REPORT OF PROCEEDINGS BEFORE

PUBLIC ACCOUNTS COMMITTEE

INQUIRY INTO COGENERATION AND TRIGENERATION IN NEW SOUTH WALES

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At Sydney on Monday 21 October 2013

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The Committee met at 10.00 a.m.

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PRESENT

Mr J. R. O'Dea (Chair)

Mr B. E. Bassett
Mr G. M. Piper
Mr J. D. Williams

CHAIR: I declare the public hearing open. I welcome everyone and thank you for attending the Public Account Committee's public hearing into cogeneration and trigeneration in New South Wales. The Committee will be hearing initially from the Office of Environment and Heritage, the NSW Distribution Network Service Providers, the City of Sydney, NSW Trade and Investment, the Property Council of Australia, the APA Group, Jemena Gas Networks and the Energy Efficiency Council. Before proceedings commence I remind everyone to switch off their mobile phones as it can interfere with Hansard's recording equipment. The Committee has resolved to authorise the media to broadcast sound and video excerpts of its public proceedings. Copies of the guidelines governing coverage of proceedings are available on request.

THOMAS ANDREW GROSSKOPF, Director, Metropolitan Branch, Regional Operations, Office of Environment and Heritage NSW, and

SAMANTHA McLEAN, Senior Team Leader, Commercial Buildings, Office of Environment and Heritage NSW, affirmed and examined:

CHAIR: I welcome Tom Grosskopf and Sam McLean from the Office of Environment and Heritage. I thank them both for appearing before the Committee today to give evidence. Can I confirm that you have both been issued with the Committee's terms of reference for this inquiry and information in accordance with the standing orders that relate to the examination of witnesses?

Mr GROSSKOPF: Yes.

Ms McLEAN: Yes.

CHAIR: I invite either or both of you to make opening comments or a statement before we commence questions.

Mr GROSSKOPF: I will make an opening statement on behalf of Ms McLean. Ms McLean and I appear today as representatives of the Office of Environment and Heritage and the National Australian Built Environment Rating System [NABERS]. The NABERS system is governed by a national steering committee of representatives from the Commonwealth, State and Territory governments. It is delivered nationally by New South Wales under the guidance of this committee and with the advice of a NABERS Stakeholder Advisory Committee of key industry representatives.

As national administrator, the Office of Environment and Heritage is responsible for the day-to-day operations of NABERS. The steering committee provides strategic governance and oversight and is the decision-making body for issues of strategic importance. Over the last 15 years the NABERS program has established market credibility for the measurement of water efficiency, waste management, indoor environmental quality and, of course, energy efficiency in Australian commercial buildings and tenancies. Today we will be talking about the NABERS Energy for Offices rating.

NABERS is Australia's premier energy rating program for commercial buildings and is a routine feature of government policies, industry programs and commercial property agreements. Last year there were 1,485 NABERS Energy for Office ratings in Australia and 695 in New South Wales. Since the start of the program 80 per cent of the New South Wales commercial office floor area has been rated. This year the program also expanded to New Zealand.

NABERS energy is a very simple idea: a building that draws less energy from the electricity grid or gas network to provide its heating, cooling, lighting and other services is more efficient and is awarded a higher rating. The program takes complex information about the actual energy used by a building over a period of one year and, accounting for variables like climate and building size or operating hours, it calculates a star rating that tells you how efficient that building is in comparison to other buildings. The higher the star rating the lower the operating costs and the lower the impact that building has on the environment. It is just like the star ratings you see on appliances in a store.

Building owners are driven to compete for higher ratings because buildings with higher ratings have better investment and rental returns and have lower vacancy rates and outgoing costs. Buildings that have been rated more than once have achieved annual savings of 380,000 tonnes of greenhouse gas, 440,000 megawatt hours of electricity and 1.6 million litres of water. These savings translate directly to the business bottom line. These market advantages are driving investment in energy efficiency, building support for this emerging sector of the New South Wales economy. The flow-on impact benefits the New South Wales economy.

NABERS energy started as a voluntary tool and remains so for many of its applications. Given its strong market credibility the Australian Government decided to use it as the basis of its mandatory disclosure requirements under the Building Energy Efficiency Disclosure Act. Under this Act, office buildings over 2,000 square metres are required to disclose their NABERS energy star rating at the point of sale or lease. This legislation is designed to allow future tenants and prospective investors to make an informed decision about the energy efficiency, ongoing operating costs and environmental impact of that building.

There are lots of ways that buildings can reduce their use of energy, and the elegance of NABERS is that it does not dictate what type of technology the buildings should or should not use or how they should be designed. NABERS leaves the role of finding the right solution to the market. If a building owner chooses to invest in lighting upgrades to improve their NABERS rating they make this decision as free agents in a free market, based on their budget, the affordability of the technology, the energy savings it will deliver and a range of other incentives that may be available. The same is true for building owners that choose to invest in onsite cogeneration and trigeneration.

NABERS recognises that some owners choose to purchase renewable energy from an accredited GreenPower provider to reduce the environmental impact of the energy used in their building. To support this, the NABERS program provides an energy rating with GreenPower as well as a standard energy rating without GreenPower. The standard energy rating without GreenPower will tell you about the actual energy efficiency of the building in operation. The star rating with GreenPower clearly tells you how much of these emissions have been offset by buying GreenPower. The transparency of these two ratings is essential for helping the market to make informed decisions and for keeping the NABERS energy rating simple and meaningful.

In October 2012, after a period of extensive review and consultation, the NABERS National Steering Committee announced that the purchase of low emissions electricity from precinct-scale cogeneration and trigeneration supplied across the grid would also be recognised as a cleaner energy supply under the NABERS energy with GreenPower rating. However, it could not be used to improve the standard NABERS energy rating. This decision was consistent with the position that NABERS is first and foremost a building rating tool that is designed to give credible information to building owners and the market about the energy efficiency of individual buildings.

If a cogeneration or trigeneration plant is located onsite within property boundaries it can help the building reduce its grid energy consumption and become more energy efficient. An offsite cogeneration or trigeneration system that is not part of the rated building does not reduce the amount of grid energy used and does not help the building to become more energy efficient. Because NABERS energy ratings are an indicator of how energy efficient a building is, onsite cogeneration systems are considered in the rating while offsite systems are not.

This issue is important to proponents and proprietors of larger-scale commercial cogeneration and trigeneration plants that export electricity for purchase through the grid. These types of plants are not located within the rated building envelope. They deliver energy to customers over the grid just like any other green power scheme. The purchase of this electricity will not improve a National Australian Built Environment Rating System [NABERS] Energy rating, just as the purchase of GreenPower does not improve a NABERS rating. It has taken considerable time to create what is now a successful, functioning market for investing in energy efficiency. Higher NABERS energy ratings have been earned by building owners who have made some very substantial investments to improve the energy efficiency of their buildings. The ratings are credible because they give a prospective tenant or investor real and reliable information about the actual energy use and operating costs of that building.

The Office of Environment and Heritage understands that proponents of commercial larger-scale off-site cogeneration and trigeneration plants would like credible environmental recognition in the marketplace to incentivise customers to participate in this scheme. The NABERS team, with the Office of Environment and Heritage, together with the NABERS National Steering Committee, is working to provide this recognition while still protecting the existing value of NABERS energy ratings by participating in an important industry led project to develop a nationally consistent scheme for certifying low emissions electricity produced by cogeneration and trigeneration plants. Progress on this project has been positive. It is on track to develop the protocol by late 2014. Given the positive contribution that cogeneration and trigeneration can make, the NABERS National Steering Committee has committed to recognising the certification in exactly the same way that green power is recognised today.

We will continue to have our core NABERS energy rating and will extend the NABERS Energy with GreenPower rating to transparently recognise the additional environmental benefits of purchasing low emissions electricity from cogeneration and trigeneration plants. I would like to clarify some comments made in some submissions to the inquiry regarding the previous treatment of off-site cogeneration and trigeneration plants. NABERS ratings are undertaken in accordance with clear rules. As industry and technology changes, new and unique situations arise that may not be covered by these rules. So the rules are routinely updated, typically at the

request of industry. In July 2010 NABERS created a ruling to address new situations relating to on-site cogeneration and trigeneration systems, including the situation where on-site cogeneration plants directly supply electricity and thermal energy to adjoining buildings. This ruling was not intended to apply to off-site cogeneration plants that supply electricity to buildings through the grid. However, it was interpreted as such by some stakeholders and it was not expressly precluded in the way the ruling was written. This initiated a public review of the ruling in light of the implications for NABERS as a building rating.

In line with the established approach taken to these situations, NABERS allowed the interpretation on an interim basis pending the outcome of the review; and stakeholders were made aware of the risk that their interpretation may not be upheld in the review. The October 2012 decision of the NABERS National Steering Committee was the first time the status of precinct-scale cogeneration was formally considered by the decision-making body of the NABERS program. That decision reflected the views of the relevant industry stakeholders that low emission electricity transfers through the grid should be supported by being transparently recognised through the NABERS Energy with GreenPower rating but should not improve a NABERS Energy rating; so that it remains a credible, reliable and valuable measure of building energy efficiency. Thank you for the opportunity to make an opening statement.

CHAIR: Thank you very much, Mr Grosskopf, for an informative and comprehensive opening statement. I anticipate that some of the questions we have will have already been touched on significantly; so there may be an element of going over the same ground on one or two of the following questions but where that is the case then I am sure you can refer back to your opening statements. By way of a preliminary statement, the committee has heard that cogeneration can be an effective method to improve energy efficiency and produce energy with lower emissions intensity. We have heard that from a range of stakeholders who have made submissions. Obviously cogeneration is seen as a useful tool in providing energy for New South Wales in a low carbon economy. Could you speak to that, to the extent that you have not already, and in doing so perhaps touch on whether or not cogeneration should be encouraged ahead of other low emissions intensity technologies. Is there currently sufficient support available—such as loans, grants or other incentives—for organisations that want to become cogeneration operators?

Mr GROSSKOPF: Thank you for what is a fairly wideranging question. I will separate the Office of Environment and Heritage from the NABERS scheme specifically in answering this question. In terms of the position of the Office of Environment and Heritage we do see cogeneration and trigeneration as a valuable contributor to low emissions energy and we are looking at a variety of ways to continue to support that sector. The NABERS scheme is one such way, and clearly the on-site use of these technologies can dramatically improve the energy efficiency of a building within that building's footprint. In that context, the NABERS scheme does support this form of low emissions energy production and is a program which we will continue to support.

When we step into that broader area of cogeneration and trigeneration across the grid, so at a precinct scale, there are again some significant opportunities in terms of energy security and diversity of supply and there are benefits to the New South Wales economy in that framework. Our involvement in the national protocol for the identification, recognition and measurement of those benefits is the primary way that we are supporting that part of the sector. As to your broader questions about whether there is enough being done and the relative merits of this compared to other forms of energy production, I am afraid that extends beyond my area of expertise and preparation for this hearing so I will defer to others in that area.

CHAIR: Through your committee have discussions taken place about loans, grants or other forms of incentives beyond the NABERS rating or the market assessing the value of something through a rating? Has there been any direct government involvement in providing further incentives?

Mr GROSSKOPF: In relation to the NABERS National Steering Committee or its Stakeholder Advisory Committee, the answer is no, because it is really outside their terms of reference. Within the NSW Government's Energy Efficiency Action Plan, and I am going from memory here, I do not think there are any specific actions in relation to cogeneration or trigeneration. However schemes like the Energy Savings Scheme may be able to provide opportunities to incentivise that sector.

Ms McLEAN: For on-site cogeneration and trigeneration, I would add that our energy efficient business team in the Office of Environment and Heritage works a lot with businesses and buildings to help them improve their energy efficiency and cogeneration is a part of that. The team will go in and help the businesses and buildings to identify where the opportunities are and then give them assistance to implement those. Some

cogeneration projects have come out of that work. We also administer Environmental Upgrade Agreements. Obviously for buildings where cogeneration is a suitable solution that is where loan funding comes in.

CHAIR: I think there is a building in Parramatta where you recently put something in place along those lines.

Mr GROSSKOPF: Yes, it is in Valentine Street in Parramatta. There is also one in the City of Sydney.

CHAIR: So there are a couple of those with subsidised or low interest loan type arrangements.

Ms McLEAN: The Environmental Upgrade Agreements are privately financed but they are administered through a levy on the building which is repaid through the council. So they are able to offer really competitive rates as well as more secure loan terms.

CHAIR: I think that is an area the committee looked at in the context of a previous inquiry on the economics of energy generation. So it is good to see that that is actually happening. But I hear that perhaps the greatest assistance is of a more operational nature rather than a financial nature with advice and operational assistance. Is that a fair comment?

Mr GROSSKOPF: Yes.

Ms McLEAN: Yes.

CHAIR: Is there any requirement for a potential cogeneration system operator to notify the Office of Environment and Heritage prior to beginning the installation of a plant?

Mr GROSSKOPF: Could you clarify that question?

CHAIR: If somebody wants to operate a cogeneration or a trigeneration plant, do they have to notify anybody in the Office of Environment and Heritage, or elsewhere in government that you are aware of? Obviously the normal planning process will apply, but I am wondering particularly about the environmental focus here. Is there a need to notify prior to beginning an installation?

Mr GROSSKOPF: No, we are not aware of any requirement certainly from the Office of Environment and Heritage.

CHAIR: The Committee has received a number of submissions that disagree with the change in the NABERS ruling in October 2012 to which you referred, particularly as it relates to precinct cogeneration. Would you provide more information around that? Are you making a distinction between generators that provided energy to other buildings using the network or grid, and buildings that might provide energy to an adjacent building that perhaps did not use the grid? In answering the question will you clarify that distinction, if there is one.

Mr GROSSKOPF: There is a distinction. Effectively what the NABERS program is all about is actually the building itself. How energy efficient is that building? In order for NABERS to properly rate, it needs to look at the things which are connected to the fabric and the operation of the building. If the cogeneration and trigeneration plant are embedded within the fabric of that building then it is applicable to be considered within the NABERS energy rating. What brought about the 2010 and ultimately 2012 rulings is that it was in the building but also those which are adjacent, the fabric of those buildings is also then connected to that plant.

Thermal energy is probably one of the easiest example to provide here. If you generate that waste heat and you can provide that heat to an adjoining building, and there is the physical infrastructure that joins the two, then that would also be part of the other buildings' NABERS rating. That was the intent of the 2010 ruling and is what was clarified in 2012. The difference here is that we actually have things which physically connect and are part of the fabric and the construction of the building. Once you move to supply over to the grid it is basically a contractual arrangement which can change quite quickly. Yes, I am going to buy my power from this supplier which is GreenPower and that is reducing emissions and that is really good, but then you may make a

decision six months later to switch suppliers, I no longer want to take that energy, and so that other energy just usual form of energy, not a low emissions provider and so that would change.

That would effectively change the NABERS rating if it was included within that core energy rating. That is why we have the separate one which is GreenPower which then identifies, "What do you purchase as low emissions?" and "What is part of the fabric of the building?" We believe it is very important that those which are part of the fabric of the building are separately identified because those are lasting, if you like. Those are ones which will persist through different commercial arrangements et cetera because they are part of the fabric of the building whilst if you were to enter into an agreement and say, "Yes, I am going to be in this building, it is a 4½ or five-star NABERS building, and you are a tenant, and that is part of your marketing of the nature of your business, and then the building provider, the landlord, said "I am changing that energy supply contract."

You might go from a five star to a four star. It becomes quite unstable; the market is not clear and the investments that are being made by people become more precarious. We are quite focused that there needs to be recognition of the two elements but they should be separated because one is about the fabric of the building, the construction of the building and the way that that building operates, and will continue to operate outside of simple, contractual arrangements about where energy is coming from.

Mr BART BASSETT: How does that work in a precinct? If one is physically connected to a building next door, whether it be new or one retrofitted joining to a building with a cogeneration or trigeneration plant, does the building that has the cogeneration plant get the rating? Does the rating given to the new building link in or is it shared?

Ms McLEAN: I can answer that question and possibly cover off a bit of the previous question as well. It comes to the question of what the 2010 ruling covered and what the decision in 2012 was about. Most rulings are typically initiated at the request of industry, and Tom mentioned that before, because they are out there encountering situations that are not covered by the rules. The 2010 ruling which was about proportioning energy used by cogeneration and trigeneration was developed in response to submissions to the Office of Environment and Heritage from a number of companies that wanted clarification about how to treat—and by that they mean measure and exclude or include in the rating calculation—on-site cogeneration and trigeneration systems where they had a single building with multiple tenants who were accessing the thermal energy or the electricity differently or what we call small-scale district generation systems.

By "district generation systems" we meant that it was providing directly to adjoining buildings, whether it was part of the one development which is typically the case, or they happen to be just located next door. They were directly supplying them and they were considered at the time to be integral to the buildings and where they were within the properly boundaries. The ruling was not initiated to address precinct scale or sales over the grid at all; it was very small-scale sharing plant in the same way that some two adjoining buildings in a basement share heating and cooling systems where that is the most efficient way to do it.

It was not intended to apply to situations where it was a generator supplying over a grid, and those situations emerged later. They did not emerge at the time that the ruling was created and consulted on. The definition though of "district generation systems" that I just mentioned before was interpreted by some proponents of precinct scale systems as applying to their systems. That interpretation was not expected but it also was not expressly precluded by the way the ruling was written. This happens in the NABERS program across a number of areas because you get a lot of innovation and new methodologies. So our approach to these situations across the board is any new situations or methodologies that are not expressly prevented by the rules, we allow on an interim basis until a formal decision or ruling is developed to cover them.

In some cases they are considered to go through different gradations of consultation, depending on the importance of the issue. In some cases the ruling is developed to include them; in other cases it is developed to exclude them. In this case the interpretation of it applying to precinct scale was allowed on an interim basis. The stakeholders in question were clearly advised that this meant that the ruling would now go to review and there was a risk that their interpretation would not be upheld as a result of the review. And also if their interpretation was not upheld, it would not apply to any future rating. So the rules that apply at the time the rating is lodged, are the rules that apply, not at any period of time when the project was previously under development.

We provided that advice on numerous occasions. We undertook a review with extensive industry stakeholder and full public consultation. Ultimately that review showed from our stakeholders, particularly our

key stakeholders who have an ongoing involvement with the NABERS program, NABERS customers. They rate their buildings a lot and they have a lot of interest in the property market and the impact that NABERS ratings have on their property. It showed that an interpretation that allowed NABERS energy rating to be improved by purchasing electricity was not supported and that is what informed the decision. It was not so much a reversal of a previous ruling but a particular interpretation that was not upheld further down the line. There was a second question but now I have forgotten it.

