



**LEGISLATIVE ASSEMBLY OF THE NORTHERN TERRITORY**

**12th Assembly**

**Committee on the Northern Territory's Energy Future**

**Public Hearing Transcript**

1.45 pm – 2.30 pm, Friday, 14 February 2014

Litchfield Room, Level 3, Parliament House

Mr Gary Higgins, MLA, Chair, Member for Daly

Mr Kon Vatskalis, MLA, Deputy Chair, Member for Casuarina

**Members:** Mr Gerry McCarthy, MLA, Member for Barkly

Mr Gerry Wood, MLA, Member for Nelson

Mr Francis Kurrupuwu, MLA, Member for Arafura

**Witnesses:** Mr Martin Poole: Executive Director, Epuron Pty Ltd

Mr Anthony Melov: Senior Projects Manager, Epuron Pty Ltd

**Mr POOLE:** It is Martin and Anthony from Epuron.

**Mr CHAIR:** Martin, it is Gary Higgins, Chair of the committee. How are you?

**Mr POOLE:** Very well thank you, Gary. It is good to meet you.

**Mr CHAIR:** We have a few technical problems, as you must have realised, so you are coming through on a mobile phone through a microphone.

**Mr POOLE:** Wow, that is impressive.

**Mr CHAIR:** I would ask during the questioning for everyone, when giving an answer, to rattle off their name first so the people transcribing can work out who is talking.

On behalf of the committee I welcome you to this public hearing into the challenges and opportunities associated with meeting the Northern Territory's future energy needs. I welcome to the table to give evidence to the committee from Epuron, Martin Poole, Executive Director, and Mr Anthony Melov, Senior Projects Manager. Thank you for coming before the committee.

We appreciate you taking the time to speak to the committee and look forward to hearing from you today. This is a formal proceeding of the committee and the protection of parliamentary privilege and the obligation not to mislead the committee apply. This is a public hearing and will be webcast through the Assembly's website. A transcript will be made for use of the committee and may be put on the committee's website. If at any time during the hearing you are concerned that what you will say should not be made public you may ask that the committee go into closed session and take your evidence in private.

I will now ask each witness to state their name for the record and the capacity in which they appear. I will then ask you if you would like to make a brief opening statement before we proceed to any questions.

Could you both please state your names and capacities in which you appear? Thank you.

**Mr POOLE:** Thank you. My name is Martin Poole; I am Executive Director of Epuron.

**Mr MELOV:** My name is Anthony Melov, and I am Senior Projects Manager at Epuron.

**Mr CHAIRMAN:** Would either of you two like to make some opening remarks?

**Mr POOLE:** We do have some opening remarks prepared, Mr Chairman, which I would like to read, if that is appropriate?

**Mr CHAIR:** Yes, that is very good.

**Mr POOLE:** Thank you for the opportunity to address you and to answer questions about the NT's energy future.

Our area of expertise is renewable energy, specifically wind and solar power generation. We own and operate the 1 MW Uterne Solar Power Plant just south of Alice Springs, which is connected directly into the Alice Springs power network. We also own and operate TKLN Solar, which has a total capacity of 1 MW solar power integrated with diesel generation at the three communities of Ti Tree, Kalkarindji and Alpurrurulam, also called Lake Nash. These solar power stations provide 30% of the energy consumed by these communities, approximately. At times, they supply 80% of the instantaneous power demand.

We believe there are excellent opportunities for renewable energy in the Territory. In 2012, solar made up less than 1 MW out of over 73 MW of Indigenous Essential Services' installed capacity. That was about 1.3% renewables across 56 communities and in terms of generation, it is 0.16% of energy supplied. TKLN Solar has since come online, and that figure is now approximately 2.4% of installed capacity.

Fixed flat-plate solar PV is an ideal solution for supplementing power supply in diesel-powered communities. Diesel prices are rising, they are volatile, and they are exposed to the exchange rate. The cost of solar photovoltaic is decreasing. Looking to the future, I believe the costs will come down further for solar photovoltaic and, potentially, increase significantly for diesel fuel.

We refer to the TKLN solar power station as medium penetration sites, and solar provides about 30% of the energy annually, as I said – 5% to 10% would be low penetration offsetting a significantly lesser volume of diesel.

At the other end of the spectrum, we are currently studying a scenario we are calling “diesel off” where, from between one to five hours a day, depending on load and the season, diesel could be switched off and the system rely 100% on solar power. This would have two benefits: increasing the diesel savings, and reducing the maintenance costs of the diesel gensets.

TKLN solar power stations was a whole new concept when we designed it, and it is working well. We own the plant, we have a skin in the game, and we are overcoming the issues that arise from time to time to ensure it continues to work with very high availability and reliability.

