have the capacity to introduce a major new clean generation source into the market. Its entry point would be North Queensland, which obviously has some major economic benefits to the north of the state if it is able to be realised.

CHAIR: Does anyone else have any questions?

Mr RYAN: Just following on from your answer there and perhaps the precedent from the Wabo proposal, do you think that governments, particularly state governments, have been a bit narrow in their outlook in investing in renewables in the sense that they are constrained to jurisdictional boundaries? For instance, wind technology is being used quite well down in Victoria and South Australia and, of course, hydro is operating out of Tasmania. Should governments be investing in technologies which may not necessarily be as cost effective or efficient in their own states? To that end, should they be investing in technologies and energy generation sources in other states which have a direct cost benefit?

Mr O'Reilly: I think it is one of the unique challenges that we face as a country in that we have designed a national market, but in some ways the regulation and the allocation of costs is on a state basis. So in some cases where you might see renewable sources being more prevalent in one particular state, ultimately those renewable sources would be used by customers potentially right across the market. But with the way the market is currently set up, the transmission costs of developing those resources in a particular state would largely be paid by the consumers of the state where the generation sources are. So they would carry all the transmission investment burden, but all the consumers of the country would be beneficiaries. So the Australian Energy Market Commission is looking at the whole issue of transmission incentives and what is a fair approach to developing the necessary transmission resources to support renewables when, essentially, the whole country would be the beneficiary.

At the end of the day, though, in terms of government, it is our general belief that they have a very important role in addressing market failures, in supporting research and development of potentially exciting new renewable technologies, but it is ultimately up to the private sector to look at whether they are viable. I would not be critical of government for not necessarily investing appropriately, because we have seen that the trend of the energy industry has been increasingly, since the mid 1990s, to be a private sector industry and to free up government resources for other industries. Therefore, I do not see it as a role necessary for the government to commercialise particular technologies but to help them deal with market failures and to help the research project and then let the private sector, with the assistance of what is a guaranteed market share through a renewable energy target, make them work.

CHAIR: So are you saying that you would not support greater investment by the government directly into renewable energy industry?

Mr O'Reilly: I do not want to see renewables get criticised because the government is just seen to be wasting taxpayers' money on them. There is a public benefit when governments engage in research and development. That is the way it should be looked at. It is important for governments to look at how they can assist the process of renewables getting to market. The way the market is developed is that a lot of the time the private sector does not want to see the government as a competitor in commercialising renewable energy sources.

Mr RYAN: I want to ask about your proposal for the deregulation of retail tariffs. I want a bit of information about the experience in Victoria and what that has meant for electricity prices as well as investment by retailers in renewable technology generation and how easy you would see that as a proposal for Queensland, bearing in mind that the Queensland electricity price is quite heavily regulated because of the size of the state and the need for more remote areas of Queensland to be subsidised.

Mr O'Reilly: What I would say in terms of Victoria is that they moved to full deregulation from 1 January 2009 by which time they had 12 active retailers competing for market share at a household level. There are a lot of things that influence relative prices. I said to you that it is the relative cost of generation and the cost of distribution. In the case of Victoria, they have a little bit of an advantage in being a compact state. Figures that were released recently—and these figures were collected by the Office of the Tasmanian Energy Regulator as part of their pricing review—showed that certainly in terms of small business Victoria had the second lowest level of prices and Victoria was also amongst the lowest in terms of household prices. Deregulation has certainly not been accompanied by higher prices.

One of the reasons, as I said, is that electricity is very hard to differentiate, as is gas. When you have that many people competing for market share, if someone is out of kilter with the market they will lose customers. One in four Victorian customers switch every year. So that discipline has kept prices under control. But, as I said, we always have to be cautious about relative price comparisons because of different sources of generation and the level of investment required in terms of transmission and distribution.

I do understand the unique challenges of the Queensland market in terms of its approach to the maximum uniform tariff. I understand that that is a very clearly defined objective of the government to ensure that essentially there is a postage stamp approach to pricing across the state and for people whose cost of supply if left to the market would be much higher than it otherwise would be without the community service obligations provided by the government.

I do not have an immediate answer. While ever that remains an objective, it does complicate the price-setting process. But, in many respects, the way the market has developed in Queensland is that South-East Queensland has very high levels of competition in switching but, because when customers leave Ergon they would lose the community service obligation the way the market is structured, there has been less competition outside the south-east corner. I would say to you that in some ways the deregulated approach would not be more easily applied in the south-east corner than it would be across the whole state. That does not mean that this is an insurmountable issue, but it would obviously require a certain amount of discussion between industry and government and regulators if it ever was to be considered as a course of action by the Queensland government.

CHAIR: Andrew or Cameron, you called in your submission for the government to allow the market to determine renewable energy supply. In a market which is dominated by coal fired power, and in the absence of a carbon price, how can the renewable energy industry compete in the electricity market without government intervention?

Mr O'Reilly: I think in many respects there are two means by which non-coal forms of generation will be developed in Queensland. One is something that some of my members have benefited from which has been the Queensland 13% Gas Scheme. That is a direct support mechanism for a particular form of generation. It has helped to support gas fired generation in Queensland. If you look at the broader picture of wanting to reduce the emissions of the state, then that sort of market intervention as an industry development strategy is probably helping to lower emissions, but like any form of market intervention there is probably an overall cost smeared across all electricity prices to that scheme.

In terms of the renewable sector, it really is, as I said, the case that now there is a national renewable energy target and, across the national electricity market, retailers by 2020 have to say that 20 per cent of their purchases are coming from renewable sources, and Queensland will be a beneficiary of that. The most effective forms of generation are in Queensland. But, as I said, probably the biggest challenge in the role for government—and this is government collectively, not just Queensland—is to ensure that where viable forms of renewables are seen—and in Queensland, for instance, for various natural reasons maybe that will be solar instead of wind, who knows—they are able to to be linked to the market by way of appropriate transmission investment. Given that the Queensland government owns the transmission network in the state, looking at how all of those renewables are brought to market is an important role for government and its transmission body.

CHAIR: There are no further questions. Andrew and Cameron, I thank you most sincerely for joining us this afternoon. We once again apologise for being a little late, but we appreciate your patience. As I said, I will see that you get the government submission. We look forward maybe to talking to you again in the near future.

Mr O'Reilly: Thank you very much for the opportunity.

CHAIR: Thank you. We are going to break for lunch and be back here at one o'clock.

Proceedings suspended from 12.21 pm to 1.01 pm

BARR, Mr Benn, Executive Director, Office of Clean Energy, Department of Employment, Economic Development and Innovation

NIELSEN, Mr Greg, Chief Officer, Office of Clean Energy, Department of Employment, Economic Development and Innovation

CHAIR: Good afternoon. We will start the afternoon session with witnesses from the state government's Office of Clean Energy. I thank the witnesses for attending. Would either or both of you like to make a brief opening statement and then the committee would like to ask you some questions.

Mr Nielsen: Many people in this room and within government understand that the Office of Clean Energy is tasked with the agenda of accelerating the renewable energy uptake in Queensland as well as dealing with the energy management agenda in relation to energy efficiency demand management. This is an agenda we are very passionate about and very dedicated towards.

CHAIR: Mr Barr, do you have anything further to add to that?

Mr Barr: No.

CHAIR: Fantastic. That was the quickest opening statement we have had so we are very grateful. I want to thank you for your input into the state government submission that we received just recently. Firstly, I congratulate the government on the work they are doing through the Office of Clean Energy. We found them very supportive with our committee. I am interested in the Wabo project that was announced just this week and I have a couple of questions I would like to ask you on that. I have about 15 questions, but I probably will not ask them all today. I might ask you to take some on notice.

Mr Nielsen: Sure.

CHAIR: The fact sheet that was released on Wednesday states that the project is planned to deliver 1,800 megawatts of electricity with around 1,200 megawatts being delivered to Queensland with the prospect to expand in future decades. Can you give the committee an idea of the total distances between Wabo in PNG, including the 500 kilometres of undersea cable, across the Torres Strait to Bamaga and then across land to the grid so we can put that into perspective?

Mr Nielsen: I will have to take that question on notice on those details. I know the undersea number is around two lots of 250 kilometres but I need to take that on notice for that exact detail and I will respond back to that.

CHAIR: If you could have the answer back before 24 September, we would be very grateful.

Mr Nielsen: No problem.

CHAIR: Are there undersea transmission cables of this length elsewhere in the world? What are the major environmental risks associated with using high voltage undersea cables of this length? What effect on marine life and Cape York industries do you envisage this project will cause?

Mr Nielsen: On the length, Basslink is about 290 kilometres and there are lengthy cables elsewhere around the world. In terms of those other questions, can I take them on notice to make sure you get the proper dedicated expert opinion?

CHAIR: Thanks. Is the government considering any other hydroelectricity projects apart from Wabo?

Mr Nielsen: From the perspective of the Office of Clean Energy, we consider all renewable projects as they arise. Currently, there are none on the table but we will always consider all range of renewable energy projects.

CHAIR: With the length of these cables, what transmission losses do you anticipate?

Mr Nielsen: Again, it is a technical question and I will respond to that question on notice.

CHAIR: I will leave it there for the moment. I do have a number of other questions. If I do not get a chance to ask them all today, I will put some on notice.

Mr Nielsen: Absolutely. We are more than happy to respond to any question.

Mr FOLEY: Timber Queensland have raised an issue with the committee about apparent restrictions on the use of sawmill offcuts from native forests. They suggested that 250,000 tonnes of native forest wood waste went to landfill in 2008 and that this could have been used to produce electricity. We need to clarify if this is so. We are concerned that a potentially valuable energy resource is being wasted. Can you explain what the restrictions are on using sawmill waste from milling timbers from native forests? Why are they in place? What is preventing the use of this waste as an energy resource?