Mr GROSSKOPF: I think the answer to your question is that it is shared. The building which has the plant within it, and the energy which is supplied within that building, that is part of that building's fabric and therefore it is part of that NABERS energy rating. Let us use the example of thermal energy, which is then taken to an adjoining building, through a series of pipes and physical connections, that is that source. That is embedded within the operation of that building. That too is included in the NABERS rating for that building. And that it is how it is done. The difference here is that the physical connection is what joins the two, whilst the connection over to the grid, a simple contractual arrangement—yes, I would like to buy this from GreenPower or I would like to buy this power from a low emissions source—can be terminated period to period. The other is more about the building and the fabric and the construction of the building.

Ms McLEAN: To clarify, there were two major changes from the 2010 ruling to the 2012 methodology. One was the introduction of allocating emissions to the thermal energy, which were previously not allocated emissions because they were regarded as waste and that was something that came out of the review. The other was new definitions, which were clearly missing in the old ruling, about what was considered on-site and what was considered off-site. In situations where it is not either within the property boundaries or in a shared basement across a couple of buildings then the plant was considered off-site. That is slightly different because if it is not a building next door, but there it is not a piece of shared plant, if you like, but there is a direct connection, it is now considered off site.

Mr BART BASSETT: There has been criticism that that decision does not necessarily encourage cogeneration happening and then being transferred elsewhere. Has consideration been given to a greater recognition of the benefits of cogeneration electricity either as well as or instead of through the greenhouse gas performance star rating?

Mr GROSSKOPF: We have undertaken a range of considerations of how to recognise cogeneration and trigeneration. The direction that we are taking is to participate in the industry-led approach to create a credible and robust framework for actually quantifying what those benefits are. How is it measured? How do we get a credible, reliable, consistent and transparent way to measure that? That is one of our key contributions. That is where the public value that we can create can be. It is about that framework and to create market credibility around the way that this is measured.

Then the nature of the tool the way that it can be created, what the NABERS National Steering Committee has done is said once you have that, we will clearly recognise that in a NABERS with—at the moment it is called NABERS with GreenPower, or however we reflect that name will probably come out of that process of the development of that protocol. We will have a very clear way that this sector will be able to identify the advantages of those tenancies which have this form of energy supply can continue. We hope that with the establishment of that credible framework to underpin the measurement, that we can then give the market confidence about the lower emissions standards of the energy which is created which then can be reflected in a rating scheme under the NABERS banner.

Mr BART BASSETT: The submission states that an industry-led steering committee has been established to develop measures to standardise, validate and audit the greenhouse gas emissions reductions attributable to cogeneration. When will those measures be finalised? If a cogeneration operator is currently applying for a rating, how will the emission reductions be recognised?

Ms McLEAN: The protocol is due for completion in October 2014 so what Tom mentioned we are on-track with that in that group. Your question: between now and then if a building is to purchase electricity that has been generated off site by cogeneration or trigeneration, it is not recognised until the protocol comes in.

Mr GREG PIPER: I think the question touched on the process of the steering committee to try to standardise the protocols. You have talked about the transmission of energy, regardless of how it is derived, whether cogeneration or trigeneration. In relation to emissions from the process, would you comment on how

you will manage that particularly in relation to refuse derived fuels, RDFs or gas, diesel generation, or whatever is the primary energy source? How do you deal with the difference of generation types?

Ms McLEAN: At the moment NABERS uses the national greenhouse accounts factors for determining the greenhouse intensity of the fuel source and with cogeneration, if you have an onsite plant, in terms of measuring the emissions, you measure the emissions from the energy that is used, whether that is gas and probably a bit of electricity that have come in, and that is how you calculate the emissions from whatever electricity it goes on to produce and thermal energy that is distributed. The 2012 decision that we talked about before was accompanied with an interim methodology for how we would apportion those emissions from the gas and electricity that are consumed in order to run the cogeneration plant across the two streams, across thermal energy and electricity. When the new protocol comes in, that is what will be recognised, so that is still under development.

Mr GREG PIPER: In relation to specific pollutants—and nitrous oxide is obviously a concern—the submission notes that cogeneration systems which are fuelled by natural gas can potentially have adverse effects on local regional air quality, particularly due to nitrous oxide. Who is responsible for ensuring that the cogeneration systems achieve their required nitrous oxide emission standards and have there been any examples of cogeneration operators failing to meet those standards?

Mr GROSSKOPF: This is an area outside our remit.

Mr GREG PIPER: So you are not involved in the actual regulatory process?

Mr GROSSKOPF: No. It is my understanding that that is the responsibility of the Environment Protection Authority and also the local planning authority in terms of the environmental impact assessment of the plant at the planning stage and at the operational stage, the Environment Protection Authority.

Mr JOHN WILLIAMS: I have a couple of aspects with respect to the NABERS rating. When we look at a new building, for example, there are fixed aspects to the rating in relation to materials used and technology used in the construction but there is a variable in the fact that they have included, say, a cogeneration or trigeneration facility. That becomes a variable because at any one time the expense of operating that system is greater than the cost of using power from the grid that produces a variable so technically the rating is a little skewed in that way, that at any point in time they comply fully or they do not comply?

Mr GROSSKOPF: The NABERS rating is a rating of actual building performance and it is often done on an annual basis where people will actually look at the costs of operating within that year and look at the way their property has functioned over that period so those variables are built into the analysis on each year. I will ask Ms McLean to explain the process of rating.

Ms McLEAN: All the NABERS energy rating will do is take information about how much energy you have actually used, not the cost, and take into account a series of variables to help us develop the benchmark and to give you a rating to tell you what the performance has been in the last 12 months, so what investment decisions are made by building owners with that information is up to date.

Mr JOHN WILLIAMS: So the key indicator is what comes through the electricity meter?

Ms McLEAN: Yes.

Mr GROSSKOPF: That is correct.

Mr JOHN WILLIAMS: In your opening statement you indicated that a building with a high NABERS rating would reflect higher tenancies. Is that driven by lower rentals? Why is that?

Mr GROSSKOPF: Generally it reflects the lower operating costs of being a tenant in that building. If you think of a NABERS rating, say it is at three stars—just making up a hypothetical—it might cost you $10 per square metre to operate in that environment whilst at five stars it might cost you $7. If you had the choice between the two, you would say, "Well, you know what, I could actually run my business in a potentially better environment, in terms of the working environment, and at a cheaper running cost" and that is where the preference is driven.

Mr JOHN WILLIAMS: In your submission you talked about the level of interest in cogeneration. How many cogeneration systems have there been since 2010?

Ms McLEAN: I do not know.

Mr GROSSKOPF: I do not know the answer to that question.

CHAIR: Coming back to your answer relating to the EPA, I want to talk a little bit more about best available technique emissions standards for cogeneration, which I think are referred to in your submission—the EPA should perhaps answer this rather than yourselves, but I am interested. The Wollondilly local government area I think is referred to as 250 milligrams per cubic metre. Is that the requirement for the rest of the State and, if not, why might other areas require a lower emission standard? Hand-in-hand with that I wanted to make a comparison also with Brisbane City Council and the standard they have of 50 milligrams per cubic metre. Is it fair to ask you that question or is it better to direct it to the EPA?

Mr GROSSKOPF: It is a question better directed to the EPA. The responsibility for air quality standards now rests with the Environment Protection Authority.

CHAIR: In terms of lower emissions, again you can redirect me elsewhere on this question, but in terms of the submission it does suggest that lower emission intensity electricity is recognised in the buildings' greenhouse gas performance star rating but a number of submissions have stated that this is not sufficient or well enough known. This is probably a question you can answer. Do you think that more needs to be done to publicise the existence and importance of the greenhouse gas performance star rating and has consideration been given to making it a requirement to disclose that rating at the point of sale or at least in the same way that is currently done for the energy efficiency star rating?

Ms McLEAN: Firstly, until the protocol is developed and agreed, we will not be able to reflect that in NABERS with GreenPower.

CHAIR: So October 2014.

Ms McLEAN: But as it currently stands, there is nothing at all to stop anybody promoting their NABERS energy green power rating. In fact, many, many businesses do. At the point of sale or lease, so mandatory disclosure, which is coming from the Commonwealth program with the primary aim of improving the energy efficiency of Australian large commercial buildings has a requirement for mandatory disclosure of the energy component but there is nothing to stop somebody also disclosing at the same moment of the transaction their rating with green power as well.

CHAIR: Do you think that should become mandatory in time?

Mr GROSSKOPF: It is really not for us. New South Wales does not require the disclosure of their energy efficiency. That is a Commonwealth requirement. I think that is a question better for the Government than for us.

CHAIR: We do take advice from bureaucracies. I have one final set of questions that particularly refer to comments made by the City of Sydney. According to them it is unclear whether energy efficiency projects which reduce gas consumption are recognised as part of the Government's savings scheme. Cogeneration systems can reduce gas consumption by using thermal energy, for example, to heat water, as we have heard. Can you clarify whether cogeneration systems which reduce gas consumption would be recognised under this scheme, the government energy savings scheme, and are the overall benefits of a thermal energy network which may be part of a cogeneration system adequately recognised in the energy savings scheme? I then have a couple of other follow-on questions.

Mr GROSSKOPF: Unfortunately that is a level of detail that I am not across and I do not have our energy savings scheme expert with us but I am more than happy to take those questions on notice and come back to you with written responses.

CHAIR: There are couple of follow-on questions that I will read onto the record that you can take on notice, and given the time that is probably not a bad way to go. Has consideration been given to the City of Sydney's recommendation that the Building Energy Efficiency Disclosures Act 2010 should recognise thermal

energy outputs of precinct cogeneration and trigeneration? The most common fuel for cogeneration systems is natural gas. Are you aware of and can you give us some detail on other feasible fuel options for cogeneration systems? We saw one in fact on Friday, which was a little different using biomass, but are there any others? Do you want to answer any of those questions now or would you rather take them all on notice?

Mr GROSSKOPF: I will take them all on notice, but maybe I will make a comment on the second of your questions which I think maybe best directed to the Commonwealth, which administers that authorisation. That will probably be the nature of my response to you if I take that one on notice. Taking the third question, there are a variety of ways that cogeneration and trigeneration can by powered—biomass being one of them. We are undertaking a range of actions to improve—under the Government's energy efficiency action plan we are looking at some of the provisions around biomass power generation and that sort of thing. I would be happy to take that question on notice and supply further detail.

Mr BART BASSETT: I have a follow-up question about biomass. Is the review considering—and you might want to take this on notice—the type of timber that is actually allowed to be used. For example, we were told on Friday that whilst there was a market for timber that could be sourced, the only approved market was out of the plantation timber market for woodchip to be added to the paper part of the biomass. Whilst there are a lot of facilities in Sydney and the rest of New South Wales where recycled timber is shredded into woodchip, that is unable to be used; it must come from plantation timber. I was curious as to why that would be the case when we have a market that could be recycled. Perhaps that statement could be taken on board.

Mr GROSSKOPF: I am happy to take that on notice.

CHAIR: You are happy to respond to that on notice; thank you. Thank you very much for appearing before the Committee today. The Committee may wish to send you some additional questions in writing in addition to the ones we have mentioned. The replies to those would form part of your evidence and be made public. Would you be happy to provide written replies to any further questions in addition to any of those we have already foreshadowed?

Mr GROSSKOPF: Yes, that would be fine.

CHAIR: Thank you both very much for all the great work you are doing.

(The witnesses withdrew)

(Short adjournment)

PAMELA ANN HENDERSON, Chief Engineer, Ausgrid, NSW Distribution Network Service Providers, and

NEIL RAYMOND GORDON, Manager, Asset and Network Planning, Ausgrid, NSW Distribution Network Service Providers, sworn and examined:

CHAIR: I now welcome Ms Pamela Henderson, chief engineer, and Mr Neil Gordon, manager, asset and planning, of Ausgrid, appearing as representatives of the distribution network service providers. I want to thank you for appearing before the Committee today to give evidence. Hopefully you can confirm that you have read the terms of reference and information about the examination of witnesses. The Committee has received a submission from your organisation. I presume you would like that submission to form part of your formal evidence?

Ms HENDERSON: Yes.

CHAIR: Before we proceed with questions would you like to make an opening statement by way of introduction?

Ms HENDERSON: Yes, we do. We do as an organisation. I note that although we are representing all three networks, Ausgrid, Endeavour and Essential, we do endorse the objective of providing safe, economical, reliable and sustainable energy. That is what we are here to do in New South Wales. We do recognise that cogen and trigen can form part of this, both in an individual capacity and also in a precinct-style plan and that it can be an economical and sustainable supply system into the future. Our key recommendation is that the legitimate concerns of all customers are considered in this process not just those proposing cogen and trigen and would have direct benefit from that. We are looking at policies that do recognise we have a full customer base in New South Wales.

The customer base in New South Wales is 2.6 million customers and currently those with cogeneration are in the order of 150,000 connected to the networks. As I said, our fundamental obligation is to ensure we have safe, economical, reliable and sustainable energy supply to our customers. There are three things we would like to have considered: One, the cost up-front of connecting cogen and trigen is borne by the proponent that is actually connecting; two, the cost of ongoing provision by the network to connect them is also borne by the proponent; and third, that the technical requirements for connecting the embedded generation does not jeopardise our need and desire to have a safe, reliable and good quality of supply for all of our customer bases.

Mr GORDON: I have nothing to add.

CHAIR: Can you clarify by way of background how the network component of a bill is charged? Obviously you have Transgrid and the transmission networks and then the distribution poles and wires, but those components of the network which are fixed costs, how do they reflect themselves on a bill as a fixed charge, or to what extent might some of that be variable at the moment?

Mr GORDON: In most cases it varies between the different types of customers. If you start at the normal residential household level, which we are most familiar with, almost all of the charge is in the variable component on a per kilowatt hour basis. Both the network and retail components are primarily charged that way, although there is a service availability charge which is a fixed component. As you mentioned, the cost structure of providing network services is largely fixed. There is a bit of variability over time, over the long run, but certainly in the short-term the costs are fixed and that does mean that the revenue to support that infrastructure is variable and the costs are fixed and it does create some issues.

At the global revenue level for monopoly network providers, starting from the next regulatory period, there will be a revenue regulatory structure, which in some ways corrects for that at the macro level. To extend some of that to business customers, particularly the larger ones, they tend to have a charging structure which has a demand component that measures the instantaneous largest amount used. In our case—I can speak for Ausgrid—that is between 2 p.m. and 8 p.m. If you use it over the weekend or at night it does not affect your charges. There is also a series of energy charges that are related to the time of use. The network component of the bill is recovered from all of those components but with a stronger emphasis on the capacity component rather than the energy component. The key difference is the ability to separate those charges because of the

metering technology, which of course is more expensive. There is a trade-off between the cost of metering and the flexibility in tariffs, which makes more sense with bigger customers than it does with smaller ones.

CHAIR: To clarify that, the rationale for charging a higher fixed component for commercial or business customers as opposed to residential customers is the metering technology.

Mr GORDON: That is largely true; although fixed components are generally designed to recover truly fixed costs such as metering and processing costs. It is a little variable and there is always a resistance to fixed charges because people quite rightly believe that they should pay for what they use, even though that does not necessarily reflect the cost structure. However, that is the nature of the business we are in that creates a commercial difficulty.

CHAIR: That is irrespective of the fact that people who might only intermittently use electricity pay a fixed cost that might be seen as insurance. I will defer that discussion for the moment, but it came up when the Committee visited a site on Friday. I have a related question. The Committee also received evidence that a key incentive for adopting cogeneration is that it can defer or reduce network augmentation. There may be savings in infrastructure costs if a cogeneration plant operates in an area and obviates the need for further investment in network facilities or capital investment. Would you acknowledge that there are potential savings from cogeneration plants operating?

Ms HENDERSON: We would generally say that we have not observed that so far; in fact, it is generally the opposite. When customers apply to connect they are generally seeking to have the same amount of network available for the times that their cogeneration comes down. For example, we have a cogenerator connected to our network in the order of 10 MVA. The load requirement is 10 MVA, but the cogeneration is supplied at 5 MVA. We connect for the 10 MVA, and we may generally supply the 5 MVA. However, when the cogeneration comes down, it still requires the additional 5 MVA. That is setting aside a bit of the network that may be used 1 per cent of the year—that is, only when the cogeneration comes down. That network could otherwise be supplying another 1,500 residential customers.

CHAIR: You submission refers to the fact that some cogeneration operators will rely on the network only for backup.

Ms HENDERSON: Yes.

CHAIR: That was my reason for referring to the insurance component and whether they should continue to pay for the backup facility in the same way that another business might charge a fixed cost for availability.

Ms HENDERSON: With regard to electricity supply or the connection of customers in New South Wales we have a system called "What is contestability?" When customers request a connection, if the load requirements are over a particular amount—which is a fairly modest amount—they contribute to the value of the assets at the front end. They pay for the assets that are close by that connect them to the existing network. However, they do not pay for any upstream augmentation that we need to do to the network to supply them. They do contribute to assets and they become part of our network when they connect, but not to the upstream assets. They are the deep assets that we must augment to enable the supply and there has been no contribution to those in general.

CHAIR: We have a situation where a cogeneration plant may be connected to the network for backup purposes, and you are saying that that is pretty much the same cost as a regular connection to the network. However, in some cases that might cost a little more depending on the scenario, and others might argue that it would cost a little less. Let us say that it is roughly the same.

Ms HENDERSON: It is in the same order.

CHAIR: If a cogeneration plant operates without connecting to the network at all, would that result in a reduction in network augmentation or maintenance? If so, how might one identify savings made and recognise that in terms of passing on savings to cogeneration operators?

Ms HENDERSON: If there were no connection whatsoever?

CHAIR: Correct.

Ms HENDERSON: Then there would be no impact on our network as far as the augmentation required is concerned. If it were connected but not drawing at any stage whatsoever, we may still have protection requirements.

Mr GORDON: If there were a parallel connection and if it were completely and utterly isolated—that is, operating as though it were in an area that did not have a network—there would be no network charges.

CHAIR: If they had gone off grid?

Mr GORDON: Yes. In that case we are not involved.

CHAIR: What if they had the connection but did not draw any energy for an entire year?

Mr GORDON: We go close to that circumstance. We probably do not get to zero; most arrangements involve some draw from the network. If they have a connection that supplies the entire load, for example, 10 units and they supply nine of them continuously—that is, they draw only one unit—they are charged only for one unit despite there being a 10 megawatt connection, and the costs are no lower. I refer to the earlier question about the potential for savings in network offsets. It is not impossible. We should not say that. In fact, Ausgrid has entered into agreements with cogeneration operators to pay them network support payments in recognition of a benefit further upstream where we are able to defer some expenditure, specifically identified, and make that possible by entering into an arrangement with the cogeneration operator. That arrangement involves ensuring continued and reliable operation during the critical periods of peak demand when they would have needed those assets. It is certainly possible.