We believe, with the right commercial structures, that solar photovoltaic can redefine the off-grid energy supply to the Territory.

We believe that 2 MW of remote off-peak solar PV is just the start. There are at least 10 MW of opportunity in the near future in remote Northern Territory communities. We know that Power and Water Corp is actively exploring options on this front.

We estimate that building 10 MW off-grid remote solar, as an example, could reduce Indigenous Essential Services’ current fuel budget by around 15%. Appropriate roll-out of this scale would encourage the private sector to fund and own such projects, and supply power back to IES at a rate which results in immediate operating costs savings.

Thank you, Chairman, thank you, committee members.

**Mr CHAIRMAN:** It is Gary here again. Can you clarify for me, and the rest of the committee, the difference between low penetration and high penetration in solar PV systems?

**Mr POOLE:** Certainly. It is not a very precise measure of how much energy, over the year at a remote site, is displaced from the diesel consumption by solar PV. High penetration are those systems where, at times, PV is supplying the great majority of the load – over 80%, say, and over 30% on an annual basis - of total energy. Low penetration sites might be of the order of 10% of total energy on an annual basis.

**Mr MELOV:** I guess one other way to distinguish between those categories is to consider that low penetration solar is the typical residential model where there is no storage component, whereas medium penetration and high penetration alternatives involve a storage component.

**Mr CHAIR:** Okay, thank you for that. Can I remind you to rattle off your first name before you speak if that is all right.

What is the difference in effectiveness and cost of electricity from the concentrated PV compared to straight PV?

**Mr POOLE:** There is a big difference. There can be a big difference in the capital costs and the infrastructure required around concentrating PV, and the nature or extent of that extra capital is reflected over the life in the energy cost. I am not sure I could make any generalised conclusion as to the energy costs on those types of system. I would rather see it as trying to make a choice of the best system for a particular application.

**Mr MELOV:** I would add the levelled cost of electricity from standard flat plate PV at the moment is \$200 per megawatt-hour or less. Compare that to CSP and CSP currently is a fair bit higher. There is also a difference in the status of the technology standard. Solar photovoltaic technology is well accepted and quite modular in its application, whereas CSP is typically rolled out at a large scale and is coupled with a steam turbine generator. It is at a different point on the technology curve.

**Mr CHAIR:** We know there have been a lot of recent developments in fuel cell technology. What potential is there for incorporating storage systems into existing solar facilities? One problem that has come up a couple of times is while we can generate we cannot store.

**Mr POOLE:** There is excellent potential for storage to increase the benefit of remote solar PV systems. The storage technology, whether it is conventional lead-acid batteries or state-of-the-art battery technology or something else, is less important than control of the system. So, the charging and the discharging of the energy storage element is properly controlled to integrate with other generators. We found at TKLN that having a modest amount of electrical storage really enables us to get a high penetration of solar energy into the system. Then,

overall, if you look at the whole power supply in remote communities, most of the storage remains where it is now, which is in diesel tanks.

Electrical energy storage is an enabling thing, but storing large quantities of electrical energy is much more expensive than storing large volumes of diesel fuel.

**Mr CHAIR:** In the remote community of Alpururulam you have three 15 KW wind turbines that overcome the overnight problems to supplement the high penetration solar power station there. Can you give the committee some idea of the effectiveness of solar wind diesel hybrid systems and the potential for wind turbines to be incorporated in any other solar power stations?

**Mr POOLE:** Certainly. I think adding wind to a solar diesel hybrid provides some diversity. In some weather conditions wind or solar will be doing better. One of the challenges with wind is ensuring there is a good resource available. Also, small wind turbines are less commonly manufactured around the world than say 1 MW to 2 MW utility scale wind turbines. Per unit of power, the cost of small wind turbines has not come down anything as much in recent years as the cost of solar photovoltaics.

**Mr CHAIR:** Do you see wind farms as an option the NT should consider as part of its renewable energy mix, based on that?

**Mr POOLE:** Yes, on the Darwin/Katherine interconnected system there is good scope for wind farms of the scale of 10 MW to 30 MW or 40 MW per installation.

**Mr CHAIR:** How do the costs of electricity from wind turbines compare to, say, the solar PV?

**Mr POOLE:** In broadest terms, as Anthony said, the cost of solar PV might be around \$200 per megawatt hour at the moment. With the wind resources we believe are available in the vicinity of the Darwin/Katherine system, I expect wind power could be generated in the region of \$110 per megawatt hour.

**Mr MELOV:** It is Anthony here. One point to add. When you are deploying very large-scale, grid-connected PV, not necessarily at the remote communities, we believe the cost of electricity from projects of that scale is actually quite a bit less than the \$200 per megawatt hour again, potentially, particularly given the NT solar resource.