Mr Nielsen: In terms of the detail of what policy would be in place, we will respond to that formally. In terms of this discussion, we have had a discussion with Timber Queensland and Mr Jim Burgess at how we actually look at accelerating the uptake of biomass generation in Queensland through products such as timber. They will be working with a team within the Office of Clean Energy under the renewable and alternate fuels team. They will be working on helping us develop bioenergy road maps in this space.

In terms of current barriers, we find many of those in many of the projects we are working on. Our commitment to those parties like Timber Queensland is to work with them through that and either come up with alternatives or try to understand what is preventing those things happening now. That piece of work will be picked up in a bioenergy piece of work we are now working on not only with the timber industry but also with the sugar industry and councils progressively over the next 12 months.

Mr FOLEY: So is it just the law of unintended consequence or do you have a philosophical position on it?

Mr Nielsen: My view is that the cleaner the energy the better, but the challenge here is going back and finding what current things are in place—not just at a state government level but at a federal government and local government level—that have prevented these things happening. We tend to map the end-to-end process with the parties to understand that and work through each of those agendas as we find them.

Mr DOWLING: With the renewable energy and biomass, we have had questions about wood going into biomass and the technology around cane. What other fuel sources have been considered, if any, in providing for that renewable energy sector?

Mr Nielsen: There were some recent tests on biodiesel in isolated generation on Ergon's network. We have a wide range of discussions going on, including algae as a fuel, and there are trials of algae happening within Queensland at the moment. We are not limiting the fuel source. We are trying to find a sustainable solution to this because the biggest risk with any biomass project largely tends to be fuel and its availability, so we are trying to go as broad as possible.

Mr DOWLING: Has any consideration been given to converting human waste to energy? There seems to be an endless supply.

Mr Nielsen: That certainly is on the agenda. Sewage treatment plants have examples of that globally for its potential so that will not be missed in the discussion. The facilities around drying that material before it goes into furnace are a bit different to some of the other discussions, but again it is on the table.

Mr RYAN: I would like to ask about feed-in tariffs. Firstly, what is the cost to government of the current feed-in tariff structure and the individual cost to retail customers as reflected in their retail price of electricity?

Mr Nielsen: Just for reference, the Solar Bonus Scheme in Queensland is a net feed-in tariff where excess power to the grid is paid at 44c a kilowatt hour, which is fixed and not linked to CPI. At the moment, given the recent determination of the AER, they are no longer a cost to the government, they are passed through distributors and ultimately on to energy bills into the future. The exact impact on consumers at this stage will not be evolved for a while. It is not hugely significant. Have we published the latest numbers at all?

Mr Barr: The update?

Mr Nielsen: No, the payments over the last years. I do not know if they are published anywhere. The payments to consumers that are on the Solar Bonus Scheme in the last two years are somewhere around $6 million over that period, but we can verify that.

Mr Barr: We will check that.

Mr Nielsen: In that sense, it is working. The uptake is quite significant. According to the numbers I saw recently, we are now hitting 60 megawatts and there have been 8,000 new connections in the last two months. We are at about 40,000-plus connected homes.

Mr RYAN: So, effectively, the broader retail electricity market is subsidising the cost of the feed-in tariff? As more people go online with feed-in tariffs, there will be a pressure on retail prices to go up to pay for the feed-in tariff?

Mr Nielsen: It is factored through your distribution network. Fundamentally, yes, there is some calculation that works through to a pricing impact, but the idea of the net feed-in tariff is that it minimises that. It is a totally different tariff to the gross feed-in tariff, for example.

Mr RYAN: Is that why feed-in tariffs are only limited to the domestic generation of electricity and have not been extended to, say, generators over 10 megawatts?

Mr Nielsen: The current one is 10 kilowatts per phase and it allows small business, so commercial operators can utilise the current Solar Bonus Scheme. Our objective is to get us to a cost-effective, clean energy future because we understand it is about sustainability—so it is economic, social and environmental pressures on that discussion. In going forward, we are looking at a multitude of opportunities of how you actually structure that so you can get sustainable uptake of not just solar but small scale wind, hydro and the like. For us, it is an economic and sustainability question, not so much about whether it is a sector question. We have quite a bit of modelling and policy development in that space. I need to advise you that the answer is not a simple one, but what we do know is that the communities of Queensland are taking an absolute passion for this agenda of clean energy and we are seeing that in the uptake of the Solar Bonus Scheme.

CHAIR: We have received quite a substantial number of submissions to this inquiry. More than half have suggested that we, as a government, heavily subsidise fossil fuels. Can you give the committee an idea on the level of subsidies the fossil fuel industry receives from the Queensland government? Are there any plans to review these subsidies as part of your development of policies to assist the renewable energy sector?

Mr Nielsen: In terms of the detail, I will have to take that on notice. I am afraid that is not my core area. My core area is focusing on getting clean energy agendas recognised and driven hard, but we can follow up on that and see what correlation there is. I suspect they are talking about subsidies to coalmines and the likes as well?

CHAIR: Correct.

Mr Nielsen: We will follow up on that.

Mr FOLEY: Mr Nielsen, you made a comment a moment ago that there was a passionate uptake of solar. I wonder how much of that passion has transferred to beyond the optimum subsidy amount. If you put in a solar PV system and have the bonus for the 1.5-kilowatt level, you get the maximum rebate so it will cost you less. What is the proportion of uptake beyond what gives you the biggest bang for the buck?

Mr Nielsen: I will answer this, but we can give you exact numbers when we track this. We are increasingly seeing people putting in larger systems than 1.5 kilowatts. In fact, the average is larger than 1.5. Just prior to this we were in a meeting with a proponent who is one of the largest providers of solar PV in Australia and in Queensland who told us that roughly 30 to 35 per cent of their sales are at two kilowatts or above. So we are seeing a trend to go above and beyond, but we can get you—

Mr FOLEY: Some of the ads I have seen tend to be a little misleading. The way I read the ad it almost says that the inverter could cope with 2.2, or whatever it is, but the panels are really—it is a bit of dodgy marketing. Could you make sure when you take that on notice that you do not include that dodgy marketing in the figures?

Mr Nielsen: We will get you the inverter size and what the customers tell us they installed—

Mr FOLEY: Because obviously if you have an inverter with the capacity of 2.2 but you have panels that produce only 1.5, it is not a true indicator of the uptake.

Mr Nielsen: Absolutely.

Mr FOLEY: With the thermal storage power station in Cloncurry and the problems that occurred there, why were those problems not identified earlier in the project as part of a normal risk assessment? What is the government's exposure to losses from that failed project? Further to that, what sorts of things have been put in place so that does not happen again?

Mr Nielsen: I will provide you with further detail on notice, but the system at Cloncurry is an R&D project. We have been at pains to point out that this stuff was not proven technology when we took on this agenda. We remain very committed to this agenda. The glare issue raised itself at the other test site in Lake Cargelligo and we have had Ergon, as our technical advisers, looking at it over the last few months. I think some of this stuff is a consequence of the technology evolving and the discovery of new issues, but there were processes through development approvals at the time with council that looked at some of these issues. But they are evolving and happening, and we are dealing with them as they arise.

Mr DOWLING: We heard from an earlier presenter that sufficient staff with qualifications are difficult to find. Can you tell us what strategies the government is implementing to ensure that we can get the staffing needs for the renewable energy sector?

Mr Nielsen: There are two components to that. One, I have seen a lot of evidence that part of this is an extension of existing capabilities and professions—so electricians that are trained up, plumbers that are trained up, things like large-scale civil works and how you design platforms for the large scale requires a spreading or diversification of existing industry. We are talking to universities quite extensively about how we are preparing our next generation of engineers, accountants and the like because this is a commercial agenda as well as an energy agenda.

As part of that, we have Energy Skills Queensland working with us on skills strategies moving forward, and that will be out in 2011. That is a piece of work we have been progressing for the last 10 months or so. We have a number of discussions occurring with industry and local governments on what we are seeing in terms of growth in clean energy skills. The way we see it, there are two things: diversification of what is already there—and we are seeing great potential to extend that—and we are trying to get discussions going about how you measure clean energy jobs, because currently there is no real measurement for renewable energy jobs. Putting those platforms in place is quite critical, as is ongoing consultation with industry about what skill sets are missing. We are aware that there are some. With some it is about getting skill sets into current professions, particularly in the installation area, because as you get scale obviously you need more people.

CHAIR: We have increased our renewable energy quite rapidly over the past few years. It is now roughly seven per cent of the market. Are you familiar with this paper titled *Beyond Zero Emissions*?

Mr Nielsen: Yes.

CHAIR: I am glad you are familiar with it. I have not read the entire document but I have read the synopsis, and I was interested to see the comments of learned people on it. Tim Flannery made a comment. Tim Flannery is, of course, a professor at Macquarie University's Faculty of Science and Australian of the Year in 2007. He says, 'This is an ambitious, technically feasible plan that should be looked at seriously.' They are suggesting that we can get 100 per cent of our energy by I think 2020. What do you think of that target? Is it realistic?

Mr Nielsen: I have read the whole document. I have also met twice now with the author, including in Sydney last Monday morning for two hours, to discuss how he will be working more with the OCE about helping us understand that vision. From my perspective, it is always important to have aspirations and visions. So it is to be given a great big tick for that agenda.

In terms of whether it is achievable and how it is achievable, there is a lot of discussion to be had, which is why I engaged with Matthew last week in Sydney to talk about the journey he will take with us in understanding how you could make that happen. In reading that document, there are significant barriers potentially if we do not address them, but theoretically that could be achieved. Cost is one area that you have to address and how that passes on to the community.