However, it is in limited circumstances, and especially at the moment where our network areas in general are experiencing very low growth so there are very small amounts of spending on expansion to meet peak demand. If you like, there is not a lot of money to avoid. That makes it more difficult to identify opportunities, but they do exist. However, the circumstance for every cogeneration plant I have seen connected has been that they have required full standby from the network, so a fully built network has been put in place. It is still early days in terms of long-term arrangements and how that might pan out with much higher levels of penetration. However, given the small numbers, there is no material saving for the generator.

CHAIR: The argument has been put that if there is a network of distributed generation it might be more reliable in terms of saying we can defer network expense and supplementation. Does that hold greater sway?

Mr GORDON: It is possible to use that portfolio approach, and we would use it ourselves in establishing a demand-management program to look to defer investment. In order to manage that risk, we would typically have a portfolio of actions that might not all be generators. There are other ways to reduce demand than to use generators, which in most cases tend to be more reliable. If generators stop working, the load reappears on the network with a load-reduction program—that is, someone switching off a process in a factory and obviously once it is off it does not come back on unless it is switched back on. There are other options that also provide the same result in terms of the electrical network that can be less expensive and more reliable. We would typically opt for a larger program and mix them together rather than rely on a single point, which may or may not perform.

CHAIR: What about the scenario where someone is not drawing energy from the grid but is connected and is generating so much electricity that they want to put it into the grid? I am not sure how your access availability charge works in respect of that customer potentially drawing on power. Your submission acknowledges that networks have been traditionally designed and built to distribute electricity rather than to receive it. Mindful of those comments, given that cogeneration is becoming more common and more operators wish to export energy to the grid, has consideration been given to designing and building networks that can more easily receive electricity?

Mr GORDON: With all these questions there tends to be a technical perspective and a commercial perspective. From a technical perspective, there is no difficulty per se with exporting electricity to the network. In fact, from a technical point of view the challenges and difficulties are very little different to connecting in parallel and not exporting. If you are connected in such a way that you do not export and you always draw some

energy from the network, there are some simpler protection technologies you can use, which will save you a bit of money. A lot of projects attempt to run in such a way that they do not export, simply to avoid an addition to their connection costs. Unless the export quantity is greater than the quantity that would otherwise be drawn, the capacity of the network is fine to take that away. If it gets too large, you get into the difficulty of having to push too far back up into the network before it gets to a point where it can be effectively redistributed to other customers. That will cause some technical concerns with voltage rise, because you are effectively pushing the power back in and the voltage at the point of connection goes up.

That is a bigger problem for the proponent, who sees the worst situation, than it is for his neighbours who would be second cab off the rank for impact on their network. We have an obligation to manage the voltages on the network, so that all customers have voltages within appropriate ranges and do not suffer damage to their equipment. There can be some difficulties at the very large end, but typically where there are amounts of export within a similar order of magnitude to the size of the load in that area, that is not a problem. Most of the solar PV systems on rooftops that are connected export at some part of the day, because usually when they are running flat out at midday there is very little load on the house, so they tend to push energy backwards, and when they come home the solar is not there. It is time differentiated, so you have periods of export and periods of import. The same thing tends to happen with cogeneration plants. They tend to be run at high-price periods, which are during the day, and turn them off at night when energy from the market is at a low cost and not worth trying to offset. They both import and export over the course of the day.

Ms HENDERSON: Solar photovoltaics that have been installed have created voltage problems for our network. As Neil noted, this has created problems for customers because systems automatically shut off if the voltage rise has been too high. Many customers have questioned why they have not been paid for power they are generating, where it would have been pushing voltage to the network too high. We have been investing across New South Wales to try to offset these unavoidable situations.

CHAIR: Have you thought about how you might redesign or rebuilt networks to receive electricity more easily, particularly where that electricity could be generated in a period of peak demand as opposed to solar which generates electricity when it is not needed?

Mr GORDON: Part of the issue is distribution. The fundamental job of the electricity distribution network is to take the energy from where it is generated to where it is used. That is what we do all day, every day. If it is generated in a different place, our role does not really change. If it is not used at the point of generation then it needs to be taken somewhere else. If it is a large quantity then it needs to be injected further up the network at higher levels. That is quite feasible, but does require the construction of some assets and that adds an expense.

CHAIR: Are you looking at that area?

Mr GORDON: That does not really present us with any difficulties or problems, to be honest. As Pamela said, a proponent who wishes to connect a generator of that size is exactly the same as someone connecting a power station but at a smaller level. They pay for the direct connection access to get the power to a point from which it can be distributed. In some areas there are more challenges than others. The CBD of Sydney, for example, is a particular type of network designed to produce a very high reliability outcome because of the nature of the customers in this part of the world. It presents some more challenging issues. The other key technical issue common everywhere is the amount of energy discharged into a short circuit if there were a fault.

Adding more generation to the network increases that fault duty, which can overcome the limits that the switchgear and switchboards can tolerate. That could produce a dangerous situation, which is the other key problem that we have to overcome. It is probably the most challenging one, particularly for dense areas like the urban, CBD-type areas whereas voltage would be more of an issue in thinner, rural-type areas. I now refer to an earlier question, the commercial aspects and charging for export. Under the current national electricity rules we are not able to levy any distribution use of system charges on the generators who wish to use the network to export part of the time and be customers part of the time. We can only levy charges on their consumption part.

CHAIR: What has been the trend in the number of requests for cogeneration system connections to the network in recent times? Where is it going?

Mr GORDON: It goes up and down a bit. My interpretation is there tend to be different economic drivers at different times under different schemes and support from government agencies, which moves things

around, and market conditions around sustainability and those sorts of things. We have 19 trigeneration or cogeneration systems connected at the moment to Ausgrid. We are currently negotiating with another 29. It is increasing, but it was probably higher a little while ago. It has dropped off a bit and it tends to come and go as the economic and other drivers go up and down.

Ms HENDERSON: For general generation, we have about 150,000 in New South Wales.

Mr JOHN WILLIAMS: But they are not putting back into the grid. There are 150,000 in location.

Ms HENDERSON: They are putting back in the grid from photovoltaic schemes. Under the Solar Bonus Scheme they are putting back into the network.

Mr GORDON: The vast bulk of those are small, which are effectively automatically connected. They do export into the grid. I can only speak for Ausgrid on hard numbers and, as I said, we have 19 trigeneration or cogeneration systems and another 46 other types of generators that are connected and exporting into the grid on occasion.

CHAIR: At what stage do prospective cogeneration operators usually contact you to begin the negotiation process? I am trying to ascertain whether it is early enough to identify and rectify any potential issues. Is there a compulsion for them to contact you at a particular time? Does that work smoothly, or is there tension in that area?

Ms HENDERSON: It is generally not early enough for the connection time frames. It is generally a long process. The higher they want to put the generation onto our network, the longer it takes. As Neil said, the technical challenges are not insurmountable, but there is quite a bit of engineering work to assist that. Invariably a proponent like us is working through a number of different options. Each of those options needs analysis, which takes time.

CHAIR: How would you propose the current situation be changed to make it better from everyone's perspective?

Mr GORDON: That may be taken out of our hands by the current AEMC inquiry which is establishing some guidelines. We have some concerns about where that inquiry is headed at the latest iteration. The challenge for us is that connecting a generator is inherently technically more complex. It is often the case that proponents are still trying to figure out what is their best commercial decision. They are still at a point where they are changing the tactical characteristics of what they are trying to connect, and that means every time they say they have decided to buy a different machine we have to start again on the technical analysis. It is much more complex than the connection of a load customer, which is better known, and it takes a bit longer.

We have a mix. Some proponents come to us too early. We have people who say: "I would like to build a cogeneration plant. Can you tell us where you would like us to put it?" That question is too open for us to deal with it. Others say: "We've built the cogeneration plant. We're connecting it tomorrow. Please come out and turn the switch on." That is clearly too late, so there is a range. Some of that is driven by inexperienced people who have not been involved in that part of the industry before. Some of it is driven by expectations around the time frames required to connect new load, which are probably the dominant things that people understand.

Mr GREG PIPER: The committee has heard about the impact of uncertainty on decisions regarding connections to the network. Do you give information on the probable decision date, or more general guidance somebody might need to make a commercial decision and the estimated costs of necessary studies or other associated expenditure? If you do, how accurate is information on deadlines and quotes?

Ms HENDERSON: We have implemented in New South Wales a scheme under the National Energy Customer Framework that came in on 1 July this year. That is where we need to give general connecting customers dates for when we expect connections to occur. Those proposed dates come into force when we have a formal application from the customer. As Neil said, often a customer comes with a number of different options and at that time it is very difficult to give suggested time frames. However, once they have the knowledge and are submitting an actual application, we do the deadlines. The deadlines will be subject to variation depending upon the customer's contractors. They have to take on an accredited service provider to do the works for them, both design and the construction framework. We only undertake connection services. Since we have only been

under this framework from 1 July this year, we cannot accurately answer your second question, but we can take it on notice and see what information we can get for you.

Mr GREG PIPER: Thank you. Are there significant differences in the connection scenarios in the applications you get? I assume from what you have said that there are quite a few, ranging from PVs. What about the cogeneration market?

Mr GORDON: If you just look at cogeneration, typically they range in size from a few hundred kilowatts to several megawatts. The types of machines vary and that creates some variation in their impact on the network and therefore the types of requirements. The other key variant is where they are wishing to connect and the nature of the network in that area. Geographically you do not have to be far apart to be electrically in a different part of the network. It is sometimes confusing for a proponent who has moved a kilometre from where they were for a certain quote and the quote for the new area is vastly different. It is one of the challenges we have faced in these sorts of discussions for years. The requirements are customised depending on the nature of the local network.

In general terms, you could say that about 80 per cent of them have similar requirements. For example, typically you could quote for what you would expect to be problems and how you would overcome them. There is usually a range of ways to overcome these issues. As Pamela said, in New South Wales, which is a little different to some of the other States where monopoly providers have control of all the design work, the design work is contestable. The proponents employ their designers to do a lot of that work in response to our requirements. In some senses New South Wales is in a better position from a proponent's point of view, because there is more control over that variation. It is fair to say that there is quite a bit of variability even for similar devices in different locations.

Mr GREG PIPER: I will have to go back and read the transcript of this but I think your penultimate answer was in relation to a national—

Ms HENDERSON: —energy customer framework.

Mr GREG PIPER: Is that framework going to develop a uniform set of rules or requirements for applicants so that they are given some surety in making decisions about whether or not to invest in these areas?

Ms HENDERSON: There is a uniform set of rules but within that there is opportunity for variation. Generally a customer submits an application and then we are required to get back to them within 10 days to advise them how long it will take. If it is a larger customer—say, over 200 amps; and we have a huge range of customers in that bandwidth—the time to connect could be significantly different. So it could be within six months, it could be within two to three years, depending upon what other network works we have to do and what contestable works they have to do to connect. There are consistent requirements of what information we have to provide to the customer. The time frames that we have to complete it within are not consistent because it depends upon what the actual connection obligations are. It does work effectively like an offer and acceptance, so we do offer a date the customer can come back if they are comfortable with it.

Mr JOHN WILLIAMS: Pamela, in your opening comments you made some statements about commercial customers connecting to the grid and if there are upgrades required that it would not be at their expense, which is an interesting comment. One of the greatest challenges for me in my electorate is commercial customers telling me that because of their new development they are required to upgrade the network on behalf of the neighbouring areas. Is that consistent with the policy that you just outlined?

Ms HENDERSON: It is a similar comment to what occurs. You are talking about an urban residential development?

Mr JOHN WILLIAMS: I will give you an example. The most recent was a motel development. They went to connect to the electricity and they said, "We have not got the capacity to supply you. For us to give you that capacity you need to spend $40,000".

Ms HENDERSON: That would be fairly consistent across the State. Generally what occurs is once you have a load that is over a certain amount—we currently have a 200-amp level and it will be changing because the actual national rules are proposing 100 amps—once a customer is over 100 amps they pay for the extension of the existing network. So if the network is up on Smith Street and they are a bit further down they

pay for the connection from where they are to where the network currently exists. What we pay for is if we have to do work further up on the network to make it more robust to be able to take on that connection. So they design the assets for which they pay, they construct the assets and then they are handed over to us once we determine they are compliant with our technical and safety obligations.

Mr JOHN WILLIAMS: We are talking about 16 recognised cogeneration, trigeneration customers currently in the network. Is that correct?

Mr GORDON: In Ausgrid, yes.

Mr JOHN WILLIAMS: So regardless of their request to generate back into the grid, their time of use—and we are looking at one particularly that would switch on in peak load and obviously generate its requirements internally at that period—as the number of those developments continue, is that going to be a challenge for the network to be able to measure the comings and goings of these cogenerators and trigenerators?

Mr GORDON: In short, yes. I think as Pamela said in her introduction, the network that we own was designed in a time when we had moved from the very early days of electricity where everything was local generation to a more centralised world with the Electricity Commission and the centralised generation because that was a more economic way to provide it and the transmission system was pretty much a one-way system. We are now moving into a world of technology which is changing and that does require dealing with some of those problems differently. One of those problems is data—collecting that, understanding it, understanding what that means for forecasts of requirements right through the system.

As you can imagine, we need to be able to forecast the demand on each part of our system right the way through for the next 10 or 20 years—we plan over a 20-year time frame—and the size of generation, where they are large ones we identify them and are able to deal with them. We have been doing some work on the very small end, the PV component, trying to deal with just what does that mean and can we understand it and predict it. You can split all these components out and develop forecasts for what that might mean in the future. As we touched on before, that idea of a portfolio effect when you have got a large number of generators, if they were operating randomly you could do some statistical analysis, but the problem is they all want to do the same thing so they tend to operate together, and there are also certain risks.

One of the situations is that at times of network disturbance, for whatever reason, and topical at the moment—if a transmission line gets affected by a bushfire it can create a disturbance right across the State very quickly and most generators, quite sensibly, are designed not to try and feed a network which is in distress and will therefore trip off and disconnect themselves to protect themselves in that sort of circumstance. So there is the hazard that in the event of something going wrong, which would be the time when you most want to rely on them, they might all, or a large number of them, disconnect for other reasons. So there is both the difficulty of knowing about them all and measuring what they are doing and then predicting what will happen during any abnormal situation, which is really what we have to plan for.

Mr JOHN WILLIAMS: At some point in time could you say, "You have got to stop further installations because we have got to work our way through this going forward"? Is there a point where you have got to stop the future developments?

Mr GORDON: I guess that is a possibility. It is more likely for the development of a large number of small-scale ones rather than the cogeneration, trigeneration space. Cogen, trigen tends to be larger, so it is not going to proliferate at a huge pace that we will not be able to keep up with. I think it is more developing how we do it rather than a place of change.

Mr JOHN WILLIAMS: That leads me into some other questions which are adverse to that. Is there sufficient information available to potential cogeneration operators on the requirements of connecting to the network? If so, is this information properly promoted and made available? If not, should more information be made available and where would be the best place to provide this?

Ms HENDERSON: We have two forms of information that we provide; one is procedural and what the process is to connect, and for all three organisations in New South Wales that is available on the website. We then also have technical information as to what is needed to submit technically for connection. I guess from time to time all of those documents are updated and they will vary from time to time. I am sure we also respond

to feedback on how we should improve them so that they are more reader-friendly. Again, they are on our website as well.

Mr JOHN WILLIAMS: Are you in a position to release information on other connections to assist potential operators?

Ms HENDERSON: You are suggesting if we have two people applying at the same time we share information?

CHAIR: Past experience, whether it might be confidential or whether it might be publicly made available.

Mr GORDON: In general terms I do not think there would be any material difficulty in releasing information that was de-identified and appropriately protected. Privacy rules do not generally apply to businesses in a legal sense, but it would be our general practice not to be giving out information about our customers. They generally do not like us to tell their competitors in particular what they are up to. The idea of case studies and information is something that we have done in the past as examples, if you like, about the technical requirements. That is something that is not only possible but we have a small amount of funding available for innovation in various things and generator connection is one of them, and one of the obligations that comes with that funding is that we publish those results widely and make them available. There is certainly information available or other examples from ourselves but mainly from some of the industry bodies that deal with that industry and have collected information and published it in the past that I am aware of.

CHAIR: Ms Henderson, you were perhaps alluding to other connections going on at the same time or perhaps in the same immediate proximity. If we apply the question in that context do you have any thoughts?

Ms HENDERSON: One of the problems is whether it is an inquiry versus the formal application for a connection. Again, within the bounds of confidentiality we should be able to provide the information, but it will depend upon whether it is an inquiry versus a firm application to connect.

Mr GORDON: There may be some concerns about commercial advantage. As we said before, with any connection, generation or otherwise, the capacity is available on a first-come first-served basis. So it could be commercially difficult to provide information in any form of detail if they ended up being competing proponents who had to argue about who came first. We would have to be very careful about appropriate probity in that sort of circumstance.

CHAIR: I am conscious that we have gone a bit over time. I am going to finish this session by 12, if you are up for another five minutes, and I apologise to those who are waiting. Mr Williams may have a final question and then Mr Bassett will follow.

Mr JOHN WILLIAMS: Within the commercial world obviously there are people who are looking for proponents for cogeneration and trigeneration schemes. Would you recognise that there are standards that have been created by these installations that you can easily match to your requirements? Do they pretty well tick all the boxes?

Mr GORDON: You are saying that there are some proponents who have been in the industry for a while and have done a few and once they have done a few they should know most of the answers?

Mr JOHN WILLIAMS: Yes.

Mr GORDON: I think it is the case in a broad sense. But, as I said before, the location and the characteristics of the network at that location can change the requirements. So something that works quite well in one area may not work in another area. If I may add: There has been a push from various quarters to try and come up with a standard connection arrangement. That is technically possible, but to have a standard it would have to deal with the most difficult circumstances and therefore it would mean that it was probably the most expensive answer, and I would always advise a proponent it would be in their interest to seek a customised one because it is probably cheaper than a standard one.

Ms HENDERSON: There could be variation upon the needs within our network alone and there could be variation between needs between New South Wales and Victoria because we have different historic networks.

Mr BART BASSETT: The committee has heard that an increased focus on location of generation and use incentives as opposed to time of use incentives may benefit cogen systems. Can you comment on that? It also identifies the potential benefits of interval metering. How common is interval metering in buildings?