**Mr WOOD:** Can I just butt in there?

**Mr CHAIR:** Yes.

**Mr WOOD:** It is Gerry Wood here, Martin. A question on the wind sector. You gave a price of \$110 per megawatt hour. Would you give an opinion on whether wind would be feasible on many of our coastal communities right by the sea? They will get breezes at least some times during the day, but you do not see much of that happening at the present time.

**Mr POOLE:** Yes, wind is feasible in those coastal communities. As I said, the cost of small wind turbines has not improved as dramatically as the cost of solar, and the opportunity to use large wind turbines really relies on having a large grid to connect to which implies a bigger load. In the Territory, we also have to overlay the possibility of cyclones, and the cost of utility scale wind turbines that are suitable for cyclone regions is significantly greater than the wind turbines you might install in non-cyclone regions.

**Mr WOOD:** That is a good point. I suppose, theoretically, you might be able to hinge the towers – do you know what I mean? – and, if it was possible, bring them down at those times when we get cyclone warnings?

**Mr POOLE:** Yes, there are commercially available utility scale turbines that do lower the cell and the blades to the ground when there is a cyclone.

**Mr WOOD:** Are there issues with salt water with ...

**Mr POOLE:** No, there are many turbines being installed in the North Sea and other shallow European waters at the moment. There are extra costs, but the technology to deal with very salty marine environments is well known.

**Mr WOOD:** Are wind turbines made in Australia, even the small ones that you said ...

**Mr POOLE:** There have been turbines made in Australia from time to time, small and large scale. To the best of my knowledge, there are not currently turbines being made in Australia, although there are at least two manufacturers of towers for industrial scale turbines.

**Mr WOOD:** The one in Alpururulam, is that an Australian made wind turbine?

**Mr POOLE:** No, it is a Scottish made turbine.

**Mr WOOD:** That would have been cheap then.

**Mr POOLE:** I cannot really comment on the wind turbine's cost ...

**Mr WOOD:** Sorry about that, yes.

**Mr POOLE:** ... but they are designed for very high wind. It is a very robust, rugged design ...

**Mr WOOD:** Yes. Okay, thank you.

**Mr McCARTHY:** I have one while we are on that vein. Gerry McCarthy here. You guys have been operating the Alpururulam plant now for what, two years?

**Mr POOLE:** Officially it was commissioned on 1 January 2013, but we did have some experience of commissioning it before that. But, I would say about 18 months.

**Mr McCARTHY:** So what is the story so far?

**Mr POOLE:** In terms of availability - that is the proportion of the time that Alpururulam solar power station has been able to run up until the end of January - its availability has been 99.1%. Of the daylight hours when it could have been able to generate, it has been available 99.1% of the time. It displaced a certain amount of diesel - approximately 93 000 litres of diesel fuel up until January.

**Mr McCARTHY:** What about maintenance and the learning lessons?

**Mr POOLE:** We have learnt a lot. We learnt a lot in construction and have learnt a lot about maintenance since. The design we started with was focused on requiring minimal intervention, but even details like modems for connecting the site computer to the Internet - we have learnt a lot about how hard it could be to reset a modem in locations like Alpururulam at certain times.

**Mr CHAIR:** Dealing with Telstra.

**Mr POOLE:** Not really Telstra so much. It is a modem where you would just have to press a button on the back to reset. In most solar applications it is not a problem, but occasionally we have had real challenges in doing maintenance tasks in a location like that. All those learnings are going back into the plant and we are making incremental changes over time. The availability has been over 99% in our first year of operation and we were very happy with that result.

**Mr McCARTHY:** Do you monitor all the three plants from North Sydney?

**Mr POOLE:** Yes.

**Mr McCARTHY:** What capacity? I know you have essential services officers on site.

**Mr POOLE:** Yes.

**Mr McCARTHY:** How much of your time is spent in North Sydney on this job?

**Mr POOLE:** To be honest, there is somebody on it almost full-time at the moment. We are watching those plants every minute of the day and understanding more about - particularly at this time of the year - more about fluctuations in solar energy over the day, how the short-term storage system is working and how we are integrating our solar plants with diesels.

**Mr McCARTHY:** You have three different areas there. With the wind turbines, is there any emerging area as a success story in production via the wind turbines?

**Mr POOLE:** We are happy with the performance of the wind turbines. They have had their first schedule maintenance and no significant issues were identified. I guess it is true to say the wind turbines are meeting our expectations.

**Mr McCARTHY:** Is Alpururulam production more by wind than Ti Tree?

**Mr POOLE:** Alpururulam is the only site with any wind turbines.

**Mr McCARTHY:** Okay. I am the local member for Barkly and travel through that area every quarter. I have been really interested. I might bump into you there someday.