There are some technical challenges in there. The more important thing is that you have assets sitting out there already and how are you going to retire them if you had that kind of vision. It is a document on which we have already engaged with the authors and about which we intend to have a lot more discussion.

Mr RYAN: Of course the amount of money that government has available to invest in certain technologies and strategies depends on the relative priorities of government. There are significant funds available for clean coal technology research. One of the government owned corporations, ZeroGen, gets significant funding. I would like to know how much money the coal industry is putting into that technology in partnership with operators like ZeroGen and why the coal industry is not funding the full cost of that research and development, because ultimately its future viability depends on it being able to have some success with those technologies.

Mr Nielsen: I will have to take that on notice. That is not our area, but we will follow up on that and get you a response.

Mr FOLEY: Can you tell the committee the cost to the government of the current feed in tariff for domestic solar PV?

Mr Nielsen: We have previously covered that discussion. There is no net cost to the government other than the promotion at the moment. It is done through the distribution networks.

Mr FOLEY: As a follow on from that, we were talking before about inverters. One of my hobbies is residential wind power as a backup. If you have an inverter that is sitting there, is there any reason why, if you did not have a wind generator like they might have on a yacht which can form part of the framework of generating power, that cannot be coupled into that same inverter that has been used for solar PV?

Mr Nielsen: Theoretically there is no reason. We are looking at this energy storage issue at the moment. I understand the relationship between inverters, storage and dual fuel supply is not unfeasible—

Mr FOLEY: With or without storage, you still have an upramping of capacity if you are prepared to spend the money to do it.

Mr Nielsen: You also have a synchronisation issue between the two fuel sources. We are picking discussions up like that as part of technical reviews on the small-scale stuff, and it does look at the inverter and the way in which inverter standards will need to evolve in the future.

Mr FOLEY: The statement is often made, 'Wind would not work in Queensland,' but when I did a 50-year research on wind in Maryborough, which is the area I represent, albeit it was at the lower scale, it was above feasibility for mean average wind. I feel like the discussion has been lost a little bit in favour of building massive wind-generating plants, but I think there is tremendous potential for small stuff as part of the energy mix.

Mr Nielsen: You have absolute agreement with us on that agenda. We are talking with quite a few parties on the small-scale agenda. I am also a believer that, if people believe there is a reason why we can't, we will find a way to prove there is a reason why we should. With regard to the issue of whether there is wind in Queensland, there absolutely is wind in Queensland. How you extract value from that resource is the question we are trying to deal with, but we are on the same page.

Mr DOWLING: The clean energy commission has identified landfill gases as a renewable resource to generate electricity. What strategies are being implemented to encourage that as an energy resource? Why has it not been picked up and addressed in the draft waste management strategies?

Mr Nielsen: It is an interesting agenda. We have been looking at this for quite a while, and so have I prior to coming to this role. We have been working with the likes of EDL, other companies that are in this space and a couple of councils on this agenda. It is not just about the stuff that is in the dumps; it is also the organic waste that comes into those dumps and the potential of that. It is also the broader potential of what benefit that adds for network support if it is available. It is right in our midst. I have an individual who works on the waste-to-energy agenda. We expect that we will see a lot more discussion on this over the next 12

months. We are particularly looking at a couple of projects in general council. Councils on the Sunshine Coast in particular are showing a lot of passion in this space, and we are working with a couple in the north. The answer at the end of the day will come down to the reliability of the fuel source and the commerciality of the project. We are trying to find ways in which we extract value for multiple parties so we get commercial business cases. It is a big part of the future.

Mr RYAN: One of the messages we have received from the many submissions that we have received is the uncertainty that goes with supply contracts for renewable energy generators. Some say that without long-term supply contracts they cannot get the project across the line with financiers. I note that the Victorian government is doing a bit of work on it. It is committing to a greater share of green power purchase on long-term contracts. Are we doing any work on looking at long-term supply contracts from the point of view of the Queensland government, and further investment in the purchase of green power for government buildings or government projects?

Mr Nielsen: On the concept of needing longer term agreements and power purchase agreements, as per any commercial venture you want certainty for your investment. Again, it is another agenda that we are currently looking at, underwritten by the fact that you do not want to do it for just a short term; you want to make sure it is the way we do business in the future. Those discussions are occurring. In terms of time lines, it is yet to be determined as to where we will go with those. The issue of renewable energy and the commitment of the community to purchase it is as broad for government as it is for industry and residential customers, but we have seen quite a significant uptake in green power by residential customers in this state. I think there are about 250,000 Queenslanders now purchasing green power. I think that is the right number. Going forward, this has to be increasingly a part of the way we think about how we manage and use energy. Part of that is also about understanding where that investment is going to and making sure it is going to projects that will be sustainable and are outputting clean, green energy for a long time.

Mr RYAN: From your modelling, would you agree that if the Queensland government had a commitment to purchase 50 per cent of its power from green power sources that would get a few projects across the line, or are there some other considerations? Some of the submissions have said, 'If the Queensland government commits to purchase green power, that will get our project up and running and make it viable.'

Mr Nielsen: If anyone were to commit to that much green power then projects would become more viable. The question is: how many projects? That is the agenda for us. If you are going to aggregate load and put it towards a green energy solution, as we know Brisbane City Council are now, you are limited by how much energy you use. In the sense of that, that may be one project. Does that help an industry? So part of the issue is about how we aggregate total load in general. So absolutely we will get projects happening, but whether it is one or 101 is the agenda we are trying to deal with, because we are not interested in seeing one project only; we are interested in seeing an industry thrive.

Mr DOWLING: With green energy type projects like biomass and things of that nature, is there a role for your office in making recommendations to government to help facilitate the application process? That seems to be something that has come up systematically—difficulty in accessing grids for alternative energy sources and help to get through the assessment project, be it through DERM, Natural Resources or local government. Is there any strategy coming out from that area to help facilitate these kinds of technologies?

Mr Nielsen: It is not so much about a strategy; it is about a commitment. That is a large part of what this office is about and we do that regularly now. We formed a regulatory reform task force earlier this year or late last year, and we have mapped the full end-to-end view on how you actually get a project from concept right through to completion. We have a number of agencies involved in that. The Department of Environment and Resource Management has been a critical part of projects we are discussing at the moment.

We have a process—like a project manager or case manager role—whereby, when projects come in, we actually work with the proponents through that process and we are available to them. Where they are finding road blocks and they do not know where to go, our people will work with them to help them through that. We are doing that with a number of projects currently, including the flagship proponents that are working on the solar flagships and a couple of wind projects. The Birdsville geothermal project is one of the ones we have been working through. Agencies like the Department of Infrastructure and Planning and DERM have been very willing and supportive proponents of that. I would suggest that, rather than a strategy, it is just part of our function already and we would be welcoming anybody that wants to work with us for their own projects on that agenda.

Mr DOWLING: They say that time is money. What sort of time line—I appreciate that they are all going to have their own set of challenges—do you think would be an acceptable and reasonable time frame, from someone walking in your door with an idea to actually having it generating power? Is it a one-year thing? Is it a five-year thing? Is it a 10-year thing or beyond? That seems to be one of the sticking points for many people getting into this. They have this great idea but they are just worn out because they cannot wait 10 years to realise something.

Mr Nielsen: There are many components to that. It is a question of 'how long is a piece of string?' Today, if someone walks off the street and wants to put solar PV on something, as long as all of the approvals are in place and so on then it is reasonably quick to build those kinds of projects. But when you

are in new territory, with local government approval rules, environmental practices and those sorts of things, some of these do take a number of years. We are starting to hear about the likes of the solar thermal boost that is going in at Kogan Creek. Those time lines are two to three years from when you hit the button—and that is really working hard. So some of these projects are really three, four, five years and beyond.

Scale is a big part of that, as is whether it is proven or emerging technology or whether you have existing projects in places that we have already learned from. At the moment, scale is not necessarily a driver of that. It is the learning process that is determining the length of those. So we suspect that as we get more of these projects in—we are doing measurement verification—we will get a better indication of how long it should take to go through those processes. But unfortunately, it is a question about how long is a piece of string at the moment.

CHAIR: Are there any constraints on Queensland government agencies purchasing green power now?

Mr Nielsen: I have not been told and I have not asked that question, I am afraid. We will follow up on it.

Mr RYAN: Of course, through your office the Queensland government provides substantial funds to different projects and different operators. What mechanisms do we have in place to protect that investment? Do we often require some IP ownership or interest for the emerging technologies? Do we require a payback of that particular investment once those projects are up and running and viable? Is there any return that we are getting for the investment we are making in the renewable energy sector?

Mr Nielsen: The core essence of a lot of this stuff will relate to the individual contracts that are done in those areas. I would have to take a broad look at that to give you some indication of the types of things you would expect to see in there. The general drivers with the emerging technology are getting an opportunity to demonstrate that. Other projects are all about proving that this could be business as usual, which opens up opportunity for industries. So some of it is industry development; some of it is R&D.

In other projects it is about committing to the amount of emissions. So with the solar thermal boost project out at Kogan Creek, we have done an arrangement there where we are talking about a reduction of their emissions on that site. So it is not linked to solar thermal; it is how they go about a range of projects to deliver that. They are largely delivered on emissions reduction and performance at that site so that you actually can see that it is delivering something that is consistent with our ClimateQ targets and the like. So it will vary project by project.

IP is a very difficult one. I do not think we as a nation value IP properly. I think that is one of the things we are bringing into our discussions with all our parties: what are the right milestones and the right outcomes from contracts on these sorts of things? It is something we have a number of legal and contract people helping us with as we go through that.