Mr GORDON: In commercial buildings I think interval metering would be available in virtually all of them. Interval metering is generally used for all large customers. The only area where we do not have interval metering is at residential level, which should not be applicable in the cogen world, and even there about 25 per cent of Ausgrid's network has interval meters. So interval metering is available very broadly and anywhere where we apply the capacity charging regime we talked about earlier we use interval meters for those. Metering should not be an issue for most cogeneration installations.

The question of locational varying charges is a very challenging one—technically how you do the economics and politically how you manage someone who lives literally across the road from someone else and pays a different amount in their electricity because of where they are and nothing they have done. That is a historical concern and you will note that in New South Wales we have three distributors. We have different charges—similar to one another but they are different—but that is the only regional differentiation in charging that exists in general.

Trying to work out how you would provide that sort of signal is very difficult through conventional pricing but in the example I gave before about a demand management project that was targeted at a particular location, those benefits of, in effect, doing the opposite, paying network support charges were difficult in a particular area where we had an issue, and that mechanism is probably the most prospective in terms of providing some elements of what proponents look for and how do they locate and take advantage of benefits that may accrue with the network. As I also said before though, right now in particular because of the low growth environment we are in there are very few of those opportunities in existence in the foreseeable future.

CHAIR: We do have other questions to put on notice. One relates to the potential real changes being considered by the AEMC around streamline connection processes and where certain time savings might be made. Another question relates to cogeneration operators that are selling energy to other tenants or seeking to avoid paying for grid support. You mentioned in your submission a recommended mechanism how those might be better dealt with within the system. The Committee will forward you some questions rather than addressing them now. The Committee also understands that there are mandatory network design planning and reliability standards for distribution network service providers. Should similar standards be applied to cogeneration operators and, in your experience, would that be feasible for smaller cogeneration operators? Should there be a distinction between the size? Are you happy to respond to those questions in writing?

Mr GORDON: Yes.

CHAIR: The Committee may have some additional questions, the replies to which will form part of your evidence and be made public. Are you happy to provide written replies to any further questions?

Mr GORDON: Yes.

Ms HENDERSON: Could I add a comment in relation to a question about investing in the network to ensure that we can take on cogeneration?

CHAIR: Yes.

Ms HENDERSON: Our assets generally have a 40 years life. We try to maintain them so they last longer than that. So anyone who is going to invest in them we have to ensure that it is prudent. We do try to ensure that we future proof the network but we can only future proof it to the extent to what its probably future is. We invest now for 40, 50 or 60 years, depending on how long the assets do last and we do have to make sure it is prudent.

(The witnesses withdrew)

ALLAN WILLIAM JONES, Chief Development Officer, Energy and Climate Change, City of Sydney, and

PETER COOMBES, Senior Program Manager, Green Infrastructure, City of Sydney, affirmed and examined:

CHAIR: Have you been issued with the terms of reference of this Committee and information about the Standing Orders that relate to the examination of witnesses?

Mr COOMBES: Yes.

Mr JONES: Yes.

CHAIR: In what capacity do you appear before the Committee?

Mr JONES: As Chief Development Officer, Energy and Climate Change for the City of Sydney.

Mr COOMBES: I am appearing as Senior Program Manager, Green Infrastructure for the City of Sydney.

CHAIR: Do you have any questions of a procedural nature?

Mr JONES: No.

Mr COOMBES: No.

CHAIR: The Committee has received a submission from the City of Sydney? Do you want it form part of your formal evidence?

Mr JONES: Yes, we do.

CHAIR: Do you want to make an opening statement?

Mr JONES: Yes. Thank you for giving the City of Sydney the opportunity to appear before you and to set out what the City of Sydney considers are the critical issues impeding the uptake of precinct trigeneration in New South Wales. I do not have time to summarise all of the issues covered in the city's submission so I will concentrate on the key issues that were set out in its submission. Firstly, regarding the use of precinct cogeneration and trigeneration in other jurisdictions, there are more than 330 gigawatts of electricity worldwide generating capacity using cogeneration or trigeneration, most of this at precinct or city-wide scale. The United States has the largest generation capacity from cogeneration and trigeneration, followed by Russia, China, Germany, India and Japan. This includes cities with a similar climate to Sydney such as Barcelona, San Diego and Singapore.

In terms of safety, reliability and security of supply, many precinct cogeneration and trigeneration systems have been operating for decades in a safe and reliable manner with some systems reporting 99.99 per cent reliability. Precinct cogeneration and trigeneration with underground networks also provides a high degree of security of supply that is beginning to be seen as climate change adaptation or as protection against extreme climate events compared with the more exposed overhead poles and wires of electricity grids. For example, when Hurricane Sandy hit the United States in 2012, it caused major damage as well as power losses across 24 States with damages of $66 billion, excluding losses due to business interruption. However, those consumers who were connected to precinct cogeneration or trigeneration continued to receive their energy supplies.

Co-op City in the Bronx is just one example of this where 60,000 residents, six schools, three shopping centres and the police precinct continued to receive their electricity, heating and cooling in island generation mode when the electricity grid's poles and wires were blown down and remained unfixed for several weeks. As can be seen in other jurisdictions, precinct cogeneration and trigeneration is embraced not only to reduce emissions but also to reduce energy costs by turning distribution networks from passive networks into active networks which also lend themselves to smart grid operation.

Secondly, regarding the actions that must be taken to enable precinct trigeneration, and renewable energy in New South Wales, we feel particularly well qualified to give you our views, and to field your

questions on this important topic because no other government in this country has devoted more time and more resources than we have in trying to make precinct trigeneration work. Those efforts include bringing me out from the United Kingdom four years ago so that I could share the expertise and knowledge gained in implementing more than 80 decentralised energy networks based on cogeneration, trigeneration and renewable energy in Woking and as Chief Executive Officer of the London Climate Change Agency policy, strategy, master planning and development of large-scale decentralised energy networks in London, including the London 2012 Olympics.

However, despite the very significant effort and resources that we have devoted to this, the development of precinct trigeneration remains challenging, particularly for new developments such as Green Square. We have had some success such as supporting the precinct trigeneration project at Central Park via an environmental upgrade agreement but in general, precinct trigeneration faces regulatory barriers to its economic implementation unless schemes can be connected behind the meter or over private wire. The regulatory environment makes it very difficult to establish schemes like those that operate in other jurisdictions around the world that delivers reliable energy with greatly reduced carbon emissions as compared to conventional coal-fired power stations. And the reason for that is simple. We just do not have in New South Wales—or elsewhere in Australia—the regulatory environment needed for precinct trigeneration or renewable energy to flourish. Most other countries have it, but Australia does not.

We need six major actions as a priority to make precinct trigeneration viable in this State:

Number one, network charges for exporting local electricity to local customers must be reduced. There is a very successful system already operating in the United Kingdom, which could easily work here. It is called the common distribution charging methodology. Under this system, local generators get paid by network operators in accordance with a fully-transparent publicly-available price schedule. The amount that local generators get paid depends on the type of generator, time of day, continuity of supply and connection voltage. This improves the economics of local generation and all consumers on the network benefit through avoided network costs and investment. Network operators also benefit because there is less congestion on their networks, costly peak power can be significantly reduced and they don't need to spend as much money upgrading their networks.

Number two, local generators must be able to economically export and sell local electricity to local customers. This is especially important for precinct trigeneration, because thermal energy network customers also want to buy low carbon trigeneration electricity. Although I have implemented more than 80 private wire networks in the United Kingdom, I do believe that the local public wires network should be able to be used to export local electricity to local customers. Using public wires for local export is referred to as virtual private wires which simply replace remote electrons with local electrons. This makes use of existing networks and minimises network investment.

Number three, a feed-in tariff must be introduced to encourage the early development of precinct trigeneration. Regulatory reform takes time and we need this to stimulate the precinct trigeneration market before too many opportunities are lost. The tariff will be a combination of the value of local electricity generated and the value of network benefits afforded which can become a precursor to a common distribution charging methodology in New South Wales. Both actions two and three, are not inconsistent with the Committee's recommendations 15, 21 and 22 in is inquiry report into the Economics of Energy Generation in November 2012.

Number four, the 2012 NABERS ruling on precinct trigeneration must be reversed back to the NABERS 2010 ruling. Local electricity generation and supply from precinct trigeneration or renewable energy is not included in the National Greenhouse Account Factors and must be recognised under the Commercial Building Disclosure Scheme, which is based on NABERS. Last year's ruling incentivised the much less efficient building trigeneration over high efficiency precinct trigeneration creating a perverse outcome in terms of emissions reduction by direct action. The NABERS 2012 ruling effectively torpedoed precinct trigeneration using local public wires networks which is detrimental to both emissions reduction and network assets. In the absence, of any other regulatory tools to incentivise precinct trigeneration as they have in other jurisdictions around the world a higher NABERS rating by using precinct trigeneration electricity is of value to landlords as it is directly reflected in tenant acquisition and retention rates as well as higher commercial rents.

Number five, the recommendations of Australian Government's 'Inclusion of Energy Generation in Building Energy Efficiency Standards' report published in 2012 must be implemented. This is low hanging fruit

for a direct action policy and New South Wales Government must lobby the new Australian Government to implement the recommendations of the report.

Number six, the Gas Act must be reformed to enable renewable gas to be injected into the gas grid and to be directly purchased via gas purchase agreements between renewable gas generators and consumers such as precinct trigeneration network operators. Again, this is another low hanging fruit for a direct action policy which will also contribute towards the rural economy and carbon farming initiatives as well as diverting domestic, commercial and industrial waste away from landfill.

CHAIR: Thank you for that succinct summary. The six action points in particular will generate some discussion. You have sat through some of the previous witnesses' questions and answers. The first series of questions that I have in large part replicate discussion we had about a process for approving the connection of the cogeneration system. I know your submission reflected on that as well from a different perspective. At what stage in the planning process did you begin the negotiations with the distribution providers and where did the main delay arise in the overall process?

Mr JONES: There are two levels to that. One is we actually spent a lot of time with Ausgrid and Jemena in developing the trigeneration master plan so much of what you have heard this morning and I daresay you will hear later today is looking around the wrong issues. Why is New South Wales—or indeed Australia—not able to do the same things that other countries around the world do? Is it something that it is doing or not doing that is preventing increasing trigeneration?

So when we developed the trigeneration master plan—and if you look at the map of the city, the indicated points where various megawatts could be injected into the distribution network are not our figures, they are Ausgrid's figures—we also took into account Jemena's, and you will hear from them later today, need to augment certain parts of the gas network in the city, which is an historic network. At that first level we produced a detailed technical trigeneration master plan that could be used by anybody that would give them advanced information about where they could connect to, where the energy loads were, that was most economically efficient, not just for the proponent but also for Ausgrid themselves.

At the second level the application for the trigeneration project, for example at Green Square and Prince Alfred Park, we were not so much delayed there; we were able to rely on information in the trigeneration master plan and we did not deviate from that. The issues that affected Green Square were not so much to do with Ausgrid or affecting Green Square or Prince Alfred Park, they were really to do with the reversal of the NABERS ruling. At the moment, unlike other countries around the world, it is the only regulatory incentive that there is for someone to actually implement cogeneration and trigeneration. So the NABERS 2010 ruling enabled those projects to be commercially viable and when they were overturned that was a significant part—there were other issues as well—as to why that was no longer commercially viable.

So the trigeneration projects that we are looking at at the moment are those that are connected behind the meter or connected by private wire; just the opposite of what we set out to do, that is, to make the maximum use of the local distribution network. If we do not have joint government thinking in this area you could end up with many thousands of small-scale systems connected to the end of Ausgrid's network causing all sorts of problems. You raised the question earlier of nitrous oxide emissions. These small-scale package systems that are incentivised by NABERS do not have to comply with those rules. Our systems not only comply with the 250 milligrams per cubic metre of air but the larger systems you can fit selective catalytic of reduction and bring that down to 50 milligrams per cubic metre of air. The systems that are now incentivised by NABERS do not do that and they are not required to do that.

CHAIR: You have probably gone on to a number of other topics which, to some extent, might be covered a little bit later as well or are relevant. I want to come back to the actual planning process and getting the approval granted for a connection. When you were negotiating with Ausgrid and Jemena and getting an indication from network providers of any potential issues that might have arisen in terms of the barrier to connection and what might have been done to improve certainty around issues connected with the connection approval, that whole process of having to negotiate to overcome barriers and the like, can you give us greater insight into your experience and how that might be improved?

Mr JONES: To be fair, we did not have that much difficulty with Ausgrid and that is partly because part of the work was done by the master plan. We could have been anybody. They could have taken the information in the master plan, they would have known what the connection capacity was, so there was a certain

amount of pre-engineering work that you already knew because that work had already been done—that is the advantage of the master plan—that meant that the delay that you would have otherwise had at that point if this had been a stand-alone project in the absence of a master plan could have probably added another 12 to 18 months. So that was a saving, if you like, because that effort was put into the master plan.

The second element, the actual more detailed process of connection to the network, where should the connection be brought in, what the capacity was and so on, we did not deviate from the master plan. Where Ausgrid had identified the maximum generation capacity, we kept within that. It is as simple as that. We are not trying to export electricity to Newcastle and Wollongong. All we are simply trying to do here is replace remote electrons with local electrons. That provides a bit of a blueprint of how to go about doing these sorts of schemes. The sort of stand-alone schemes starting off from scratch, there are considerable delays and we have been working with people like the Property Council, for example, and we are aware of some projects that have been delayed by as much as three years.

We did not get that far because for other reasons we had to actually pull out of Green Square and Prince Alfred Park and we are now proceeding in other areas, including the Town Hall precinct. That is going in accordance with the program that we think this sort of thing should be done. It is fair to say that the connection program could be speeded up. It is certainly far longer than it is in other countries. Rather than trying to reinvent the wheel as to what is to be done, it makes sense to look at how other countries in other jurisdictions are dealing with these issues. Certainly I can tell you in Woking in London it never took more than six months yet over here projects can run out as far as three years so there is quite clearly a disconnect between how you could do it and what you could do and how it is actually happening at the moment.

CHAIR: I hear what you are saying that your work on the master plan is not typical of a lot of other cogeneration facility operators and to that extent you took a more proactive approach but equally I am hearing that you would support a standardised connection process or a uniform set of rules or requirements that a cogeneration operator would have to meet prior to applying for connection and that that should be developed in conjunction with overseas experience? Is that a fair summary?

Mr JONES: That is correct. In the United Kingdom this is referred to as the Electricity Council recommendation G59; it is a detailed document. It covers all the possible things—and you have heard some of those issues raised by Ausgrid this morning—you can think about that you would need to take account of in terms of connection, capacity, voltage, fault levels. It is all written down and specified to the nth degree in detail and both the network operators and the cogeneration and trigeneration proponents work to that document. It is either G59 compliant, in which case it has an easy ride through. If it is not G59 compliant you have to go through a whole lot of rigmarole and so that actually disincentivised people to do that and everybody goes down a properly set out technical specification. Indeed when I came over here I was very surprised that Australia did not have such a document.

CHAIR: Do you have a sense that the Australian Energy Market Commission [AEMC] is actually going down that path or would you think that impetus is needed from elsewhere?

Mr JONES: The latter, I think, because I think the AEMC one—and here we are referring to the proposals from the Property Council, and I have advised them of this—is that you only see the barriers in front of you that are actually stopping you from doing things. You actually need to look at the whole barrier because you can get through the first raft of the barriers and then find there are these other barriers that you were not even aware of because you never got past that barrier in the first place. I think what you are talking about is a classic example.

The AEMC basically has kind of kicked that into the long grass whereas I think that ought to be one of their priorities, that we ought to have this standard specification, this set of engineering recommendations so that everybody knows what they have to do, so that we can minimise some of the issues that Ausgrid was talking about. We can make these projects more economic, we can deliver in a much more timely manner because it is complying with the standards set by regulation. I think that is work that AEMC should undertake as a matter of priority rather than just pushing it out to some point in the distance, which they currently have. They have concentrated on much smaller minutiae of detail rather than dealing with the core issue.

CHAIR: I move to a different issue. As part of the planned precinct cogeneration operation, did the City of Sydney consider gaining authorisation as an energy retailer itself and if so what were the main barriers to

proceeding with that plan? If not, were you happy with the arrangements you made with your energy retailer partner, Origin, to the extent that it did not become an issue?

Mr JONES: If you are aware of my background, that is what I did in the United Kingdom, but the regulatory environment over here is nowhere near as advanced, even back then, so therefore at no time has the city ever considered being a retailer for third parties—certainly to supply itself and maybe there might be third parties but even then we would do that through an energy provider and the reason for that is that we are not seeking to be an energy retailer per se. What we are trying to do here is to make it easy for the private sector to actually develop and implement their schemes.

So the Origin Energy work we did was as a result of a competitive tender and the model that they were using kind of fell away at the end and made the commercial proposal to us unacceptable. We are now of the view as far as our own projects are concerned that we are better doing it ourselves but what we are trying to work through now is really when the public sector is looking at these sorts of things, what is the area of market failure? The area of market failure is not in building trigeneration plants or even retail, assuming that the electricity barriers can be overcome. It is the thermal energy network. When you look around the world it is municipalities that put those in; it is a kind of third utility, if you like. We do not own the energy generated and we do not supply the energy; we just simply transport the thermal energy from A to B. That is currently missing at the moment in Australia.

The first example of that will be at Central Park where over 3,000 households will be supplied in that way, plus some commercial buildings as well. That is the area we see a market failure, not necessarily generating electricity or supplying electricity. That is an area that is actually being held back by government regulation. That is a part of what we are trying to do, to the point that people get fed up with us keeping pushing the removal of the regulation barriers. That is deliberate. That is an area that we see that we can have input. The second area is the ability for people to export thermal energy as well as electrical energy.

Mr GREG PIPER: With the proposal for distribution of energy produced under trigeneration proposed for the city, is it intended to use a private or parallel network or make use of the virtual private network?

Mr JONES: Either could be used, to be honest with you, but my advice to the city has been that we should be able to make use of the local public wires network and that the modern way of doing this is not so much by private wire but by a virtual private wire, that is, using the local public wires network and recognising that the electricity is not travelling very far. There are many ways of introducing cost-reflective charges. I think the most popular is in Europe by this common distribution charge methodology which rewards generators reflecting the beneficial impact on the network in terms of avoiding costs and future investments in networks. If we had that in place that would make the low carbon electricity going from A to B a lot more commercially viable to connect customers up.

Mr GREG PIPER: Can you clarify: I understand that the transmission losses within the present system from power stations such as Eraring run at 30 per cent efficient. If that is in the ball park what sort of losses would there be within this more localised grid?