**Mr POOLE:** Great! Please let us know and we will meet you there.

**Mr McCARTHY:** Either there or North Sydney. I do not mind that either.

**Mr POOLE:** We are often in North Sydney so that would not be a problem.

**Mr MELOV:** One small point is those wind turbines are not owned by us. They are owned by Essential Services or IES, although we do the O&M on them, whereas we own the solar plant and associated storage and operation.

**Mr McCARTHY:** Thank you.

**Mr WOOD:** You gave the amount of diesel saved. Do you know what the percentage of the total diesel used would be?

**Mr POOLE:** We will have to take that question on notice. That might be a question for PWC.

**Mr WOOD:** Obviously it has cost a bit of money to put this up. I am looking at the cost benefit analysis rather than the environmental aspects because I think it is a great project. I suppose, like a lot of things, the money has to stack up to prove it is a benefit.

**Mr POOLE:** Absolutely, yes. I am not sure that we know the overall saving in diesel because we are not aware - there is no need for us to be aware of PWC or IES diesel purchases for the sites.

**Mr WOOD:** We can get that information from them I think. It is an important figure because ...

**Mr MELOV:** Yes. In the total IES fuel budget across all communities, we believe our projects have displaced, at the TKLN sites - represents around 1% to 1.5% of that total amount. The 10 MW roll out Martin referred to before would equate to up to 15% of diesel usage ...

**Mr POOLE:** Whole diesel budget.

**Mr MELOV:** Of the entire budget, yes.

**Mr WOOD:** If it has only used a relatively small amount of the diesel, does that mean the diesel generators are still running a fair bit of the time?

**Mr POOLE:** Yes, at the moment there is at least one diesel generator running all the time.

**Mr WOOD:** It is not a system like on some of the cattle stations, which operate during the day on solar and the diesel will only come on if someone wants to do some welding or when night falls. It is a system that still operates diesel and alternates between one or two generators and solar or just one generator?

**Mr POOLE:** That is right.

**Mr WOOD:** Okay, thank you.

**Mr CHAIR:** One issue that has been raised by the exploration companies has been access to land and compliance with requirements under the Aboriginal Land Rights Act, native title, sacred sites and the *Heritage Act*. Does that have an impact on you? To what extent does that sort of access and compliance with that legislation cause you problems?

**Mr POOLE:** It has an effect on us. We are fully aware of it and our obligations. Meeting our obligations has not been too onerous. We have a relatively small well-defined area of land we are interested in and have found working with the Territory government officials in various departments has been fine. There is a process we have been through.

**Mr MELOV:** Two of the sites - a slightly unrelated one would be a PWC-owned site and the other is Crown land. With respect to the third one, there is an Indigenous land use agreement in place and we went through the Aboriginal Areas Protection Authority process and got the relevant certification in relation to sacred sites and the heritage value of that land. We did go through that process.

**Mr HIGGINS:** Mr Gerry Wood has the last question.

**Mr WOOD:** Who is Epuron? Is it just you two people, is it a local company ...

**Mr POOLE:** Epuron is locally owned. There are 23 people in Epuron. We have been developing wind and solar projects out of north Sydney for the last 10 years.

**Mr WOOD:** Do you have other projects around outback Australia?

**Mr POOLE:** Not yet. We are pursuing some and we hope Power and Water Corporation will go ahead with some more sites this year. We are also the proponent of the Uterne Two solar power station which we are hoping will be constructed in Alice next to Uterne One later this year.

**Mr WOOD:** Do you see any possibility of small scale solar thermal to operate small generators?

**Mr POOLE:** Technically I think it is possible and has some attractions. Practically - this is not really a local thing but a global phenomenon - the rapid reduction in cost in photovoltaic has really caught the solar thermal industry a bit by surprise. Solar thermal is now struggling to meet the same sort of construction time lines and energy price ultimately, and that is at 50 MW or 100 MW scale. An appropriate scale for Australia, particularly in some of our remote sunny areas that have relatively expensive power, might be 5 MW to 10 MW, perhaps in mining applications. It would be very hard to get concentrating solar thermal to work at that small scale in the near future.

**Mr WOOD:** Thank you.

**Mr MELOV:** Just one quick point to add. There is potential for solar thermal. One consideration, however, is its use of water and that may be a relevant consideration in the Northern Territory.

**Mr WOOD:** Okay, thank you.

**Mr CHAIR:** Unless there is something else you want to say, thank you very much for your time today.

**Mr POOLE:** That is it from us, thank you.

**Mr CHAIR:** We will be in touch. We might see you in Alice.

**Mr POOLE:** I hope so. We would like that. Thank you.