Mr RYAN: It is important, I guess, from a public perception point of view that taxpayers' money is well spent and also that, where taxpayers' money contributes to some groundbreaking discoveries, there is a return to the taxpayer.

Mr Nielsen: And we are increasingly building that into the thinking on this agenda. With that also is understanding the risk that comes with emerging technologies. So we are right at the very front end of the learning curve, unfortunately, but we are confident that those sorts of considerations will be thought out going forward.

Mr DOWLING: Do you think there are opportunities in the future for the state government to exercise more of its call-in powers for some of these projects because they are significant projects and they are complex? In some respects, councils do not have the expertise and capacity to assess them and look at that bigger picture, as it were. Are there opportunities for government to enter into commercial arrangements with some of these—rather than just the grant mentality where they subsidise research et cetera—where they could actually get into a financier or banker type arrangement? Something may be commercially viable but the conventional banks will not invest money because of the time of the return and it is not necessarily a given or a known quantity; it is not like bricks and mortar. Are there opportunities for governments to have a role there in financing some of these projects—partnering?

Mr Nielsen: I will start with the first one. Could you restate the first part of that question?

Mr DOWLING: It was about call-in powers. The infrastructure and planning minister has certain powers to call in projects that are of significance, of critical importance et cetera. Are there opportunities for that power to be exercised more liberally in this type of area in the future? Are there strategies there?

Mr Nielsen: In relation to call-in powers, this government has demonstrated to us in the projects we are doing that it is extremely committed to the agenda. In the projects we are working on there is this intent as a government to demonstrate, through its ability to influence things, that there are opportunities to bring it forward for consideration. So, clearly, it is within the agenda that we would use what is available for briefing papers to bring up. We are starting to see some discussions happen. I think CopperString at Mount Isa has been declared of state significance. So I think we are seeing a demonstration that there is a government committed to that agenda and there is potential for that. The extent of that I cannot comment on. I think it is a project-by-project consideration. I know that in all the work we do we get a significant amount of support on this agenda to be able to look at all the options.

On the second part of that issue around the financing agenda, we are encouraging people to look at a number of vehicles for that. We have had discussion with the Carbon Trust about what is evolving with their model, about the potential for that group to attract funds for this kind of work as well. We, in some of our projects, are acutely aware that the upfront funding costs and the cost of those funds are critical factors in a lot of these projects. Again, it is another discussion that we have on the table. In terms of what the outcomes are, it is just a discussion at the moment but we are acutely aware that it is a factor in moving forward.

Mr FOLEY: It has been suggested that the government should do more to promote the opportunities that the 2020 renewable energy target presents. Can you tell us if the government has developed a marketing strategy to educate the energy industry to understand the scale of transformation required by 2020 and also the opportunities that it presents? Are you working to educate electricity users?

Mr Nielsen: On the concept of educating electricity users there is ongoing work, but on the concept of working with the industry on their education, that is a good point and I will take that on notice and come back to you with an idea of how we might evolve that, because I think that is a good piece of input for us. Thank you.

Mr FOLEY: This is obviously not your brief, but I thought I would get a solar PV set up on my roof, and when I rang the Office of Clean Energy they said, 'Have you had your audit done?' I said no. They said, 'Don't buy any solar stuff until you have your audit done.' I said, 'That's good. Sign me up for the audit.' I've been waiting for months and months.

Mr Nielsen: This is your ClimateSmart Home Service?

Mr FOLEY: Yes.

CHAIR: Get on to your local member.

Mr FOLEY: If I had a decent local member, I would! There seems to be a bit of a road block in getting those clean energy audits done in regional areas. Is that a fair thing to say?

Mr Nielsen: It is not our group, but we can put that question back and find out. My only comment on this will be that I am a big believer that renewables do not happen in isolation of energy management. So we have to have an end-to-end energy view on this. There is an absolute relationship between energy efficiency, energy conservation, demand management and renewable energy. The more we look to exploit that combined relationship, the more opportunities present themselves. So putting a PV on the roof does not make you greener; it is about how you use energy and being consciously aware of using energy. And how you then generate the energy that you need makes us a more sustainable community. So I agree with whoever said to you that the energy audit and PVs make sense together because it teaches us how to use energy but also makes us aware that we need to be respectful of this resource. We need to change the way in which we think about energy.

Mr FOLEY: Try telling that to my five teenagers! I need a second job to pay for my power bill.

CHAIR: That was well summed up, Greg.

Mr FOLEY: True.

CHAIR: I think that is it for the questions.

Mr Nielsen: Thank you for the opportunity. I just want to get across: this is a big agenda. We are having immense support, not only from within government. Industry and community are also engaging really well on this. The biggest learnings we are having out of this are that it is an education process. While some of this technology has been around for 100 years, getting it to be business as usual has been the hardest challenge we face and as a consequence we have not done that. What we are saying to people is that if we are all committed to this agenda now then we will do this. That is our absolute commitment on this agenda. We will do this in some form or another. The issue is: it is so broad, how do you get everyone's attention at the same time? We are striving to do that. If people bear with us, we'll be right.

CHAIR: We have that trouble with our own committee because we all have other commitments as well. I think this committee could honestly say that we could spend a lifetime on this subject and still be on a learning curve. Bearing in mind the fact that this committee is only a relatively new one, I think we have come a fairly long way in the short period of time we have been operating.

Mr Nielsen: This committee has done an exceptional job and it has been very helpful to our agenda. But, more importantly, if we begin to understand that energy is absolutely linked to economic development and we start to treat it as such, we see that quality of life, productivity and all of those sorts of things are linked to this agenda as well. So the more conversation we have on this agenda and the more we are focused on how energy and community evolve together I think we are going to get a lot smarter on this agenda and I think some of the issues we are struggling with now will just become so much simpler. So thank you.

CHAIR: Thank you very much, Greg and Benn. We will send you via email a list of those questions. As I said, we do have a fairly tight time frame. We would like to get the report to parliament by November, so 24 September is a reasonable cut-off we hope.

Mr Barr: Yes.

CHAIR: We thank you very much for your time here this afternoon. We appreciate the information that you have provided to the committee. We look forward to receiving some more and we really appreciate the information that you have imparted this afternoon. Thank you.

Mr Nielsen: Thank you very much.

CHAIR: We are now going to have an open forum. This is quite a new strategy. We are now ahead of schedule, so I can stop apologising now for being late. There are a couple of other people who have expressed an interest in saying something, so I want to invite those people forward. If you come to the table we will give you all an opportunity to at least have a short period of time to say something.

We have Calum Kippin from the Queensland Youth Environment Council on the phone. Sid Dyer is here, so I ask you to come up to the table. We have John Craddock from Clean Energy Australasia. Come on up, John. You are well known to the committee now. You have been here before. I also ask Lloyd Stumer to come up to the table because you have expressed an interest in saying something about wind, and we are experts now on wind. We can probably answer some of your questions, because we are actually quite impressed with wind, as well as other renewable energies. I also ask Marco Conti from Essence Energy Group to come forward because you also expressed an interest in having a say this afternoon to the committee.

Welcome, gentlemen. We will give you a couple of minutes to introduce yourselves and give a very brief outline of why you are here today addressing the committee. You can start, Lloyd.

Mr Stumer: I am Lloyd Stumer and in a previous life I was a senior scientist with the engineering and scientific division of the Queensland Electricity Commission, so I have a bit of history and background on the Electricity Commission. I also worked with the Commonwealth Bureau of Meteorology as a weather forecaster, so you are going to believe everything I am going to tell you! We are trying to start a wind farm in North Queensland, so I am very familiar with the pitfalls of the renewable energy situation in Queensland at the moment. I have 10 quick points—not just on wind—but I would like to bring up these 10 points because I think they are very relevant.

CHAIR: I think we might do one at a time; it might be easier, because we have a couple of questions on wind that we would like to ask you now that we know who you are. How big is this proposal and how many turbines are you proposing in this?

Mr Stumer: We made representations to the Queensland government to have 6,000 acres of land set aside at Archer Point just south of Cooktown which would bring up to 250 to 300 megawatts.

CHAIR: How many turbines can you fit on that?

Mr Stumer: Around about 100 turbines.

CHAIR: That is an extremely large wind farm.

Mr Stumer: It is a major wind farm.

CHAIR: We have heard that there is a problem in that when you put the application in to council, which up there would be I suppose the—what is it?

Mr Stumer: The Cook Shire Council.

CHAIR: Okay, the Cook Shire Council. They need to know, as part of that application, exactly where these wind turbines are going to be situated on the land. Is that correct?

Mr Stumer: Yes. Actually, the Cook Shire Council are very much in favour of this project and just yesterday they were down here talking to the Department of Infrastructure and Planning trying to get this wind farm project kick-started.

CHAIR: That is a good sign if you have the local council on side, because I heard there have been some difficulties with the applications and I just wondered whether you were having the same problems, but you are obviously not having the same problems.

Mr Stumer: No. This is the best site in Queensland. Actually, I say that as a meteorologist. This is where the strong south-east trades hit the coast. You get very high capacity factors up there.

CHAIR: What are you looking at the government to do—go into partnership with you—and are you looking for council money as well? How is the funding going to be achieved?

Mr Stumer: Okay. We had an agreement with a German consortium to build this wind farm. We put a submission in to Geoff Wilson when he was the minister for the department of energy to build this wind farm at Archer Point, so we gave him a price for the power that they would need to meet. We were hoping by supplying green power to the Tugun desalination plant that the Queensland government would get $100 million from the federal government that was offered for green power, but the wheels fell off the whole project and we are trying to get the government to put the wheels back on, and they can very quickly put the wheels back on the project.