Mr JONES: In terms of the laws of physics electricity will always flow to the nearest load. There are virtually no losses. It would be something like 0.0 something per cent In terms of thermal energy with a well-designed network. typically about 5 per cent. When you look at the power stations in the Hunter Valley—we have done some detailed work in this area—they have an electrical efficiency of 28 per cent. That is a little bit worse than Eraring. They lose about another 10 per cent getting that electricity from the Hunter Valley into Sydney. By the time the electricity arrives in Sydney you only have 25 per cent of the primary energy that has been burnt at the power station. If you generate electricity locally you are going to get something like 99 point something per cent efficiency as far as electricity is concerned and you are recovering the waste heat that would otherwise be thrown away in the Hunter Valley or in remote locations—you are putting that to good use.

An additional benefit from that heat is what it displaces. For example, if you are displacing electric air-conditioning that is 25 per cent of the network investment for peak power for just 40 hours a year and the trigeneration master plan shows that we would displace of the order of 542 megawatts of electric air-conditioning. I listened to the evidence this morning. If you do it properly and you do not have backup electric chillers to back up thermal chillers, you simply have backup thermal chillers to back up thermal chillers, and if the trigeneration goes down it gets its heat from a gas fire boiler backup you avoid the huge expenditure of

network charges. There is an element of education here because of the way the National Australian Built Environment Rating System has driven people to operate sub-optimal things. They have not seen the proper engineering that you need to get the real benefit from this, which is not only reduction of electricity flows in the local network and the avoidance of losses, but taking a huge chunk of peak power that causes so much problems in places like Sydney.

Mr GREG PIPER: I sensed you champing at the bit to interject at some stages during the earlier submissions. When we were talking about energy losses you were saying that basically you have 99.9 per cent efficiency, or something around that. That is for energy efficiency or transmission efficiency but what about reliability? In your submission and in your introductory remarks you say there is a very high level of reliability for the trigeneration distribution that you are talking about. I would imagine there has to be some consideration of the risk to customers. Can I ask: What protections would you put in place to protect energy customers for any potential failures of the system?

Mr JONES: Trigeneration systems, if designed properly, have three levels of backup. They have thermal storage which, in the case of the projects I used to do in the United Kingdom, could supply thermal energy for up to 48 hours in the event of a grid supply cut with no thermal energy going in at all. Second, you have gas-fired backup boilers. If the gas energy for any reason fell over it could still provide thermal energy. Electrical energy would still come from the network, but it would be much reduced electrical energy. The whole point of precinct-scale or city-wide systems is it is not a single generator. It is typically a group. In the master plan we worked out that should be 4 megawatt modules. For a 20 megawatt system you would have five 4 megawatt modules. They would not all go down at the same time in different parts of the city.

It is really about how you design these. It is common in the United States and other countries to design these as island generators. They operate connected to the network for normal operation but if there is a power cut in the grid—which is how they operated in Hurricane Sandy, for example—they switch over and they supply energy within their defined electric and thermal networks. That is something that has not been done over here. This is a key attribute of decentralised energy. When looking at the removal of barriers and incentivizing precinct systems it would be a good idea to extract the significant reliability benefits that you can get from the systems by making it much easier for the system to operate in island generation mode.

Mr GREG PIPER: Mr Jones, you talk about gas as being a significant part of that. I imagine gas is a primary source of energy. Earlier you were talking about renewable gas, methane from anaerobic digesters. Also I imagine you would be drawing on the grid, in other words natural gas. What is the contingency in your proposal for the loss or interruption of gas supply? Following on from your previous answer I imagine we are talking about a possible protracted significant impact?

Mr JONES: Gas networks very rarely break down. You only have to look at the evidence around the world of all the major disasters that they have had where decentralised energy networks have continued in operation. That is primarily because they are underground. The biggest risk for big grid electric networks is that they have overhead poles and wires and pylons and they are subject to storm damage, being blown over in severe weather, flooding and bushfires. Something that is buried underground, both in terms of the gas network supply in the system, and the local electricity network, is less vulnerable.

Cities, in any event, should be looking to move away from overhead poles and wires to underground systems, if for nothing else than to combat extreme weather events. The thermal energy networks themselves are also buried underground. You are not going to get 100 per cent. I can point to part of our submission where I have given you a number of examples where they have had truly significant events, including earthquakes, where these systems have continued in operation. My answer to that would be that it is, in my view, the next engineering level up of safety and reliability that an overhead poles and wires system could never provide.

Mr GREG PIPER: The submission from the City of Sydney suggests that thermal energy providers ought to be able to enter into binding agreements with building developers to provide for future demand. Can you elaborate on how these agreements might operate and why should occupants be required to enter into an agreement with a cogeneration operator if they are able to receive energy at a cheaper rate somewhere else?

Mr JONES: Like all things when you are developing a new market, it is the chicken and egg problem: you cannot invest unless there is a known energy take from that. We found in the Green Square development we were able to demonstrate that energy could be provided at a lower cost than they could get from the grid but body corporates do not exist and you do not have a body corporate to enter into a contract with. It is about trying

to get a similar regime to recycled water. We are building a recycled water network in Green Square. That is currently being built as we speak. The reason why that is being built is because it has a regulatory environment that allows you to do that. We did not have that for thermal energy.

Mr COOMBES: I would like to add that one of the major barriers there was the fact that the developer was unable to enter into a contract for thermal energy on behalf of the body corporate that would be formed in the future. Because the developer was unable to take on a contract on behalf of the body corporate it did not want to enter into contracts for the supply of thermal energy. That means that there is no certainty about getting return on investment until the building is built and all the people are in the building and the body corporate has been formed.

Mr GREG PIPER: It might be a given from what you have already said, but what would be the main benefits for occupants obtaining their energy from a cogeneration operator?

Mr JONES: We can start from the point of the benefits that are being tapped into elsewhere around the world. There are some barriers preventing that from happening. They get a lower cost of energy and by far a lower cost of carbon. Whether you have a carbon pricing scheme or not the reality is that a lot of people want low or, if they can, zero carbon energy. It does have a huge attraction to landlords because tenants want it. Tenants do not necessarily know what it is they want but what their agents are looking for is the greenest building. We heard from the Office of Environment and Heritage this morning. I think it is more than what they are saying. I do not think it is anything to do with costs. My experience here and in the United Kingdom is that it is the retention and attraction of anchor tenants. That is what drives commercial development. If you get a void of only one or two weeks it costs you a small fortune and if you end up with voids of 6 months or 12 months it costs you far more than investing in environmental improvements.

The environmental upgrade agreements Act which is being introduced in New South Wales is one of those wedges that go towards assisting that. I think the Office of Environment and Heritage representation of the National Australian Built Environment Rating System is entirely wrong. It is a case of perfect is the enemy of good. If we are to reduce greenhouse emissions in a cost effective way by taking direct action to implement projects then you do not want to put up artificial barriers because someone thinks it ought to be energy efficient as opposed to emissions. It is measured on emissions. They may say it is energy efficiency, but you get your star ratings on the amount of emissions savings.

The reality is precinct generation is not connected to the grid. It is important to understand what we mean by the grid. We have the transmission grid where the power stations are connected and the distribution grid or the distribution network, as we prefer to call it. That is missed entirely with the national greenhouse gas account factors. It is just not included. It is not double-counted in any way, it is just missing. Also in other countries, for example, the Energy Performance of Buildings Directive in Europe, it is not an option to say whether you are supplied by renewable energy or cogen or trigen, it is a legal obligation.

The previous Government steadfastly refused to put emissions ratings on the National Australian Built Environment Rating System. You have something that is notionally energy efficiency based on emissions but you are not allowed to mention emissions. Having the voluntary ability to put green power or trigeneration power is of little or no value at all to a developer or to a landlord. They will produce what the minimum allowed is in the legislation so that they are comparing apples with apples with other developers and other landlords. Something needs to happen in this area. Either precinct trigeneration needs to be brought back to the 2010 ruling or we need some other mechanism where they are obliged to state what their emissions actually are.

Mr GREG PIPER: I want to return to your Green Square proposal where cogeneration is being provided. Obviously it is a monopolistic regulatory environment. How could operators be prevented, or should they be, from charging higher fees in that environment where there is less choice?

Mr JONES: In terms of electricity, nothing at all in that area, it still forms part of the competitive market. The driver for the operator is to supply low carbon electricity at the same or lower price than their customers can otherwise get from the grid. That is all you need in this area. You do not need to force it on them at all. It is connected to the local electricity distribution network, so that electricity can come from the local generator or remotely from the Hunter Valley and the choice is with the actual customers themselves. We are not talking electricity here, we are happy with a fully competitive environment. The issue is about thermal energy because clearly there is a physical infrastructure connecting the generator and taking that waste heat and supplying heating, hot water and air-conditioning via a thermal network.

The way that these markets have started elsewhere around the world, like any market, they first of all start as an unregulated market because you need to get the business up and going but then it reaches a certain point—Copenhagen is a good example of that—where it becomes regulated. There are12 thermal energy network companies injecting thermal energy into the municipal owned thermal energy network, but that supplies 98 per cent of the buildings in greater Copenhagen. That is a quite a different position to where we are today where we have zero per cent.

Mr BART BASSETT: Your submission notes that large-scale cogeneration engines can be fitted with selective catalytic reduction to reduce nitrous oxide emissions but that it is not possible or economic to do it with to smaller cogeneration engines. What can be done to reduce the nitrous oxide emissions of those smaller systems? Given that you support increased use of cogeneration, how do you propose to manage the potential increase in emissions, particularly in the Sydney central business district?

Mr JONES: At the moment the Environment Protection Authority requirement starts at a certain level. It is based on thermal input, not on megawatts. If you have best-available technologies and you want the best environment available, why is there an artificial limit? If it is better to have large-scale systems because they can be fitted with that selective catalytic reduction but not for small-scale systems because they cannot, because manufacturers design their systems so they cannot be fitted, or because it is just not economic at that small scale, and if nitrous oxide emissions are of concern, you need to extend those requirements to all energy generation. That would at least be an incentive to reduce nitrous oxide emissions.

The measures set out in the Trigeneration Master Plan would reduce nitrous oxide emissions by centralised power generators by 5,000 tonnes per annum. That would be replaced by something like 220 tonnes per annum, and the only difference is that the emissions from the electricity that the city is currently using come out in the Hunter Valley and other rural areas as opposed to locally. That is the reason for reducing the nitrous oxide emissions themselves. When you compare that with the nitrous oxide emissions of the city as a whole, it represents 0.2 per cent, which is a relatively tiny amount. Other aspects of the Green Infrastructure Master Plan will neutralise that as well.

Mr BART BASSETT: When you said 0.2 per cent of the total in the Sydney central business district, is that based on current figures?

Mr JONES: That is the latest figure published by the Environment Protection Authority. In addition, 78 per cent of nitrous oxide emissions in the city are from transport.

Mr BART BASSETT: Your submission comments on the 2011 State environmental planning policy dealing with State significant proposals valued at more than $30 million. You believe that that is too low; you recommend $50 million. Why is $30 million too low and on what have you based the $50 million?

Mr JONES: It is just the scale. If we are to have policies that will incentivise precinct-scale systems, by and large it takes it above that limit. It is about having a more flexible arrangement. If we have other policies that incentivise precinct trigeneration, we do not want to be left with another bit that holds it back. It is about looking at all of these things. We pointed out the State environmental planning policy because it is one of the things that we know could potentially hold back some of these schemes on the assumption that the regulatory barriers are removed. If they are not removed, it becomes a point of interest and nothing else.

Mr BART BASSETT: I refer to feed-in tariffs for electricity generated by cogenerators. How does the city propose that the tariffs be funded, particularly to avoid escalating increases in the cost of electricity?

Mr JONES: We think that should be a precursor to the common charging in distribution methodology. If members have not seen it, we can provide the Committee with a copy of how that works in the United Kingdom and how it is saving money.

Mr BART BASSETT: That would be good.

Mr JONES: Members heard about that this morning. These things must be looked at in the round. We need all these other things in place. However, we are not looking for just any old feed-in tariff. This really is a precursor to something that should be looked at properly. It should not take this long, but we know from experience that regulatory reform typically takes about three years, during which many opportunities could be

lost. If the regulatory reform happens sooner rather than later—but let us say it takes three years—you can then look to regress, which is how it is done in Europe. There is a regressive feed-in tariff and people know in advance that it will decline and disappear. It is about having much more conjoined thinking about how these schemes are implemented.

Mr JOHN WILLIAMS: You mentioned transmission loss. If the master plan for Sydney were accepted and up and running, does it have the capacity to offset some of the transmission losses?

Mr JONES: Yes.

Mr JOHN WILLIAMS: By what percentage?

Mr JONES: It would reduce electricity consumption by 30 per cent and peak power by 60 per cent.

Mr JOHN WILLIAMS: Will that provide any benefit to other electricity consumers who are obviously not reliant on cogeneration? If you are offsetting those transmission losses at some point there must be a saving that may be passed on.

Mr JONES: The benefits I mentioned are not particular to Sydney. Given the way electricity networks work and what they charge, those benefits would apply to New South Wales as a whole.

Mr JOHN WILLIAMS: You mentioned a number of precincts, particularly London and Barcelona. Was there similar resistance to the development of cogeneration in those areas on the part of the grid operators?

Mr JONES: Yes. However, having said that, the regulator set up a joint working party and we worked through this. It is really about overcoming these opposing forces. Ausgrid has had to face many schemes that I would not like to see developed here—for example, the National Australian Built Environment Rating Systems schemes which have entirely the wrong incentives and which produce perverse outcomes. As I said in my opening comments, Ausgrid was involved. The first thing I did when I appointed a consultant was to set up a project team and invite Ausgrid and Jemena Gas Networks to participate. We had several meetings with Ausgrid, both with the team and independently because it wished to keep information confidential. Indeed, we signed a confidentiality agreement that enabled us to get some very detailed technical information in order to develop the master plan.

The message is that rather than taking a laissez-faire, scattergun approach, we need a proper plan, particularly in a city such as Sydney. We could not hope to implement an energy system for Australia based on a scattergun approach. The advanced economies of the world are moving away from centralised energy because it is the network charges that are causing price increases. That is one of the key advantages of decentralised energy, but not if people are still required to pay the full grid charges as if they were transporting electricity to Wollongong or Newcastle when it is going only across the road. These are very big issues that must be grappled with, and they have been. At the end of the day, Australia is competing and will be competing more and more with other countries that are experiencing declining rather than increasing energy costs.

Mr JOHN WILLIAMS: That is interesting because the evidence we have just heard does not instil any confidence in the networks' ability to do more rather than less for cogeneration and trigeneration. Somewhere along the line the resistance experienced in other precincts will be standard. We should know the answers to the points they are raising.

Mr JONES: You raise a perfectly good point. They are issues that had to be addressed in other countries. All I can say is that the politicians in those countries were able to make it happen. The networks in New South Wales spent $17.4 billion in the current five-year period and that has increased electricity bills. More than half of our electricity bills cover network charges. The operators have been incentivised to spend capital because they get a good rate of return. The regulator set too high a rate of return and the public sector can get capital at a much lower cost. All of the regulator tools that were in place pushed everyone to increase investment in networks. The networks are now worried about stranded assets and how they will be paid for.

At the end of the day it is an issue for the political masters on both sides of that coin. On the one hand they are receiving income from the network-owned businesses and on the other they are being hammered by businesses and residents who are paying these high electricity charges—some of which are entirely unnecessary. We must bring this into the round so that we minimise stranded assets. Having things like the National

Australian Built Environment Rating System ruling will maximise stranded assets because everyone will want to connect behind the meter and not export anything. That will mean a declining income base for the networks. That is just crazy.

Every country has been caught out overinvesting; it is not unique to Australia. It has simply happened earlier in other countries. We should ring-fence the infrastructure that is not currently being used because we have overspent. Some time in the future we will need it because we will have growth—we will build more houses. A large part of the stranded transmission network assets in the United Kingdom is now being used to run offshore wind farms. They actually generate more energy than onshore wind farms. It is really about being smart and looking at what we have invested in, what we are using and what we will not use and deciding whether it can be set aside. That will give pointers to how we should operate and invest in our network system over the next 20 years.

Mr JOHN WILLIAMS: I understand. Looking at us as a group of politicians who want to facilitate change and to see the development of cogeneration and trigeneration, particularly in New South Wales, can you tell us where we should seek guidance to put opposing views to the network to try to break down this resistance?

Mr JONES: It is already there. The City of Sydney has been aware of this for the past three or four years. Submissions to the inquiry contain similar suggestions. There are submissions from Origin Energy and Jemena Gas Networks. Jemena will say that the gas networks need augmentation for any large-scale systems. It would have problems with lots of small-scale systems connected at the end of its network. It is similar to Ausgrid and it would much rather go into the higher end. Ausgrid prefers 11,000 volts and connecting at that point, which is the workhorse of the distribution network. Jemena would have similar requirements for where gas is taken. We are okay for gas without any further augmentation for about 60 megawatts or 70 megawatts. The Trigeneration Master Plan gives two levels of network investment. No one single operator could invest in that gas network augmentation. It would have to be the public sector acting for the benefit of all of the proponents.

Mr JOHN WILLIAMS: Are you aware of any cogeneration systems that are able to run on renewable energy?

Mr JONES: There are quite a few around the world. That is the policy developed in London. I will explain what we mean by renewable gases. Anaerobic digestion has been mentioned. There are two types of renewable gas. Wet waste, which is mainly agricultural and farming waste, would use anaerobic digestion to create biogas. Current thinking here is that that is used to generate electricity. The New South Wales Renewable Energy Action Plan suggests that that will produce between 15 per cent and 30 per cent recovery of the primary resource—the average is 20 per cent. Converting the renewable gas into a substitute natural gas not to generate electricity at some remote location but to inject into the gas grid, produced an 80 per cent—that is, on average, four times—primary renewable energy resource recovery. Germany has the largest renewable gas grid injection program in the world and has significantly altered the economics of the rural environment. More than 10 per cent of total farm income in Germany now comes from renewable gas grid injection.

The second type of waste is dry waste, which is from municipal, commercial and industrial users. It also includes biomass or woody waste. That is converted into syngas using gasification. That can also be altered to comply with the specification of natural gas and injected into the gas grid. Germany passed an amendment in 2009 and by the end of 2012 it was injecting 8.5 billion kilowatt hours of renewable gas into the gas grid. That is how quickly that market moved. They discovered that renewable gas is cheaper than natural gas. That creates another political problem because how do you stop people from taking advantage of that?

That is set out in our renewable energy master plan and I am happy to provide further details. It is a very detailed technical regulatory and political document explaining how countries like Germany, Sweden and the United Kingdom are managing that process. Of course, it avoids all that waste going to landfill. One of the reasons it is economic is the avoided cost of disposal and the New South Wales waste levy. In my view it is a hugely significant for New South Wales because we considered the area within 250 kilometres of Sydney. There is more waste than we need to produce renewable gas to run Sydney. Therefore, there is potential to look at a much bigger area—New South Wales in its entirety or Australia as a whole.

Renewable gas could be injected into the gas grid, where we automatically get energy storage so it is not intermittent. European countries are even converting wind electricity to renewable gas and injecting that into the gas grid, because it is more economic and can be stored. There is inherent energy storage in the gas network.

In the eastern Australian gas market alone this would be 150 petajoules, which is more than Australia's 20 per cent renewable energy target. There is a need to open minds, educate people, disseminate knowledge and look at what is going around the world. New South Wales and Australia could take significant advantage of that by being early movers.

The gas regulations at the moment are not the same as the electricity regulations. A consumer cannot buy renewable gas from a renewable gas generator. It works on a system of all gas going into the gas network and that is it. It does not have the same process we have with renewable electricity connected into the electricity grid. For renewable gas we need a set of regulatory rules that mirror what we are doing with renewable electricity, so proponents in Sydney could purchase renewable gas from a farm in the Hunter Valley instead of electricity from the Hunter Valley and use that energy to run their systems. That is the kind of regulatory change we are looking for.

Mr JOHN WILLIAMS: Would these produce lower emissions?

Mr JONES: Zero emissions. If that waste goes to landfill it would generate methane, which is 24 or 25 times more powerful than CO2. You would essentially get negative emissions. In the Renewable Energy Master Plan we neutralised it to avoid arguments with people who said we would burn it. Essentially, if that waste were going to landfill, you are going in the opposite direction. It is a negative saving, because you are displacing methane with carbon dioxide.

CHAIR: Unlike some other cogeneration proponents, you emphasise the importance of producing energy to relieve peak demand as opposed to base load, which some cogeneration operations focus on. In referring to our earlier report and recommendations regarding feed-in tariffs, you said they need to be value-based—in other words, adding value. Are there ways to encourage cogeneration to relieve that peak?

Mr JONES: Yes, there are. Part of offering of network benefits by going to trigeneration and using waste-heat to run the air-conditioning, you do not get that benefit if you back it up with electric chillers. Ausgrid are quite right: although you might not use it, it is sitting there and they have to allow for it. That is being driven by the NABERS ruling, because by and large people are interested in the NABERS ruling to get a higher green-star rating. Some of these systems are switched off once they have their anchor tenants. There are some examples of that in Sydney and I am sure you are aware of anecdotal evidence of those. That is not where you want to be or where you want to incentivise. You want a system that incentivises people to do things you want them to do, not what you do not want them to do.

If you want the benefit of avoiding peak power, it is a permanent disconnection. If you do not have backup electric chillers but backup thermal chillers you can never consume peak electricity because it is not there. If you have backup electric chillers you are defeating the point. However, people are only interested in the green-star rating are not bothered about that. Incentives are needed that benefit the network and customers, and not just customers in the city. This has an impact right across New South Wales. A huge amount of energy is consumed in Sydney, 25 per cent of the New South Wales GDP. That is reflected in its energy, particularly peak power. People beyond Bathurst are contributing to this energy, although they do not know it.

CHAIR: What is a fair price for network access? At the moment, if you are connected to the network, you are charged the same amount by the distribution network. You are arguing for a different or discounted price as an incentive. How do you work out what that should be?

Mr JONES: It is in the evidence we submitted.

Mr COOMBES: This is done in the UK, a good example where regulations allow for cogenerators to be paid to put their electricity into the grid. A methodology for calculating the value of that benefit is set out in the UK electricity rules. The calculation takes into account reliability, the time of day, the type of generation and factors that make up the benefit cogeneration gives to the network.

CHAIR: That recognises electricity going in. I am talking about the network access charge for having the electricity available and being able to draw.

Mr JONES: We go back to the point Ausgrid mentioned. The reason we called this decentralised energy and not distributed generation is that distributed generation implies that you can inject more electricity into the network than it was previously consuming. The principle behind decentralised energy is that you put no

more into the network than you are currently consuming, so you neutralise the impact. The advantage of that is you avoid network augmentation. There are still fault level issues to be dealt with, but it is much easier to deal with them at the 11,000 volt level than the 400 volt level. There is a mechanism for network access charges and a mechanism for the ongoing available benefits. The real problem is that money is being spent on infrastructure and a certain amount of it is wasted. Demand has gone down and investment has gone into expected growth.

The real issue is how to deal with that political issue. If you know where you want to be and the only thing holding you back is the disconnection between what has been invested and the fear of having stranded assets, they will not be stranded for years and years. As I explained, those assets can be used in the future. That is the real issue. It is not technical or financial; it is the problem of overinvesting in networks that are no longer needed and who pays for what is left. That is the issue for all governments in advanced economies that have gone down this route. Germany has had to deal with this; the UK has had to deal with it. Countries try to deal with that as best they can. The NABERS ruling that tries not to put any electricity into the distribution network makes matters worse. You need a system that at least incentivises economic export of electricity, so that networks get a fair amount of their income passed through their wires. It has to recognise the benefits of local generation supplying local customers.

CHAIR: It seems that the mechanism should not be NABERS, which is really about a building. Trying to make NABERS something it is not, is problematic in itself.

Mr JONES: You are right. The reason NABERS has had so much attention is that it is currently the only available tool. There is no other mechanism.

CHAIR: As I said, you need a new tool if you are going to do that.

Mr JONES: At the back of our submission we gave an example of what is done in the UK. There is a list of things they do to incentivise decentralised energy. I disagree with what you said. Buildings are not just buildings, particularly those in cities. They are part of a precinct. If you take a building-by-building approach, you are not helping yourself with energy, recycled water, waste systems. We are dealing with Barangaroo, which has a recycled water system that could export 50 per cent of its surplus water to nearby buildings. There is no regulatory incentive to do so. You have to recognise that these are not detached houses in a suburb. This is a world city and its buildings are next to each other. They are almost organic in the way that they work. You are quite right about other regulatory devices incentivising precinct cogeneration or trigeneration, but to get this right from a planning point of view, buildings in cities are part of precincts and they do not stand alone.

CHAIR: Reportedly gas prices are rising and the carbon price is reducing. Where do you see the future of cogeneration?

Mr JONES: The simple answer is that most countries operating precinct and citywide cogeneration and trigeneration systems have higher gas prices than Australia is hoping to get for its export gas. If you recognise the true economic value of decentralised energy, it can support quite a high gas price. We know from the work we have done that we could have made Green Square work on that basis from some very detailed analyses and studies carried out by world leaders in this field. Long term, we feel that as part of the renewable energy master plan developing the renewable gas market is disconnected from oil prices. It is our own gas coming from waste and it should not be linked to oil prices. This is the way forward. There are no single silver bullets. That is the purpose of having the green infrastructure plan and the master plan. They all work together to get a low-cost environmentally and economically efficient system.

CHAIR: Acknowledging that the economic model, as it projects gas prices and the carbon price, is probably not working in your favour, there are people within the elected council of the City of Sydney who are critical of the trigeneration and cogeneration space, largely based on economics. Would you like to comment on that?

Mr JONES: I do not think it was the economics so much as being told we were going to spend $5 billion. That was never the intention. This is about incentivising the private sector to spend money to make it more economically efficient to make good business sense of this project. Yes, the council is spending money on legal advice for the regulatory environment and potentially could invest in thermal energy networks to connect precincts, but that was as far as it went. On our own projects, the same members you refer to are aware of the economics of the Town Hall precinct project and did not have a problem with that. On economics, I do not think we are that far apart. It is just the way it is being presented. When you look at some of the policy objectives, I

am not a politician and I cannot comment on carbon pricing. If you look at other countries like Germany and Sweden, that is being done by direct action energy policy. They have not relied on the European emissions trading scheme. It was not enough to make things happen. It might provide an income for traders, but essentially if you want to reduce emissions then you need to do projects—that is, direct action. One of the low-cost things that can be done is to remove regulatory barriers. That is what most countries have cracked first, removing regulatory barriers so you can tease out the true economic efficiency of decentralised energy technologies.

CHAIR: Thank you very much for the extensive information you have imparted. We have flagged a couple of areas and I understand you wish to table a document.

Mr COOMBES: We table our introductory presentation and our submission along with the common distribution charging methodology, the pricing schedule from the London Power Networks. It covers the payments to generators and the charges to customers.

CHAIR: Mr Bassett asked you to take some questions on notice. We may provide additional questions in writing and the replies would form part of your evidence and be made public. Would you provide written replies to any further questions?

Mr JONES: Yes.

Documents presented.

(The witnesses withdrew)

ANDREW JOSEPH BRUCE LEWIS, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, affirmed and examined:

CHAIR: I welcome Mr Lewis, Executive Director, Department of Resources and Energy, appearing as a representative of NSW Trade and Investment. Thank you for appearing before the Committee today to give evidence. Can you confirm that you have been issued with the Committee's terms of reference and information about standing orders that relate to examination of witnesses?

Mr LEWIS: Yes, thank you.

CHAIR: Do you have any questions of a procedural nature relating to any of those documents?

Mr LEWIS: No.

CHAIR: We have a copy of your submission from your organisation. Do you want that submission to form part of your formal evidence?

Mr LEWIS: I am fine with that, yes.

CHAIR: Before we proceed to more formal questions would you like to make an opening statement?

Mr LEWIS: No. I am happy to go straight to questions.

CHAIR: The Committee has heard from a number of stakeholders that there are significant barriers for cogeneration operators, particularly those that wish to supply more than one building from a single plant. What consideration has been given to changing the regulatory framework, if any, to make it easier for cogeneration operators to export excess energy—for example, removing the need to hold a retail licence?

Mr LEWIS: Our department has been looking at this issue for quite some time and we have been closely involved particularly with the City of Sydney as they have developed their proposal over the last few years. So we have looked at a number of the barriers that have been identified, particularly in terms of some of the licensing and regulatory proposals. We are interested in the potential to look at perhaps having a single licence that may apply to trigen network operations, which would bring together some of what we believe are still some fundamental statutory requirements in relation to safety, reliability and consumer protection.

But rather than have the split, as is currently the case between, say, a specific network regulation which is under the Electricity Supply Act and consumer protection which is under a different part of the supply Act and also under national rules, that there could be a consolidated effectively single licence to operate, which would get rid of some of the problems that have been identified with the existing regulatory regime, which has been designed for large-scale public networks and for large retailers. That is predominantly the way that legislation and the associated statutory requirements have been set up.

CHAIR: Just thinking about whether or not there might be a feed-in tariff for cogeneration operators that generate excess energy, in the same way that a tariff has been offered and continues to be offered to household photovoltaic solar system providers might it be feasible to think about a feed-in tariff, albeit more value-based, as indeed this committee recommended across an energy-neutral environment in a previous report?

Mr LEWIS: Any consideration of a feed-in tariff would ultimately be one for government policy to make that decision. But certainly I have seen the calls for that. I guess what has got to be kept in mind is that for any kind of feed-in tariff there has got to be someone who has to pay the tariff to the plant, and using the analogy of the solar bonus scheme which has been here in New South Wales, that has been levied from all electricity consumers that pay that. So you need to factor in where the cost of that is coming from, but also whether in fact there is a need in that part of the reason for the feed-in tariff for solar was to try and stimulate development of the industry and because the costs of that generation were significantly higher at the time than the normal costs associated with running the electricity network.

So seeing whether, in fact, trigen networks are significantly more expensive and therefore justify the need for a feed-in tariff or whether perhaps the economics are such that they can stand alone. Maybe some of the

problems that are being experienced by developers at the moment trying to get these proposals up is not so much related to the economics but, as you mentioned before, perhaps some of the regulatory streamlining may help and may mean that the need for a feed-in tariff potentially disappears if the economics of the projects can stack up quite favourably.

CHAIR: I suppose that was inherent in my question. If the value generated, particularly if it was alleviating peak load demand or contributing towards a need that had a demonstrable value, then why would we not have a feed-in tariff type arrangement which catered for that?

Mr LEWIS: There can be alternatives to a feed-in tariff. For instance, Minister Hartcher announced last week that the Government was amending the reliability licence conditions that apply to network operators. One of the reasons for that was to help reduce costs to avoid the need for direct infrastructure investment. So the changes to those reliability licence conditions combined with the new national regulatory framework that is going to be applied to the New South Wales networks from next year on means there are greater incentives for the network operators to look at alternatives to simply building poles and wires and transformers, that they may be able to contract with trigen or other embedded network operators to help relieve some of the stress on their system in particular locations, and therefore the embedded network or trigen operator may be able to receive payments from the network. So there are alternatives to a simple straight payment from a feed-in tariff; there are other regulatory mechanisms that are being put in place that could potentially benefit these kinds of networks.

CHAIR: Indeed, your submission outlines some of the regulatory framework surrounding the distribution network service providers to ensure the safety and integrity of the electricity network. To what extent does that regulatory framework properly cover cogeneration operators at the moment?

Mr LEWIS: It depends on the nature. There are so many different types of systems. There can be a single building system and that is not one that our department particularly gets involved with. If it is within a single building, particularly if it is only supplying, say, the base building, so things like the common lighting and the lifts, it is regarded as effectively an appliance and therefore it comes under Fair Trading jurisdiction—in some ways no different to other household electrical appliances like kettles and TVs in terms of electrical safety. The issue we are concerned about is where the supply is potentially in the public domain and therefore there are risks involved.

We would anticipate that there need to be requirements in place for how a network operator that had assets in the public space managed and insured the safety of those systems, but we certainly do not think it needs to be at the same level as applies to the current public networks; they obviously operate significantly across a vast range of terrain and locations, which means they need a fairly extensive network management plan. Our approach would be, and in some ways already is allowed for in the regulations, for those network management plans to reflect the nature of the operations rather than trying to cover every single circumstance and do a risk assessment approach to what are the main issues and how they are going to be managed.

CHAIR: Who is responsible ultimately for ensuring that those risk management plans, emergency procedures, et cetera are suitable and adhered to?

Mr LEWIS: The network operator is responsible. They are required to get third party audits done to ensure that they have been done to a satisfactory level. They are then forwarded to the Minister and then the department and we review the audit findings and engage with the network operators if we see that there are any particular areas for improvement that might be required or anything that is lacking. So it is a little bit of an iterative process in terms of getting them to the standard that is required. That would particularly be the case obviously for new networks being developed.

CHAIR: And, mindful of that, have there been instances where cogeneration plants have failed to submit sufficient information or have been refused a connection due to safety concerns?

Mr LEWIS: We are not aware of any that operate in the public domain so we have not actually had any come to us. Any that do exist at the moment have been effectively within single premises or within a single property area, so they do not cross over into the public domain or across multiple properties. So we have not had any come to us.

CHAIR: The submission notes that the department publishes service and installation rules for standby and small-scale generators to connect to the grid. Are you aware of any similar rules or would it be feasible to devise them if not, or potentially adapt the existing ones to cover larger-scale cogeneration systems?

Mr LEWIS: Certainly the service installation rules are a flexible document. I believe there is certainly the capability within the existing rules to build trigen systems but we are always working to make sure that they are up to date and reflect current practice. So if there were particular issues that were being faced from a technical perspective that required the rules to be reviewed and updated we are certainly prepared to do that.

Mr BART BASSETT: Your submission notes that cogen customers may be treated differently from and afforded less protection than customers using the traditional energy networks. Are the protections offered by the Commonwealth Competition and Consumer Act sufficient or should more be done for prospective cogen customers?

Mr LEWIS: I would say that there is a lesser standard of protection under the Australian consumer law but it is important to realise that it is not all cogeneration and trigeneration systems necessarily are going to be in that boat. What we are looking at there from the perspective of our submission was where a trigeneration system, in order to be economically viable, it would require all customers to take the power from that system. In part, that was driven by the way the City of Sydney was looking at things a couple of years ago. It has moved on with its proposals towards more of an approach which has less concerns from our perspective because it is looking at selling electricity into the market and allowing the retailers to still supply the customers, rather than being a monopoly supplier.

There are still potential models that may exist for monopoly supply. Certainly internally within the department the way we have looked at this is we are not necessarily opposed to having a monopoly system, we just want to make sure that if there is going to be a trade-off between the protections that the customers get under the national energy retail law, if there is going to be any difference, we want to know what those differences are, and potentially, what might be put in place maybe to have some other different types of protections for the customers that are in a monopoly supply situation and do not have the ability to choose who their retailer is.

Mr BART BASSETT: That is in relation to electricity retailers. City of Sydney looks to go through an existing retailer. If you look at thermal energy producers in cogeneration and trigeneration, do you think the powers of the Energy and Water Ombudsman [EWON] in New South Wales should be expanded to cover hot or chilled water customers to allow that flexibility in deregulation?

Mr LEWIS: I think it is certainly an argument that anyone could have coverage there. If it is classed primarily as a form of energy, and it is going to become more prevalent, there is certainly scope for the Ombudsman to have coverage there. That would generally require the network operator to become a member of EWON because that is the way the system works. The network operators and retailers are members and they pay the fees and the costs for EWON so if there are investigations occurring in this area, they would need to contribute towards those costs. I guess, it probably has a line reasonably closely with EWON's terms and conditions but if you take a broader view, and say it is a utility services, there may be other ombudsmen who may be able to fill in. But certainly EWON seems to be top of the list if you are looking at options.

Mr BART BASSETT: In relation to those options, would it involve amending the Energy Supply Act to provide statutory protections as exists in the electricity network for the thermal energy network? Would you support that type of recommendation to change that Act?

Mr LEWIS: Given there are a number of similarities, then that is certainly possible but there may be the opportunity for potentially stand-alone legislation that covers all aspects of trigeneration networks as an alternative which could have those provisions included in that statute as well. I think there are a number of options. We could certainly look at whether having it as part of the Electricity Supply Act. There is also obviously potentially a gas element as well so we have got the Gas Supply Act which has similar customer protections. There is an existing framework that would be used either to incorporate or as a model for separate stand-alone legislation.

Mr BART BASSETT: You have noted that your department is aware of a lot of issues relating to cogeneration and trigeneration and you seem to be open minded about taking on those things that have been

mentioned today and considering them. Are you looking at a date to put further information to the Minister or submitting a report to the department about reviewing the current regulation structure?

Mr LEWIS: We are not thinking of a date at the moment. We would certainly look at the outcomes from this inquiry of this Committee and see what recommendations are made. I do not think we would want to be premature about putting anything forward without getting the feedback and comments from the Committee after its deliberations. We have also been looking at what we can to push things along nationally. A lot of the regulatory emphasis at the moment is looking at having consistent national approaches.