CHAIR: Have you put in a submission to this inquiry?

Mr Stumer: I did not put a submission into this inquiry. I made a submission in 2006 to the department of energy on renewable energy which I will submit to Rachelle.

CHAIR: If you could send it to Rob or Rachelle, that would be fantastic. We would appreciate that.

Mr Stumer: Actually, that looks at not just renewable energy. As a senior scientist in the Electricity Commission that was about referable things on the biomass potential, on the wind energy potential, in Queensland. There is a lot of information out there, and that submission tried to bring all of that information together into a reference type document.

Mr RYAN: Lloyd, just so I am clear in my mind, what is the obstacle to this project proceeding?

Mr Stumer: If we can keep this sort of in-house here, the obstacle—

Mr RYAN: Let me say that this is a public forum, so it will be on the public record. So if you are going to say commercial-in-confidence stuff, be careful.

Mr Stumer: There are a couple of commercial-in-confidence issues that the government is very well aware of, but I am very willing to speak in private to the members of the committee on that because I think it is probably best if they are kept off the public record.

CHAIR: Thank you very much. I call on the next speaker, Marco Conti.

Mr Conti: My name is Marco Conti. I am a director of Essence Energy Group. Essence is a company that has been endorsed by the Queensland government as a sort of flagship. We proposed a 170 megawatt PV solar system distributed in Toowoomba, Redlands, Mackay and eventually Cairns. We are a spin-off of a land development company, so we already own the land and we would be technically ready with investors. I would like to answer a direct question of the committee about what we have to do to bring investment to Queensland from overseas. We had meetings with our banks last year in Europe and the banks in Australia. In Europe there is a monetary mass of about €90 billion available for investment in energy. However, there is a level that determines if the money comes here or not. I will try to explain better. I apologise because I am bilingual.

Europeans would be available to invest in Australia, but they need zero risk and they need at least a 14 per cent internal return on the investment. Australian banks could work with a 12 per cent internal rate of return on the investment. This means that in PV solar, wind and thermal solar we need a commercial feed-in tariff because without a feed-in tariff it is impossible to pay back an investor. We are strong supporters of the feed-in tariff, and I bring to the committee the example of Germany. There are fascinating documents that nobody talked about, and I refer to a report of the German ministry for energy. There is a 2010 report on the state of renewables. Amazingly, we discovered that in only eight years Germany from 1999 to 2007 developed 14 per cent of the energy share in renewables with a feed-in tariff and they had only a 5.5 per cent or 5.6 per cent increase in the cost of energy.

We have to consider at the macro-economic level not only the mere increase in the cost of energy but also the beneficial effects in the community that increase purchase power, that increase salary level and the reduction in many social costs that are not currently considered in this kind of economics. So I think that the commercial feed-in tariff is the way to boost the renewables and to achieve targets above 20 per cent, but we need a commercial feed-in tariff. I would move away progressively from the grants system, which is I think—I do not know if I can use this term—distortive of the market and we leave the market to self-regulate with a feed-in tariff.

In terms of giving an answer as to where there is the best value for money, I think the best value for money is in photovoltaic, in wind and in thermal solar and in some geothermal applications where the structure is close to the surface because that is reasonably achievable and technically controllable. The member for Maryborough asked about cutting-edge technologies in PV solar. Last week the MIT announced a new solar cell with up to 100 times energy density than silicon cells. This is a technology based on a nanocarbon. I think that this technology can be rolled out very quickly in a few years because it is based on processes that can be implemented industrially quite quickly. So where is the best money? I think the best money is clearly in solar, wind and thermal solar.

CHAIR: We might have to just stop there to make sure that everybody has a fair go. John, I am sure you have a slightly different viewpoint.

Mr Craddock: Yes, just slightly different. One of the things that we have heard at the public hearings is that there is an abundance of renewable resources available to Queensland. They are all in different states of maturity and different processes or different policies that are adopted by governments will encourage one or another in a probably perverse way that brings more mature industries up the front and leaves the less mature industries to languish behind.

The other issue in relation to all of that sort of stuff is that each type of technology that is available or each type of resource that is available has different attributes to it. We have heard today that there is wind, there is solar, there is geothermal. Some of it is intermittent, some of it is baseload and there is a mixture that is required for the market to be matched. We can also try to cover off the market issue in some way or modify the market issue in some way by demand management and energy efficiency and that sort of thing. We can change the process and the profiles. It is all a very complex interrelationship that is going on and to filter out the best way to go in the future requires a really detailed analysis of what the benefits and costs and attributes of each source is. The other issue in relation to all of that is time frame and how quickly you can do it by and whatever can be done. That in itself can be distorting to getting to the final point of your 100 per cent total renewable energy in the aim of the thing.

In relation to this committee, it is called renewable energy but it sort of has a secondary effect. One is carbon abatement. Renewable energy is couched across a much broader range than carbon abatement. For instance, bioenergy does not actually pull carbon out of the atmosphere; it just recycles it, whereas geothermal energy actually pulls, or replaces any sort of carbon production. So it has a different sort of attribute to it in terms of what our total aims are. I guess our total aims are to stop global warming and all of those sorts of things that brought about the idea of bringing in renewable energy. My thought process is that where we need to go to is to really examine the attributes of each source and try to put it into a mix that creates what the community wants.

CHAIR: We will come back to you, because you have summed that up very well. Sid, would you like to make an opening statement, please?

Mr Dyer: Thank you very much. First of all, I would like to apologise for David. He is on jury duty. He would have liked to have been here. He alludes a little bit to my part. I unfortunately cannot answer the questions that David had, but he and I have worked together for the last 2½ years on another alternative, that being a submersible power generator. I must confess at this stage that we do have commercial-in-confidence, but I am happy to talk to the committee separately on certain issues. There are patents pending, but basically the unit is set out in the deep ocean current. It will be installed, in this particular case for the power we are looking for, in water that is approximately 200 metres deep and we are looking at going off Stradbroke Island, which will put us about 40 kilometres east of Stradbroke Island in the eastern current.

We have been having negotiations with CSIRO for some years now and there are other models that we have. We have a river model and a tidal model. They would be in general size between half a megawatt to five megawatts. The ocean units, particularly for Australia at the moment, would maximise out at five megawatts. We would look at developing an ocean farm with about 25 units to 50 units bringing the power in. We would have a single cable coming in.

We have looked at conversations with the department of marines and harbour. Most of that cable will be trenched and buried to bring it in. One of the things that has been alluded to by just about most of the speakers is the hurdles that one has to go through. In my situation that I have been going through we have some 33 different regulations that we have to look at. The thought that was being put by Peter Dowling MP is to try to find a department that will consolidate this and I have to say that DEEDI has been helping me. They actually identified all the hurdles within the state and, of course, all of a sudden I go beyond three kilometres of the Queensland ocean and so I now become federal and I have those somewhat similar situations.

There is a proposition that, because this is the first of this type of installation in Australia, which will be baseload current 24/7, we are trying to guide it as a total template controlled by DEEDI helping us to get it through, cooperating with the feds, because they do have not a clue. They have never licensed a generator and our generator is in the federal domain. The fact is that we hope that we will be in a situation to come over the horizon within six months. Coming to the question of funding, that is an issue that we would like to address. We would welcome the state government as a participant partner in it. The unit has a 25-year life expectancy.

CHAIR: Can you just describe the unit, because I cannot get a visual picture of what this thing will look like. Just give me a bit of an idea very quickly.

Mr Dyer: Very simply, imagine a submarine back to front with the impellers driving the generator rather than the propellers driving the submarine.

CHAIR: Yes.

Mr Dyer: It is tethered by three anchor lines.

CHAIR: So it is fully submerged.

Mr Dyer: It is fully submerged 200 metres below the ocean, thereabouts.

Mr FOLEY: It is a fan in reverse.

Mr Dyer: It is virtually in reverse, but it is anchored. It will not move. The impeller will not rotate faster than the actual current that is there. Hence one of the reasons of being involved with CSIRO. They need to do an ocean survey and data collection that will probably go over 12 months to work out what the average current will be, because the current will dictate the diameter of the impeller. Remember that the energy coming from the ocean is 18 times greater than that of wind. So one knot current is equivalent to an 18-knot wind.

CHAIR: So it is a constant thing. So it is baseload power as opposed to—

Mr Dyer: Yes, very much so. At this stage, we have been talking to Energex. One of the things that we see of benefit is that we will be following the coastline and we have some hurdles, because of heritage areas and so forth to overcome, but once the cable is laid it is going to cause no hassle and we can help with some of the capital involvement in the grid by bringing power in. In this case, we can bring it straight into Redlands through Stradbroke Island and Surfers Paradise at Broadbeach and so forth. So we are going straight into the demand area.

CHAIR: As a committee we would probably appreciate a bit more information on your proposal. So if you could send us some information that would be really good.

Mr Dyer: Yes.

CHAIR: It is the first I have heard about the project.

Mr Dyer: It is. I was in Canberra three weeks ago and they could not even imagine what it was like.

CHAIR: I think we could. We might open it up now to questions, if that is okay.

Mr DOWLING: Can I start with the last one, because it is close to home? In relation to the ability of this technology, first of all, has it been trialled, tested and proven anywhere in the world?

Mr Dyer: It has been fully tested by Alden, the largest hydraulic testing station under US government supervision. It is highly favoured by the US EPA as the product that produces the least damage to the environment.

Mr DOWLING: That eastern current that you referred to that drives it, it has similar applications from the top of Cape York to the bottom of Australia, or is it something that is specific to Queensland?