There has certainly been work through the Standing Council on Energy and Resources of which Mr Hartcher is a member, to look at where changes can be made in response to calls from industry. Work is also being done by the Australian Energy Market Commission and the Australian Energy Regulator to address some of the barrier issues that have been raised by governments and by industry to improve, particularly in relation to connection of systems to the grid, and what can be done there. So it is a combination of looking at what we can do in New South Wales as well as being aware of what is occurring nationally and trying to be as consistent as possible.

Mr GREG PIPER: According to the Energy Efficiency Council in the United Kingdom, cogeneration operators are able to retail directly to customers as long as the prices that are charged are within the bounds of prices charged by nearby energy companies. Could that be considered in New South Wales?

Mr LEWIS: Definitely. As part of looking at the pricing models, that is one of the issues I mentioned before in terms of what some of the consumer protections might be. We already have a number of say, for instance, in shopping centres where you have tenants in the individual shops, the shopping centre owner, the landlord, generally is the one that pays the bill to the retailer and then they on-charge. One of our requirements—and this also applies to caravan parks—is that they cannot charge more than the current regulated tariff that applies to the network that they are in. Those kind of pricing mechanisms are already in place for some customers and we have certainly looked at how they could be applied in New South Wales.

The Government has caused the Australian Energy Market Commission to look at the effectiveness of competition in New South Wales. The ANC put out its report at the end of September. I believe that the Government is currently considering its response. One of the options may be to deregulate prices. Generally the regulated price set by Independent Pricing and Regulatory Tribunal has been the price against which you would assess what could be charged to customers. If there is deregulation we need to look at how that would then apply because there would not be that benchmark, that independently set price, to peg against, I guess.

Mr GREG PIPER: The submission from the City of Sydney recommended changing the State environmental planning policy, State and regional development 2011, so that developments are only considered of State significance if they have a value of $50 million rather than the current $30 million. How was $30 million set? Would your department support an increase of it to $50 million bearing in mind that some homes at Point Piper are valued at $30 million or a small shopping development that would hardly consider in the overall context of property values now as State significant?

Mr LEWIS: I think that is probably a matter for the Department of Planning and Infrastructure. Our area is obviously aware of it and when State environmental planning policies are due for review or amendment we get the opportunity to comment but it is primarily a planning issue, so I would not feel comfortable commenting on it.

Mr JOHN WILLIAMS: Is your department committed to developing opportunities with cogeneration and trigeneration?

Mr LEWIS: Yes.

Mr JOHN WILLIAMS: Regarding policy, would there be consideration of looking at what is happening internationally to develop policy and maybe New South Wales taking the lead nationally to properly drive further opportunities?

Mr LEWIS: Certainly I believe we have already done that to an extent and are keen to do that. We made a submission to the Commonwealth Government's White Paper and called for greater emphasis on encouraging regulatory frameworks that would allow for cogeneration and trigeneration to develop. I think this

is covered in my submission. We addressed some of the barriers we have talked about already. In terms of developing policy options for the Government to consider, we certainly look at not just domestically but internationally as to what is leading edge and best practice and try to look at how that could be applied in New South Wales. Or even go further, and try to implement our own best practice legislation.

Mr JOHN WILLIAMS: How are your policies linked to offering guidance to network providers?

Mr LEWIS: Given particularly trigeneration networks wish to connect to the public network, there are a lot of issues that can emerge there in terms of costs, arrangements and time taken to assess applications. We are certainly happy to work with networks New South Wales to understand what are their issues and sometimes try to be a more independent bridge between the proponents and the networks to try to get some of the issues that proponents, in particular, are facing; try to solve them and sped up if that is what is required.

Mr JOHN WILLIAMS: Would your department be concerned that currently they are an impediment to progressing your commitment to cogeneration and trigeneration?

Mr LEWIS: That is part of the reason why we have been pushing some of the reforms at the national level because in terms of the economic regulation where networks are required to seek their return on their capital and other investment, we are looking at trying to get changes there to make it easier for them, as I mentioned before, to incentivise them to look at working with the proponents to try to get non-network alternatives which are potentially cheaper and more effective for the way they operate their networks, to try to get that in place.

CHAIR: Mr Lewis, without suggesting that you or this Committee undertake a world tour, you referring to drawing on international best practice experience while, admirably, setting aspirational goals and New South Wales setting its own new level of best practice, but what analysis has been done of international experience, given that there is very limited regulatory history in Australia in this space?

Mr LEWIS: Earlier Mr Jones spoke about his prior experience in the United Kingdom at Woking and we looked at what was done there. That has been a very effective example. Even though it is not our direct remit at the moment, we have been looking at some of the thermal issues. We have looked at what has happened in a lot of the European countries that have thermal energy as part of their systems, even though they may not be part of the trigeneration system to see what frameworks are in place. We have certainly looked at what we have been able to identify both in England, Europe and cities in the United States of America to try to gain an understanding. As I said before, our starting point has been with our main drive around the safety, reliability, security and customer protection issues so that is where a lot of our focus has been. We are still broad-minded to see what else we may need to take on as part of this process.

CHAIR: Ultimately, if cogeneration and trigeneration is to proceed it has to be based on decisions largely made by private sector organisations but the Government has a role in sensibly facilitating and enabling those organisations to make those decisions and not put roadblocks in the way. Where do you think there have been some roadblocks to date, being frank? How are we going about removing them?

Mr LEWIS: Going back to our conversations before, obviously the existing regulatory framework has been based on a different way to supply energy. There needs to be changes made or new legislation put in place to facilitate these developments. As you say, it is government's role to help and to not put barriers in place so we have certainly been looking at what we can do to recommend to government for changes that could be made. At the same time, we also need to inform government about what some of the issues are. One of the areas that we focussed on is fuel supply. Initially, we would anticipate the trigeneration systems to be powered with gas.

There are a range of potential issues that arise in terms of maintaining a reliable supply of gas, particularly into the Sydney area both in terms of the long-term contracting and short-term physical infrastructure—I think you might have Jemena appearing a bit later and they obviously will be much better placed to talk about some of the physical infrastructure issues—advising government on some of the potential implications that could emerge if there were potential threats to the supply of the main energy source that underpins the trigeneration networks and therefore understanding the broader implications and alternatives needed to be put in place to be able to quickly ensure customers continue to receive reliable and timely, particularly electricity, supplies, particularly if you are looking in the Sydney central business district [CBD] or surrounding areas where you have a lot of high rise that rely on electricity for powering lifts and pumping

systems and those kinds of things. There is an identification of risk issues that we think is important to factor in as well.

CHAIR: I should qualify my earlier statement/question; it is for the private sector to drive and it is also for the public sector to the extent that the public sector owns buildings. Obviously we have seen that with the City of Sydney. The State Government owns a large number of buildings although fewer now than a few years ago but, nonetheless, through NABERS we have an acknowledgement of the importance of what it represents in terms of public tenancies. In terms of the Government, whether local or State, promoting cogeneration and trigeneration in its own environment, what sort of financial analysis has been done by the State Government to see whether economically it stacks up as an investment?

Mr LEWIS: I am aware that there has been an analysis done. I am not across the detail because primarily I believe that has been done by Treasury and some of the agencies that are looking at it. The ones we are aware of, particularly say Health and Corrective Services, have significant opportunities for using trigeneration systems within their buildings because they have a heating requirement, an electrical requirement and they also have potential other uses for some of the by-products like steam in laundries and that sort of thing. There are quite a few opportunities in government-owned facilities where this could go. It is a matter of when the projects are being developed that cogeneration and trigeneration are factored into the initial assessment as to what is going to be the source of electricity or gas or other energy supply to just do the analysis to understand how it stacks up.

CHAIR: I was reading an article recently on a project that has been launched later this year in Queensland Hospital, a state-of-the-art new facility. Is there anything in train in New South Wales that is a little more advanced than the broad investigation of the nature that you have referred to? Do we have anything at the moment in the public sector?

Mr LEWIS: I am not aware, sorry. It is probably something that is more being pushed by Treasury or say the health department in terms of what they are looking at.

Mr JOHN WILLIAMS: Ministers work with the Commonwealth and other Council of Australian Governments Ministers. Is this topic confronting all States in the Commonwealth?

Mr LEWIS: Given that this is a potential form of energy efficiency and that is one of the things that governments around that country are looking to promote and develop, yes.

CHAIR: Are there any final comments or advice that you would like to give us?

Mr LEWIS: Nothing, but certainly if there is anything further that comes out of the submissions or the public sessions and you require further information from us, we would be happy to provide responses to any further questions you may have.

CHAIR: Thank you for appearing before the Committee today. We may wish to send you additional questions in writing. The replies to those would also form part of your evidence and be made public. Thank you for indicating that you are happy to reply to any such questions. I appreciate your input to our Committee's deliberations and information gathering.

(The witness withdrew)

GLENN BYRES, New South Wales Executive Director, Property Council of Australia, Level 1, 11 Barrack Street, Sydney, and

MENDO KUNDEVSKI, Neu Consulting, 75 North Road, Reservoir, Victoria, affirmed and examined:

CHAIR: Thank you for appearing before the Committee today to give evidence. Can I confirm that you have been issued with a copy of the Committee's terms of reference and information about the standing orders that relate to the examination of witnesses?

Mr BYRES: Yes.

Mr KUNDEVSKI: Yes.

CHAIR: Do you have any procedural questions?

Mr BYRES: No.

Mr KUNDEVSKI: No.

CHAIR: The Committee has received a submission from your organisation. I take it you would like that to be part of your formal evidence?

Mr BYRES: Yes.

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

Mr BYRES: Yes, sure. I would just give a concise explanation of the Property Council and our interest in all matters of sustainability and then specific issues related to today's hearing and also hand over to Mr Kundevski, who is a prior member of the Property Council but now consulting back on this issue, so thank you for the time today. The Property Council is the nation's peak representative of the property investment industry. We have about 600 members in New South Wales alone and 2,000 nationally. Our members are the nation's major investors, developers and owners of commercial office, retail, industrial, retirement, tourism and residential assets. Because the industry holds institutional grade assets and holds them for the long haul they see the economic, social and environmental value of investing in sustainability and there is clear and growing demand, particularly from tenants in this space.

There are financial gains from lower operating costs; there is the value of healthier workplaces, the corporate social responsibility [CSR] obligations, particularly for listed companies and the major retailers and there is the environmental leadership from boards and executives and of course there are government-based programs, both incentive and performance based. There is not a singular approach that should be adopted to improving the environmental performance of the built environment and energy efficiency in renewable energy needs to be part of the mix but the capacity for greater adoption of cogeneration and trigeneration is real.

That is why last year the Property Council partnered with ClimateWorks Australia and Seed Advisory to submit the connecting embedded energy rule change to the Australian Energy Market Commission. Our Victorian division led a lot of the research in this space and was tasked with leading the organisation as a whole working in this space. The barriers for connecting embedded energy systems have long been a persistent problem for the industry and property owners. These difficulties are also experienced by other industries and businesses, including small business, local government—and I note the City of Sydney is here and I understand appeared earlier—community groups and households. That is why the rule change is significant for many stakeholders.

In practical terms we hope the rule change reforms will do two things; one is to enhance opportunities for businesses that already seek embedded energy solutions and, two, empower stakeholders who are left out from pursuing such options. Enabling customers to have a greater say in their energy usage will serve them well in the decades ahead. As I said, Mr Kundevski was previously a policy manager within the Property Council based in our Victorian division and coordinated our work. He now consults back to the Property Council and is managing the energy reform project for Seed, ClimateWorks and the Property Council. I might hand over to him for a few comments as well, if that is appropriate.

Mr KUNDEVSKI: Thank you, Chairman, and Committee members. Thank you for the opportunity to make this presentation and contribute to the inquiry. I will break this presentation up into four main components and give you a bit of an overview of what has been almost three years on this connecting embedded energy project. Firstly, I will talk about the project itself, secondly about the energy market commission's draft determination on, and progress of, the final determination, which should be published on 19 December—and many stakeholders are waiting for the energy market's final determination—and, lastly, a couple of recommendations for the New South Wales Government that are also in the Australian Energy Market Commission's submission.

The connecting embedded energy project started in 2011 and we undertook a research project called "Unlocking Barriers to Cogeneration". That report had market-ready case studies for cogeneration and trigeneration. It also included a variety of stakeholders from governments, industry and the regulators. As Glenn said, in 2012 that report was the foundation for our 2012 connecting embedded energy rule change proposal to the energy market commission. We had several key aims in that project; firstly to identify the barriers for all embedded energy systems. As I mentioned, cogeneration and trigeneration were the case studies but we sought to explore all the barriers for other technologies as well.

Secondly, we wanted to propose solutions for the entire national energy market. The solutions had to be technology neutral. It was not our job to pick winners and losers but to put in place a better connection process for all embedded generators and, lastly, with everything that we proposed we had to make sure it did not compromise the integrity of the electricity grid. That was the basis of our intentions and our aims. We identified several key barriers that are present in every jurisdiction around Australia, in CBDs as well as regional areas. Firstly, the national electricity rules actually deter grid connection. You have probably heard that they were not designed to receive embedded generation. That is mainly because there is a massive gap in the current rules and that gap extends from generators that are 10 kilowatts, mainly micro-embedded generators for households, all the way up to 30 megawatts and beyond. Systems that are 30 megawatts and beyond are power stations so it is that massive gap in the middle where the bulk of the problem lies.

At the moment chapter 5 of the rules does provide a streamlined connection process for the large generators of 30 megawatts and above. Equally, there is a new chapter of the rules, chapter 5A, which provides a streamlined connection process for the micro-embedded generators, those under 10 kilowatts for households and under 24 kilowatts for small businesses. But it is important to note there that there are only two classes of customers in chapter 5A that are captured—the households and small businesses. Secondly, we found there are a lot of inconsistencies and confusion between State and national regulation on behalf of the proponents who have to deal with this but also between the agencies. It was common in our project to pick up inconsistencies and differences of opinion between the State regulators and the Australian regulator, for example. Thirdly, the connection processes—because there are many connection processes that are designed at the discretion of distribution network companies—are very costly, time consuming and complex.

For example, there are no clear and binding timelines at present. That means it can take up to three years for a successful connection: and that is if you are lucky. Most proponents do not get that far and that is the problem. There are no standard up-front information requirements for proponents and customers. There are diverse technical requirements imposed on customers and there are very high costs. I will give an example: The costs relate to the connection costs. Proponents also have holding costs, for example, commercial buildings have a certain timeline and one of the case studies that was in our report, a proposed commercial building on Collins Street in Melbourne, estimated holding costs at around $100,000 per week. If you add to very prolonged connection processes for the embedded generator it compounds the time and expenses they have to incur. Last, some proponents have to pay for shared network augmentation, which I will talk about a bit later on.

I stress from the outset that these connection barriers exist for all embedded generators in all jurisdictions, not just cogen and trigeneration. The solution we put forward in our rule change proposal to the Energy Market Commission is designed to achieve one simple and efficient national connection process in chapter 5 of the rules under two streams: An automatic stream and a negotiated stream. The automatic stream would afford proponents an automatic right of connection as long as they comply with a technical performance standard. The negotiated stream would afford customers a revamped and simpler negotiated connection process, especially for those embedded generators that might be tailored a certain way that will not meet a standard.

In June 2012 the Energy Market Commission published the draft determination on our solutions. It was the result of extensive consultation by the Energy Market Commission. The Energy Market Commission

produced a public consultation paper. As a result of that there were a record number of submissions, around 50. The Energy Market Commission usually receives 10 or 12 submissions for rule changes and that indicates the level of interest on the issue of connection barriers. The solutions and support received was from diverse stakeholders and parties—Mr Byres mentioned some of them—not just the property industry as a whole and some of the businesses, but local government, community groups, the Australian Council of Social Services [ACOSS], the Victorian Council of Social Service [VCOSS] and other interested associations. This was a broad coalition of supporters from social, environmental and business sectors.

In the draft determination the Energy Market Commission recognised the problem and accepted there was a need to provide some solutions. They came back with a determination accepting some of our solutions but also providing some of their own solutions. The result was a robust hybrid. Some of the elements of the draft determination include—I will not go through all of them—first, certainty on timeframe with maximum time limits at each stage, which we do not have now; second, information packs will be provided by distributors to their customers that will include critical information such as technical standards, indicative costs, application details, timing and a model connection agreement up front. There will also be location specific network information provided by distributors and distributors will also publish and maintain a register of compliant equipment. That will be very useful because any proponent can go to the register and look at some of the proven relevant generation technologies for that location taking away some of the guesswork.

One element the commission did not accept was the automatic right of connection. However, they put in place a fast-track provision that could be adopted if a generator met a future technical standard and did not have to pay for augmentation of the grid in that area. Overall we estimate that these reforms will be significant. As I mentioned, connection should be delivered from a current three-year time frames—for the lucky few—to about four to six months for more stakeholders. There was a workshop last week on 17 October to talk about the progress of the final determination. The key message here is that the commission is still committed to this rule change. It is going through some of the technical issues and working with stakeholders and looking at how they could be implemented in practice and in New South Wales' case if this new connection process goes ahead in chapter 5, as is planned, New South Wales will have two connection processes: The new chapter 5 will deal with generators over five megawatts and because New South Wales has adopted the new chapter 5 generators under five megawatts can use the new chapter 5.

Some elements of chapter 5 might need work in the future but this is still a very good indication of the commission's intentions and there is some clear work that has been done to progress that. I will conclude by reinforcing and highlighting the recommendations that the Property Council of Australia put together. First, we ask the New South Wales Government to support the draft determination before the Energy Market Commission and to support the submission of the Property Council and other advocates of rule change in the draft determination. There are some elements that could enhance the draft rule. If for some reason the rule change does not go ahead the New South Wales Government should consider what it can do within its own regulatory powers. There are a couple outstanding issues and major barriers in the draft determination which I will bring to your attention. One is the issue of shared network augmentation. We initially asked the commission to exempt customers from paying shared network costs. I will give you a quick definition of shared network costs. Shared network costs are those costs shared by all customers beyond the first substation and connection point, the assets that everyone receives a benefit from.

At the moment the current system for seeking reimbursement for customers that pay for upgrades to those assets is not transparent or fair. What happens in practice is a proponent that needs to deploy better generating in a certain location and the distributor will say, "You can go ahead, however, we do not have a lot of capacity in this area and you will have to upgrade some augmentation to that network. The shared component could be in the order of $500,000 to $1 million." These are real examples I am referring to. That happens with members of the Property Council and businesses that are not Property Council members. The business will pay for that investment but there are two problems: There is a last in worst dressed and a free ride problem. The last in worst dressed means that customer who arrived at that point is paying for previous beneficiaries that have connected to that network. Equally, by upgrading the network at that time he is contributing a benefit to future applicants. Keep in mind the distributors are the only parties that have information to the network and it is difficult to decipher which applicant will receive the benefit in a meshed network.