Mr Dyer: We appear only to be able to tap into it out from Fraser Island because of the Barrier Reef heritage marine park. We would have to go out to about 120 kilometres to get into the open current. The tidal units would be far more beneficial in between the islands where the velocity is quite a bit higher and we could run it on that basis. The disadvantage that we have is, of course, you have that ebb tide situation but, other than that 40 to 50 minutes a day, it is constant.

The river one is in actual fact ideal. In fact, one of the areas that it is going into is the Third World, where energy costs are high and difficult to get but they do have these rivers flowing by and we have some opportunities I think in Queensland.

Mr DOWLING: I think when you were explaining it you said that one unit generates five megawatts.

Mr Dyer: It will deliver five megawatts at shore.

Mr DOWLING: You were going to have farms of 50 of them sort of banked together somehow. Does that translate to a 250-megawatt plant?

Mr Dyer: Delivery, yes, and the cable size is a 250-megawatt cable. It has been specifically designed for this application. It also has fibre optic cables for control of the product.

Mr DOWLING: Thank you.

Mr FOLEY: Marco, you mentioned a 14 per cent internal rate of return. It strikes me that that is relatively high, given the current economic situation. I could go and borrow some bank bills and take the 14 per cent return if it was available as an investment. Have you looked at the exchange rate variations on that?

Mr Conti: Yes. When I say 14 per cent, I mean 14 per cent before tax, including the 2, 3 per cent spread that covers the risk of exchange between the two currencies. Australian banks could work, I think, between nine and 12 per cent, because if we revert to solar, solar is a very low risk because we know when the sun rises and the sun sets. So we can predict with an accuracy measure of 0.5 per cent the energy production. So it is a financial investment.

Mr FOLEY: So could you then have a situation where those less potentially hazardous situations like solar then have a lower internal rate of return to be guaranteed?

Mr Conti: Sorry?

Mr FOLEY: You just said that solar is very reliable.

Mr Conti: Yes.

Mr FOLEY: Because the sun comes up and the sun goes down. If that is the case, could you then split your portfolio into that renewable energy that is not as risky and maybe not need as big a rate of return, because 14 per cent sounds very high to me in the current economic climate?

Mr Conti: I think that it is possible to have a portfolio of different renewables. If I were a private investor, I would put money more into solar, into wind and do very well on my calculations, because the power of wind drops with the cube of the speed so minimal mistakes would put it not to zero, but to 10 per cent of the prediction. Then with solar, because we have a great solar source, this is where I would put in very short term my money. Fourteen per cent is not really very much, because if we consider the grant system managed by the federal government rather than the state, these grants, if we see where the money goes, it goes to China.

Mr FOLEY: I see what you are getting at.

Mr Conti: So it does not stay in Australia. So 14 per cent is very little.

Mr FOLEY: So you are saying, as an alternative to mass subsidies on solar, let the market dictate.

Mr Conti: Yes.

Mr FOLEY: With that exchange rate variation, does the company that you represent just buy options on the dollar? Does it have like a hedge fund arrangement to cover that?

Mr Conti: Yes, yes. However, I think that we could go down to nine per cent, 10 per cent, as an internal rate of return as a warranty to investors, which is very acceptable

Mr FOLEY: It depends on whether you are trying to cover the business risk or the currency fluctuation risk.

Mr Conti: Yes. You could have also a new policy, I think, where solar farms could act also as energy buffers. We have a big floating price between peak time and night-time, but a very complex regulation does not permit smaller companies or solar farms buying energy on the spot market in the night and reselling in the day covering the cost of energy storage. It would be interesting to study more in detail what could be done in terms of policy to permit in a distributed energy system as solar farms of about 20 megawatts, which is an optimal size—it is an economic size of a solar farm—to act as a buffer storing energy in traditional or more advanced kind of batteries so to release energy between 8 am and 11 am when the sun is quite low on the horizon and does not permit that activity and from 3 o'clock to 6 o'clock.

Mr FOLEY: We just need to extend the Premier's extension lead up to the Northern Hemisphere and we will sell you our power when it is dark up there.

CHAIR: Thank you very much, gentlemen. There are a few other people that we would like to come up. We do really appreciate your time. I am sure you are all looking forward to our report, which of course will contain a number of recommendations to the state government on renewable energy and where we go from here. Thank you for sharing your information with us today.

Mr Conti: Thank you very much.

CHAIR: Our pleasure.

CHAIR: Hopefully we are going to get Mr Kippin on the phone. Good afternoon, Calum. We have just had a session, and we are about to have another session, with a group of people representing various companies giving us some insight into what they do, and we would like you to do the same. Calum, you are representing the Queensland Youth Environment Council. I might ask you to start. Could you give us a brief outline of what you do and then we will do the same with the three other gentlemen we have on the panel here this afternoon.

Mr Kippin: I am the deputy chair of the Queensland Youth Environment Council, and the council is an advisory body for the Queensland government. The idea is that we provide a youth perspective on environmental issues to ministers Kate Jones and Geoff Wilson.

CHAIR: Would you like to make a brief opening statement and then we might open it up to questions?

Mr Kippin: Certainly. One of the key issues I would like to put forward today is that expanding the renewable energy industry is a really pertinent issue to young people. We have conducted some research in a survey that we called the youth and environment survey in partnership with the Department of Environment and Resource Management and the University of Queensland. What we found is that young people of all ages, particularly 12 to 24, have indicated that renewable energy is one of the three key ways in which they feel like the government needs to be addressing the environment. So for young people this is a enormous issue that we feel needs addressing.

Obviously we are very aware of the issues and problems that arise at this point in time for the renewable energy industry, not the least of which is cost, particularly for uptake at a household level. From a youth perspective, again, based on this research that we have done, we are finding that, while a lot of young people particularly aged 18 to 24 are keen to do what they can and they believe that on an individual basis they can make a difference, at this point in their lives they are forced to take into consideration saving and the cost problems that arise from this. So we feel it is crucial that the government continues to support rebates that make this more affordable.

Other issues that have come up include the inconsistency of the rebates which have made it really difficult for the solar and renewable energy industry itself and for consumers who at this point appear to be quite confused about what is available, who it is available from—with the complexity of some from the state government and others from the federal government—and whether or not they are eligible to be a part of this and to receive these rebates. Also, long-term and very public support from the government of renewable energy, we feel, needs to be improved. There are issues around a lack of a renewable energy target, which we would like to see brought in; a lack of marketing of the renewable energy initiatives that have been used; and inconsistencies, as I have mentioned, with the solar rebates which create a lack of clarity about how serious the Queensland government is about supporting this still relatively new industry and showing that it feels that it is the way of the future for the energy industry.

CHAIR: Thank you very much. Now I would like to hear from Seqwater.

Mr Mortimer: I have prepared a few statistics that supplement our submission. I will hand those to you. Seqwater, through our strategic plan, really focuses on our role in the grid—which is about supplying secure, sustainable, cost-effective, high-quality water from South-East Queensland water catchments. Achieving this long term, our key focus is ensuring that the catchments are developed sustainably. While on the face of it you would say our interest in this is about hydro energy—and obviously we do have an interest in that—in some ways what is even more important is that the sorts of developments that occur within our catchments are water sensitive. We think renewable energy is potentially a highly compatible

development within our catchments, but there may be some forms of development which are not compatible. If you like, the crux of our submission today is that we are looking to get support for strong, compatible, water sensitive developments within the catchment.

Referring to the table on the piece of paper, the first thing is that broadly our processes are source, store and supply—sourcing from greater than 1.4 million hectares of which we only own about 62,000 hectares, of which 20,000, or about a third, is underwater at full supply. So we have very little control of most of our source water. We store through, as you can see there, 25 dams and 47 weirs and then supply through largely 46 water treatment plants. When we talk about treatment in Seqwater, we talk about treatment right from source through to supply. One of the points we made in our submission is that there is growing evidence that the further upstream you treat, if you like, or manage water quality, the greater the benefit of it is. When we talk about greater benefits, we are talking particularly about energy. If you look at the costs of water and correlate that with the level of forestation of catchments, there is a strong correlation. So the greater the forestation, the cheaper the cost of water treatment at the end point, if you like, at our supply area within the water treatment plants. We are looking for a range of developments and influences on developments across our catchments which are increasingly water sensitive.

This is becoming a fairly key area of policy in parts of the world. The so-called water energy climate change, or WECC, nexus is significant. There is a lot of research. Over the last 12 months we have been monitoring that research. There is an increasing body of knowledge now about the complexity of that relationship. While on the surface, water and energy are inputs and potentially waste outputs from each other's major processes, we are increasingly seeing that there is a much greater complexity. I suppose that is what we are saying about our catchments: if you push that relationship back up into the catchment, it becomes potentially much more relevant and complex.

In the table here we have talked about our current stake in renewable energy which is very small obviously. We have some hydro capacity and some solar on some of our sites producing largely energy supplementing our own sources, but we are contributing to the grid in a very small way. But we do have a vision for our catchments which is about water quality fundamentally. That is the lens we look at our business through, but it is also saying that there are win-win opportunities, if you like—compatible development opportunities in a range of areas when we look across our source, store and supply components of our catchment.

We have talked about solar capture. Obviously there is a lot of area there, and potentially solar capture is something which we can expand. We have done some research on biofuels for aquatic weeds harvest. It is a bit marginal at the moment in terms of its cost competitiveness, but there is a resource there which is of the type we are talking about. Potentially there are water quality benefits but also other benefits which can help us with the efficiency of delivering our services. We have some research partnerships at the moment that are looking at methane collection from dams as an option and how you can capture that. Dams develop a significant amount of methane through an anaerobic decomposition.

Obviously we are looking at hydro and, within that capacity, looking at the opportunities for pump storage. There are sites within our catchments that have been identified as potentially available for pump storage, particularly storage of climate dependent or weather dependent renewable energies. Perhaps this is not directly within the scope of your inquiry, but we do have opportunities for environmental restoration in ways that provide carbon offsets, bearing in mind that we would be looking at environmental restoration which also contributes to biodiversity. We do not think we would be interested in monocultures, certainly not on our land anyway. That is an example where with that sort of development and potentially with other forms of biofuels we would be very keen to see a holistic approach to water take place. Yes, there might be an energy benefit but we also need to look at the downstream benefit. Is it going to increase sedimentation? Is it going to increase nutrients which are going to bump up the cost of water production? What is the net benefit for the community?

Our catchments are complex things. We are still building the knowledge. We would like to be able to come to this committee and quantify some of the things we are talking about. We are a new business. It is going to take some years to do that, but that is our aim. That is where we are heading with the business, to build that level of knowledge of our catchment so that we can provide that level of input.

CHAIR: I am mindful of Calum. I just want to make sure that the committee did not have any questions for you because then I could let you go.

Mr RYAN: Calum, I have two questions for you. The first relates to your proposition that young people are not well aware of what different levels of government are doing from a renewable point of view. As you may know, the Queensland government is doing a fair bit when you think about the ClimateQ strategy, the Office of Clean Energy and the hundreds of millions that are being spent on renewables. What is your idea or does the Queensland Youth Environment Council have any ideas about how to better sell that message to young people?

Mr Kippin: For starters, I do agree. In researching this I have realised that there is a lot going on. But my own initial lack of understanding of it just shows how poorly I feel that message is getting out there to young people and to the wider community. I feel that the internet is the obvious first place to go to for targeting youth and interactive opportunities on websites that discuss the options that are available—

whether they are in rebate form, whether it is just helpful information and tips about renewable energy. The internet is obviously going to be your primary starting point, more so than some of the other resources to target other demographics with.

CHAIR: We will make sure, Calum, that we send you a copy of the government's submission to this inquiry.

Mr Kippin: That would be fantastic.

CHAIR: It is quite practical in that it does list everything that the government is doing and it is in quite a simple format.

Mr Kippin: I do think that is important. As I said, there is no doubt that actions are being taken, but I think there is difficulty at the moment in cutting through to all areas of the community. A perfect example of this—and I know that this is not entirely the state government's responsibility—is the Solar Cities program. I am up here in Townsville, which is Queensland's only solar city, and there is not a lot of community awareness that we are a part of that program, yet that is going on in this city.

CHAIR: We, as a committee, have actually been up to see your solar city and Magnetic Island and we are quite impressed.

Mr Kippin: Yes. Some great things have happened with that but I think the community is not aware of what is going on. This is just one of the many things that, as you say, are being done but it is not cutting through to the community, unfortunately, that those options are available.

Mr FOLEY: I would also put it to you that the people who briefed us on it grossly exaggerated the take-up rate that was there. I suspect that might have had something to do with justifying the funding. We were led to believe in a briefing that there was a massive take-up, but when we queried the figures he said, 'No, that was just people who wrote for expressions of interest.'

Mr Kippin: Yes. From what I can tell as well, it has been very concentrated in the area of Magnetic Island, which is great but it is a small area. Even if the message could come across to more people, then you would start to see that we have a government that really supports this industry.

Mr FOLEY: The message coming across was reported as a purchase just about. I was a bit cynical about that.

Mr RYAN: In your presentation and submission, you talked about the need for the Queensland government to have a Queensland renewable energy target. I think you have suggested a 25 per cent target.

Mr Kippin: Yes.

Mr RYAN: I want to get some thoughts from you on how incentives or mechanisms can be put in place to encourage that target. Of course you can have an aspirational target but, without the relevant pricing mechanisms or subsidy programs in place, it would be very difficult to get the private sector to actually implement things to reach that target.

Mr Kippin: Absolutely, and that is an issue that would need to be addressed. The first thing I would say is that we clearly want that set target to be met, but it is just an initial way of the Queensland government very publicly saying, 'We support this industry. This needs to happen. This is the way of the future.' I think straightaway, from a public relations perspective, that is important for the industry. It is showing there is strong support there.

As for how you could go about initiating how to get involved with this, I think it is important to make sure that households themselves continue to be brought into this opportunity. I know that does happen with the Australia-wide energy credit system, but I think that is the key area—getting individuals and households on board to give them the opportunity and the incentive to take this up. From there, you can start to have a flow-on demand effect throughout the wider industry.

Mr RYAN: Thanks.

Mr DOWLING: You said that the youth see this as an important issue. By your own admission, you said that you were not actually aware of how much the government had done to date until you researched this in your role as deputy chair of the Queensland Youth Environment Council. The youth see this as important but it is secondary. They are young—and the age range you referred to was 12 to 24—so they think it is important but it does not keep them awake at night. It is something that they see as topical, but they do not necessarily have a burning interest in this. So how do we make it relevant? I know you said the internet but how do you make it relevant? I have had teenage children and it is very hard to get them interested in anything other than cars, girls or boys, getting through their studies et cetera. How do you make it relevant?

Mr Kippin: For starters, I would like to point out that our target for the survey was 12 to 24 but we did that in two groups—12 to 18 and then 18 to 24. Even in the 18 to 24 age range, which is where obviously you are more realistically starting to look at young people who can potentially consider renewable energy options, it is still 70 per cent of people who think renewable energy is an important step for the government to take.

In terms of how to get them interested, I think public awareness and value behind this issue for young people is increasing as they appreciate possibly better than other demographics just how important the issue of climate change is. The key thing though is that there is this attitude that, as much as they believe—and our data shows that they believe that we can make a difference as an individual—the price is going to be too far out of their range to make it a viable option.

I think there could be some kind of rebate or targeted schemes for young people, and one example could be young people who are renting. That is a clear issue given that, in a rental situation, the landlord pays for the infrastructure and the tenants benefit from having it so there is no incentive for landlords to provide that opportunity to renters, many of whom are young people. Another example could be targeting new homeowners, who are more likely to be younger. If there can be some way to target young people with a real opportunity to make this a cost-effective plan for them, then I think you will start to see them getting on board with it. At the moment, the real issue is that they are disenfranchised with it because they feel it is too expensive for it to be relevant for them. As much as they would like to help, it is an issue for other people.

CHAIR: Calum, I thank you most sincerely for being available this afternoon. We really appreciate your input and look forward to talking to you again.

Mr Kippin: Thank you. Good luck.

CHAIR: We will now hear from Ed Parker from Sustainable Jamboree.

Mr Parker: I appear before the committee as a representative of Sustainable Jamboree. I am standing in for our group's convenor, Ngaire McGaw, who unfortunately could not attend in person today due to a prior commitment. Sustainable Jamboree is a local group operating in the Centenary suburbs and surrounds, taking its name from the Brisbane City Council ward of Jamboree from where it originally sprang in 2006. We also happen to be in the electorate of your fellow committee member, Julie Attwood.

Amongst its objectives, Sustainable Jamboree seeks to respond to community concern about impending climate change, environmental degradation and loss of biodiversity. We seek to do that through, firstly, encouraging and where possible empowering local residents to reduce their individual ecological footprint and, similarly, encouraging local businesses to adopt sustainability as a corporate value. Sustainable Jamboree does this through a program of seminars, events, creating partnerships and undertaking activities, such as the state government's low carbon diet initiative which we led the way on in the south-western suburbs of Brisbane. A current exciting initiative of ours at present is establishing a local buying group for electric bicycles because there is a need and a yawning gap for people to take greater participation in mode shifting their local trips from vehicle to bicycle. We see a lot of evidence of that already.

I have elaborated on that because, although we are only one small community voice—we are a local grassroots group—we operate under the adage of 'think globally, act locally'. We are just one example of many such sustainability and climate action groups that are springing up throughout Brisbane, Queensland and Australia—things like the Transition Towns movement that you might have heard of. Rest assured, there is growing support in the community, as evidenced by the emergence of these grassroots groups, for governments to actually bite the bullet on the causes of climate change and move the community to sustainable lifestyles and a clean energy future.

Just yesterday, polling released by the Australian Conservation Foundation found that 85 per cent of rural respondents and 82 per cent of urban respondents want the government to 'make clean energy cheaper quicker, through large scale development of solar, geothermal and wind power in urban and regional Australia'. The Sunshine State can use its natural advantage of high solar access and other clean energies, such as wind, to move to a clean energy future.

Combating climate change is often inappropriately touted as a cost to the economy but, as Nicholas Stern stated at his recent Press Club talk, the cost of inaction by Australia may well see adverse trade implications for us in the future—something that is very pertinent for us in Queensland with our reliance on coal exports. Stern is quoted as saying —

Not participating in this new industrial revolution runs two types of risk: You drop behind technologically and you risk, not tomorrow or the next day but 10 or so years from now, finding real difficulty in the trade story. Ten or 15 years from now, those that produce in dirty ways are likely to face trade barriers.

Our own Australian Conservation Foundation, in concert with the ACTU, has published a comprehensive report, *Creating Jobs—Cutting Pollution: The roadmap for a cleaner, stronger economy.* To focus in on the Queensland picture, that report suggests that Queensland could gain 165,000 new jobs in a clean energy future.

Sustainable Jamboree has taken the opportunity to make a written submission to the inquiry, dated 25 June. I will not go into the submission in detail, but I want to point out one recommendation, amongst our other recommendations, relating to the *Zero Carbon Australia 2020 Stationary Energy Plan*. It is a highly regarded research collaboration that demonstrates how Australia can transition to 100 per cent clean energy production by 2020. The assumptions incorporate only proven and commercialised technologies, and they estimate a required capital investment of only three to 3½ per cent of GDP over the next 10 years to achieve that. Amongst the plethora of documentation, at least this is one comprehensive,

very current study which is not about blue sky technology or flying kites. In fact, I wish to draw the committee's attention to, if you are not already aware, the forthcoming Queensland launch of the *Zero Carbon Australia 2020 Stationary Energy Plan* which is happening on 27 October.

CHAIR: Whereabouts?

Mr Parker: At the Brisbane convention centre. I have a copy of the notes and some of the links and references which I can leave. With your liberty, I am happy to leave some copies of the jobs report, if you have not seen that, and also ACF's *National Agenda for a Sustainable Australia*.

CHAIR: Thank you. We would appreciate that.

Mr Parker: Just following on from Calum's comments and your questions about engaging with younger people, I happen to know that the Australian Youth Climate Coalition, AYCC, is doing a lot of stuff with young people. If you are not aware of that, it is an avenue to pursue. Thank you for the opportunity to address the committee.

CHAIR: Thank you very much.

Mr RYAN: I have not seen the ACF survey that came out yesterday. From your experience with activism in the Jamboree area, I imagine the response that people want more access to renewable energy sources and green power is probably pertinent in the Jamboree area, as well as from those results of the ACF survey. Is there any indication that people are willing to pay more for their electricity? If they want renewable energy, are they willing to pay a bit more for it, or do they want the taxpayer to effectively make up the difference to make that renewable power available to them?

Mr Parker: Following on from Chris's question and cynicism before about the Solar Cities in Townsville, I guess there is great interest in it and it is a matter of translating that interest and actually shelling out the investments.

If I can respond on a couple of points. First, I happened to sit in on a focus group recently where people were asked what they thought of the current government's approach to a clean energy future. These were people who were in the mid-range—the soft environmental voters who were not hard extremists on the one hand or totally complacent on the other. It was interesting that they actually want government to be credible. In terms of the whole issue of that greatest moral challenge, they saw a need to go along that path but then suddenly that fell in a heap at the federal level so they are left confused. That is probably one important factor: you need a consistent message and follow-through.

The second aspect is that there is a lot of confusion, even for those of us who try to keep tabs on it, about what are the current rebates and subsidies. Certainly, there is advertising in the local press and elsewhere, with opportunities to get a 1½ kilowatt PV system for very little dollars. I am sure we will be seeing more and more sales of PV cells, but obviously solar hot water is the first option that we recommend people pursue.

Mr FOLEY: Everyone wants it, but not everyone wants to pay for it.

Mr Parker: I grant that that is an issue, but government policy needs to keep educating the community and maintaining and reinforcing a clear message as to what is available.

CHAIR: I will make sure that you get a copy of the government's submission to our inquiry.

Mr Parker: Thank you.

CHAIR: It might be a practical document for some of your members, because it lists in simple form everything the government is doing. They are going like hotcakes today. I had to photocopy more.

Mr Parker: Thank you.

CHAIR: We did not get a chance to ask Seqwater any questions. We do not want them to get off lightly.

Mr DOWLING: In your submission you have done some investigative work, albeit fairly preliminary, on the aquatic weed. I have seen and heard about this technology, but I do not have a big understanding of it. Is there anywhere in the world where it is developed that you are drawing from, or is it still an emerging technology? Do you see it as a solution to issues like blue-green algae, which is a problem in a lot of large storage dams?

Mr Mortimer: This is why I brought Adrian. I will put him on.

Dr Volders: I am the Manager of Asset Policy and Strategy at Seqwater. We have a large aquatic weed problem at Seqwater. Cabomba is one of the weeds that we have to remove. We might remove 1½ tonnes a day in some instances when it is growing heavily. At the moment that goes to landfill. We also have huge problems with salvinia and water hyacinth. They are huge water quality issues as well as big problems, because in a water supply the last thing we want to do is spray a lot of chemicals. So we do a lot of mechanical removal of those weeds and at the moment we take them to landfill where they rot and create methane.

At the moment we are looking at a project which we are doing in conjunction with the University of Queensland and the CSIRO. It is fairly small scale but it is looking at using biodigesters to create methane. Basically we are using large vats to create methane and we are trying to get a power source from that. It is fairly emergent technology, but, if we can crack it, it is a whole of system approach. Rather than just having weeds and sending them to landfill we are trying to look at beneficial uses for that.

CHAIR: I want to invite Paul Slatter, from the Rocky Point group, to the table. Paul has been sitting there very diligently all day. Every time anything is mentioned to do with bio anything, his ears prick up.

Mr FOLEY: I just have a quick comment.

CHAIR: Okay. After your quick comment, I will get Paul to say a few words while he is here.

Mr FOLEY: In terms of water quality, in the Mary River we have had fairly significant issues with weed infestation. Initially someone hired a water harvester for a huge amount of money, and we went to a demonstration where they collected all the weeds and dumped them onto the shore where they sat, went off and stunk, and it was no good. Then one of our bright minds designed a much smaller scale machine which had a V opening, and as it went through it pulled it all up into a bin where it had a hydraulic press, compressed it down, discharged all of the water and then bailed it up and put it out as much more profitable waste. The huge saving there is to the water quality because of the lack of deoxygenation of the water that that brings. If that can be used as a biofuel, then it is a win all round, isn't it?

Dr Volders: Yes. I will just add a little bit in terms of water quality. The big driver for us is trying to keep water quality at the appropriate costing levels. If you look at it from a whole of life cycle perspective, what we use to treat water is a lot of alum as the flocculant, which is incredibly energy intensive in itself. The fact is that, when we have a dirty water event, it takes a lot more energy to push water through the filters. All the costs increase. Doing catchment protection work saves us a lot of energy in the long run, and for me it is a pretty simple cost-benefit analysis to come up with that.

Mr FOLEY: Once the sunlight penetrates that water ...

Dr Volders: Absolutely.

CHAIR: The port of Brisbane has one of those weed harvesters which it leases out.

Dr Volders: Yes. We do not just rely on mechanical harvesting. In the Redlands we use a small mite—the salvinia weevil. That chews its way through hundreds of tonnes of salvinia for us every summer. We grow it in swimming pools.

Mr DOWLING: But apparently we are not supposed to tell DERM about it, are we?

Dr Volders: No, you can. We have all the permits we need for it.

Mr DOWLING: I know there were problems when I was in the council where they stopped us from using it for a number of years. Obviously they have woken up to themselves.

Dr Volders: The issue was mainly about transportation of aquatic weeds. That is the issue.

CHAIR: Paul, would you like to state your name for Hansard and give us a brief overview of what your company is doing?

Mr Slatter: I am the General Manager of Rocky Point Green Power. Rocky Point is a biomass fired renewable energy station based on the northern end of the Gold Coast, so green power from green waste. Our learned colleague's green waste down here that he takes to the landfill can be turned into power. Last year Rocky Point prevented 240,000 tonnes of timber waste or green waste going to landfill. This is readily available. Most communities have a massive amount of it, and it can be used. It can be used in co-generation plants in sugar mills—

CHAIR: Do you buy it off the councils?

Mr Slatter: The council pays us to take it away.

CHAIR: That is a win for the council, isn't it?

Mr Slatter: It is a win for the council because they do not have to put it in the landfill and they do not have to pay the government's $35 levy next year. That is the way we are heading. We are preventing it from going to landfill.

CHAIR: Are more councils going to come on board?

Mr Slatter: The councils need to come on board. The councils need to give long-term contracts. The biggest problem we have is that councils are very short-sighted. It is one or two years and three years maximum for a contract. When you are investing $100 million in a project, you need a 20-year fuel supply contract to get the finance to get them over the line. That is where we need help from you people to get the councils to see the long-term profitability and viability of these units.

CHAIR: What about our waste management strategy? Has that been included in it? Has it mentioned it?

Mr Slatter: No.

CHAIR: Okay.

Mr DOWLING: Regarding the challenge with councils, there is an expression, 'You can't rule from the grave.' I think there are some requirements in the state government Local Government Act that prevents councils from setting a contract that runs well beyond their term. They have a four-year term so they are restricted to normally a five-by-five kind of arrangement for contracts. It is a catch 22. I know that the Redlands provides product to you. Maybe that is something the committee could look at through the Local Government Act in allowing things like environmental initiatives which have a much longer payback period; they are not a four-year cycle.

Mr Slatter: If that could be achieved, that would be great. In the Brisbane area we believe there are another 300,000 tonnes of material going to landfill at the moment. Rocky Point is prepared to expand, but we need a commitment from the councils to source the fuel for the long term.

CHAIR: We have made a note of that. As there are no further questions, thank you very much, gentlemen. It was really great that some of you jumped in at the last minute without any preparation to give us some extra information. I thank the committee members—Chris Foley, the member for Maryborough; Peter Dowling, the member for Redlands; and Mark Ryan, the member for Morayfield. Also in attendance today was Simon Finn, the member for Yeerongpilly, who unfortunately had to leave a little early. It is disappointing that a couple of our members could not make it today. They have missed what I think was a wonderful opportunity to hear from a group of people who have been outstanding in their contribution today.

Our report will be put together by our research director, Rob Hansen, who is a great benefit to this committee, and Rachelle Stacey, who was here earlier. I introduced Grace Field to you earlier. Grace is our newest member and has only been on board for the last three weeks. I most profusely thank Hansard, who have done an exceptional job today. It is a difficult task to keep up with all that has been said, but we very much appreciate their attendance here today.

Thank you, ladies and gentlemen, for being a part of this hearing. As I said before, I think we have stimulated a lot of debate on renewable energy and for quite a long time to come. That concludes our hearing.

Committee adjourned at 2.55 pm