We are simply saying the solution is for distribution network service providers [DNSPs] to be more transparent in providing information. When a company makes the initial investment to upgrade a network and when other customers get onto that network the DNSP should implement a system of reimbursing the initial customer for that investment. That is in our submission. That is a barrier that has not been dealt with

comprehensively in the rule change and will linger as an issue beyond the rule change. We ask the New South Wales Government to support the development of an Australian standard for medium sized embedded generators. At the moment there is an Australian standard AS4777 for micro-embedded generators that are household systems under three kilowatts. That is great because if your system at home complies with that standard you tick the box and get a connection and it satisfies the distributors that that system will comply with all the performance criteria and will be safe and reliable. We are looking for the development of a standard for medium-size generators that in the future will provide a better process for these connections. That is where I will leave it and we are happy to answer your questions.

Mr GREG PIPER: Would you mind repeating all of that?

CHAIR: It is all recorded by Hansard and you can read the transcript. Some of the questions that we had prepared may have been pre-empted somewhat but we will, nonetheless, proceed and where appropriate you can refer to your opening statement in response. I will touch on the negotiation process which we have explored with a couple of previous witnesses. You have proposed a model where there might be automatic approval or negotiated approval depending on the circumstances. In the past at what stage have prospective cogeneration operators contacted distribution network service providers to negotiate? Has it resulted in a lack of early communication resulting in a failure to identify and rectify potential issues? If so can you give us an example?

Mr KUNDEVSKI: Yes. Proponents generally contact distributors at the outset. The problem they face at the moment is that there is no clear process. So what happens, from our experience, is that distributors drip-feed and delay information to the proponents. That is a big barrier. What this rule change proposes is that customers and proponents should be given a lot of this information up-front. The connection process that is looking to be redefined should be published on their websites and the information pack will take away the guesswork that takes place at the moment. The added complication is that distributors behave differently depending on their circumstances. Some are better at responding to customers while some do not even have a dedicated customer relations person. It is possible, and in our experience a reality, that you could deal with two or three different people within the same organisation and get different answers. Equally, you may not be given a clear idea of where you are in the connection process. That is the current problem.

CHAIR: Would you concede that there are cases where some proponents have left it too late, whether through lack of understanding of what might be required or just not proper planning themselves?

Mr KUNDEVSKI: That is possible, but from our experience the proponents we represent are proactive, they have dedicated teams and this new connection process is designed to place obligation to both parties. Let us look at it. At the moment we are saying that there is too much discretion and power with the distribution network service providers [DNSP].

CHAIR: I understand. I am trying to get a sense of balance.

Mr BYRES: I do not want to absolutely categorise proponents. However, those of our members who are very much in the investment grade space and who have a sophisticated understanding of what they will encounter when they head down this path understand the value of engaging early because they will not waste time, resources and capital. Perhaps what you are referring to is an issue that depends on the proponent's sophistication and whether they have been down this path before. Is it possible that it has happened? Yes, it is.

CHAIR: There is also an education role that everyone can play.

Mr BYRES: That is correct. I was interested in one of the questions you asked the previous speaker. It is new technology for everybody and the rules reflect that. That is why the work is being done to amend them.

CHAIR: The Committee has heard that there can be uncertainty about when a decision can be made with regard to connection of a cogeneration system. It also heard evidence—in a more balanced sense—that the delay might be caused for different reasons. Obviously you have had some experience in the area. Two of your more sophisticated clients conducted a tour of plant facilities at Bond Street and at 161 Castlereagh Street and provided commentary for the Committee on Friday. That was very good in giving members a tangible feel for what they involve. That is positive feedback. To the extent that we are focusing on the need for a decision to be made clearly and expectations managed, from your experience is it usual to receive information on the probable decision date and the estimated cost of necessary studies or other expenditure that might be required on receiving an application? In other words, will they provide that information upfront? You said there is room for

improvement, but to the extent that they provide that information, how accurate has the estimated deadline or quotation system been?

Mr KUNDEVSKI: It is not. They do not receive that information upfront; it is drip fed. To quote one of our members, the goalposts keep shifting. For example, they will be asked to commission a network study and when it is finished they are asked to do another one because something was not included. We have examples of proponents who have conducted four or five studies and 18 months into the discussions with the network service provider there is no timeline in sight. That is the problem. These are some of the biggest companies in Australia and they have well-resourced teams of engineers. If it is difficult for them, it is virtually impossible for other customers. The answer is, no, the information is not provided upfront in a clear way.

CHAIR: You are clearly supporting a standardised connection process, including a number of rules and requirements for potential cogeneration operators to fulfil before entering into discussions with network service providers so there is an onus on them to provide some information before they expect it all to happen.

Mr KUNDEVSKI: Yes.

CHAIR: That sounds reasonable.

Mr KUNDEVSKI: Yes.

CHAIR: Is there a benefit in having a standardised or limited choice of cogeneration designs to facilitate such expedited connection because there would be fewer variables? Or do you think it should be flexible, in which case they would simply go down the negotiation path as opposed to the automatic path?

Mr KUNDEVSKI: There has to be that embedded flexibility because the systems for different locations might vary slightly. Let us be clear: We do not have a standard for the automatic stream that you touched on. It might cover a portion of the market, but the other generators that do not meet the standard will need the negotiation path and flexibility. I will put it in context. Australia is a secondary market for these technologies; they are already proven overseas. Manufacturers like GE and other companies work in the Australian market and are already putting systems in place.

Therefore, it is possible that manufacturers' standards are already proven and tested. For example, in South Australia, when the former ETSA was looking at connecting a significant commercial building involving a generator producing five to six megawatts in the central business district it sought the manufacturers' standards to satisfy the performance criteria of the unit. Determining standards is not a big guessing game because ours is a smaller market and much of this has already been done overseas. We do not need to replicate a thing; we should look at what is happening overseas and how we can refine it for our market.

Mr BYRES: In terms of having an established path with fewer variables versus flexibility, the second path involves going in sight seen rather than sight unseen. Where that "vanilla" path is available, at least those who want to head down there know the rules and there is consistency of approach and processing.

CHAIR: Mention of consistency leads to the next question. On page 5 of your submission you state:

> Information requirements can also change during the course of a project and can be inconsistent with current commercial design, development and procurement practices.

Can you elaborate on those inconsistencies?

Mr KUNDEVSKI: There are different information requests at different times in different States. There is no standardised process for providing the information to the distribution network service provider. This goes both ways. There is information that the distribution network service providers need from the applicant about the system, their intentions, the size and the characteristics. It is not sought in a uniform way, and that is one of the issues.

CHAIR: You talked about other jurisdictions and I will ask a question about the Victorian guidelines. However, before doing so, to what extent have you looked at international best practice and other jurisdictions?

Mr KUNDEVSKI: We looked briefly at some other jurisdictions. The Department of Resources, Energy and Tourism commissioned a report from Acom on the standards overseas, and that report would

contain a lot more information. The United Kingdom has a guideline—I believe it is guideline No. G59. Allan Jones from the City of Sydney has commissioned some work on a streamlined process in the past. There has been discussion about the automatic right of connection in Germany. Customers know upfront that they have a right to connect and they can proceed down that path. Some jurisdictions in the United States were also discussed. They were mentioned, but not in great detail; the bulk of our work looked at the Australian jurisdictions. However, it did emerge that those countries and jurisdictions are more advanced than we are.

CHAIR: Can you provide the Committee with more information about Victorian guideline No. 15, which provides that embedded generators should be charged only grid connection costs and not shared augmentation costs? Can you also indicate whether this has been considered a success and how it affects the augumentation costs for other customers who connect to the grid?

Mr KUNDEVSKI: That is what I alluded to earlier. We asked the commission to consider the Victorian model for the entire market, but it rejected the proposal. Determining whether it has been successful depends on who you ask. Even though the Victorian guidelines are clear, there is still confusion about what a proponent must consult. Is it the national electricity rules or the guidelines, and which one has the greater authority? This was played out at a public event with regard to the Australian Energy Regulator. The Essential Services Commission discussed this guideline a couple of years ago. It was unclear about how prevalent the guideline was and how much authority it had in Victoria. The answer is that we believe it is a good guideline and that it should be applied nationally. However, there is still a lot of uncertainty about its application in Victoria, and that would obviously be the case in other jurisdictions if it were applied nationally.

We tried to get a compromise. I mentioned that last in my discussion and it is also mentioned in our draft determination to the commission, which is an appendix to our submission. We said we would not worry about exempting customers from shared network costs, but that there should be a fairer and more transparent system for those who have to pay those costs and that they should be reimbursed. By the way, the national rules suggest that customers should be reimbursed for those costs. I have worked on this with many businesses for four years—Property Council and non-Property Council members—and not one business has ever received a reimbursement. We are asking for a fairer and more transparent system.

Mr GREG PIPER: How do you propose to encourage customers to connect to locally produced energy when it would be more expensive than traditional forms of energy?

Mr KUNDEVSKI: As I said, the rule change was not about picking winners and losers; it was about allowing market participants—large and small—to make the decisions. We sought to remove one of the most prevalent barriers to the connection process. If that were removed, there would be better rules that deal with the current and future needs of market participants. We should let those customers make those decisions. It was not our intention to provide recommendations for specific customer classes.

Mr GREG PIPER: Can you provide a more detailed response to the comment made to the Committee that cogeneration is not sustainable because building residents do not sign up?

Mr KUNDEVSKI: Can you elaborate?

Mr GREG PIPER: You have the cogeneration bible. Do you have any comments about the regulations? Should it be all in?

Mr BYRES: Are you asking about the requirements?

CHAIR: He is asking about tenants.

Mr BYRES: That they be mandated to sign up?

Mr GREG PIPER: They could be encouraged if not mandated.

Mr KUNDEVSKI: I am not avoiding the question, but customers must ensure that they receive competitive rates. That is the point of the regulation. Customers must have options and the price they are offered must be competitive.

Mr BYRES: Asset owners are constantly fighting for tenants and if they are not offering them a good deal on rent, energy pricing or any other service they risk losing them. I will take the question about the residential sector on notice.

Mr GREG PIPER: I would like an answer covering both sectors where cogeneration is being rolled out.

Mr KUNDEVSKI: A lot of the case studies we have done did not consider exporting energy and on selling it to tenants. Most of the situations were to cater for their internal demand, like base building operations. That could extend to a commercial building in the city or a precinct somewhere. We had a situation of a farm with a production process capturing biogas and wanting to use that for operations. There are many applications suited to these technologies that do not include on-selling or exporting.

Mr GREG PIPER: The committee has heard concerns regarding the reliability of cogeneration, particularly the protection of customers should the cogeneration operators suffer financial or other failure. Do you have a view on what protections should be put in place to protect energy customers from any potential failure of the system?

Mr BYRES: For example, you said you went to 161 the other day and that system that fell over.

Mr GREG PIPER: A cogenerator wanting to export to a local precinct or a grid like a virtual private network and protecting those customers.

Mr KUNDEVSKI: From the outset I mentioned the whole intention of grid connection and this project as well as the rule change is that it should not compromise the electricity grid. The first criterion is it should make sure the grid is reliable and safe. That means any system has to comply with the DNSP's technical requirements and the Australian Energy Market Commission has oversight through the reliability panel. In addition to that, the Australian Energy Market Operator has a role in looking at these matters. It is not in the interests of a commercial property owner or a shopping centre owner to have unreliable or unsafe power. They have leases and contracts in place that stipulate that tenants must receive safe and reliable power and no blackouts. There is an obligation on owners to make sure they can comply with the requirements of their tenants. No suggestion should compromise the safety and integrity of the electricity grid.

Mr GREG PIPER: Do you have any views on the risk associated with the reliability of the gas side of the cogeneration and trigeneration process?

Mr BYRES: Thinking about the overall state of the gas supply market?

Mr GREG PIPER: It could be towards the end of the line or the overall market. It could have all gone to China, but that is more of a pricing issue. I am asking about a structural failure and being able to supply gas.

Mr BYRES: I do not want to avoid the question, but I am not sure I am in a position to comment on the overall reliability of the long-term gas market in New South Wales, given some of the other regulatory debates.

Mr KUNDEVSKI: When we look at the evolution of the cogeneration and trigeneration part of the embedded generation market, natural gas is one fuel, and increasingly biogas is being considered. In addition, Property Council members and other businesses are considering other technologies. For example, large distribution centres with a large roof space are looking at solar. Members have feasibility cases ready to go and equally they are looking at solar technology, which has expanded to include solar on facades not just rooftops. This has happened in the last two or three years. It might be the case that if there are constraints in the market for cogeneration and natural gas, the market could adapt to looking at other technologies and fuel sources.

Mr BART BASSETT: Following from the question on who steps in if the system fails, what is the Property Council's opinion on how the Water Industry Competition Act regulations on water compare to this market? Can anything be gained for the cogeneration energy market operating in a deregulated market from how WICA is operating?

Mr BYRES: Are you talking about the works-in-kind agreement?

Mr BART BASSETT: I am talking about the ongoing licensing of independent wastewater operators selling into the marketplace.

Mr KUNDEVSKI: I am not equipped to give insight into that.

Mr BYRES: Can we take that on notice?

Mr BART BASSETT: Yes. I thought some of your members might have been involved in that for greenfields developments.

Mr BYRES: Some of them will have. I have had some cursory conversations with them, but I would rather give a meaningful answer.

Mr BART BASSETT: That is fine.

Mr BYRES: A couple of companies operating in green fields have had exposure from a private perspective, so I can get an answer.

CHAIR: To clarify: What would happen if they fell over?

Mr BYRES: Yes, it is a question about security of supply. We can establish that easily.

Mr BART BASSETT: City of Sydney's submission suggests that thermal energy providers enter into binding agreements with building developers to provide for future demand. Would this be a viable option for building developers? How might it affect incoming tenants?

Mr BYRES: The question was in relation to thermal energy providers.

Mr BART BASSETT: Thermal energy coming from cogeneration plants ought to be able to enter into binding agreements with building developers to provide future demand.

Mr BYRES: Can we take that on notice?

Mr BART BASSETT: Please take all three questions on notice. Would this be a viable option for building developers? How might that affect incoming tenants? Are there any similar arrangements for other industries?

Mr JOHN WILLIAMS: In your preamble you suggested that policy was restricting installation of cogeneration and trigeneration. We heard evidence from the network which highlighted constraints within the infrastructure and, a few minutes ago, that despite policy in Victoria you are still having difficulty in getting connections.

Mr KUNDEVSKI: I mentioned not so much policy as the actual rules. The National Electricity Rules are not designed to promote grid connection for a large proportion of the generators. In Victoria we were referring to the guidelines in the Victorian distribution code. I have not referred to specific policies of any government, Federal or State. The confusion rests with the jurisdictional and national rules and regulations.

Mr JOHN WILLIAMS: Do you not believe there are constraints within the network that could stop a connection?

Mr KUNDEVSKI: There are constraints. As I mentioned, some of the constraints are related to capacity in certain parts of the network. For example, one of the barriers is that if the proponent needs to connect at a certain location and there is no capacity in the network, the distributor will ask that proponent to pay for the augmentation of the network at that point. It is still a barrier.

Mr JOHN WILLIAMS: Earlier evidence would suggest that that is not being offered. The City of Sydney recommended extending provision under New South Wales environmental upgrade agreement legislation to provide incentives to include environmental upgrades in new developments rather than existing ones. Would you support this change?

Mr BYRES: I have not studied their proposal. Is this in reference to what was achieved through the environmental upgrade agreement struck with Frasers on the Central Park development or is it separate?

Mr JOHN WILLIAMS: We are driven by the submission of the City of Sydney.

Mr BYRES: I have not read it in full. We have done a lot of work on it and I had a meeting this morning with the Office of Environment Heritage about some work on the template behind the environmental upgrade agreements and some adjustments needed in that space. That was separate to the conversation here. We are very familiar with the EUAs and the legislation and templates behind them, but I could take that question on notice and get an answer.

Mr JOHN WILLIAMS: My questions are: Would you support this change? Are there sufficient incentives or support for development to install cogeneration systems? Would you support a feed-in tariff for cogeneration systems exporting energy to the grid?

Mr BYRES: We have not explored anything on a feed-in tariff. We will take that on notice.

CHAIR: What is your view on cogeneration and trigeneration in existing buildings versus new buildings? It is obviously a lot easier in a new building. Is it worth pursuing in existing buildings?

Mr BYRES: It has been done in some existing buildings. The pure design and build component makes it easy to do on a greenfield site. An example is the system operating in Coca-Cola Place. It is linked to the Deutsche Bank building in the city. In effect that was a combination of an old asset and new asset. It can be done within existing assets, but it is easier to do in a greenfield site.

CHAIR: Are there any other road blocks or obstacles that Government should address?

Mr BYRES: No. Mendo has given you a very comprehensive view of our take on some national rules and what New South Wales can do to encourage some change in that space. I appreciate a lot of that is asking you to make a case at national levels.

CHAIR: You have indicated you will take a few questions on notice. We appreciate your appearance before the Committee today. We may wish to send you some additional questions in writing. The replies to those and your replies on notice will form part of your evidence and be made public. I take it that you are happy to reply to further questions.

Mr BYRES: Yes. If there is anything else, please let us know.

CHAIR: We appreciate that. Thank you for your contribution to making New South Wales number one.

(The witnesses withdrew)

SCOTT MARTIN, Manager Commercial Operations, Jemena Gas Networks (NSW) Limited,

DAVID MUSSON, General Manager Commercial Operations, Jemena Gas Networks (NSW) Limited,

PETER GAYEN, Manager Networks Commercial, APA Group, and

ADAM PEGG, Head of Environmental Development, APA Group, affirmed and examined:

CHAIR: Thank you all for appearing before the Committee today to give evidence and particularly for agreeing to appear together to facilitate proceedings. I would like to confirm that you have all been issued with the Committee's terms of reference and information about the standing orders that relate to the examination of witnesses. If no-one has any questions of a procedural nature, we will proceed to formal questions, but first I invite somebody from APA and somebody from Jemena to make opening comments or statements.

Mr GAYEN: I have an opening statement; it broadly reflects the key points in our submission. I will shortcut that and say that I am employed by APA's networks group. We manage networks in four States and the Northern Territory. The networks that we manage in New South Wales are relatively small, being in Albury, Wagga Wagga, Tamworth and Tweed Heads. APA, of course, is also the major owner of gas transmission pipeline infrastructure in eastern Australia.

Mr MUSSON: Jemena Gas Networks distributes gas in New South Wales to approximately 1.2 million consumers. The network is connected to a number of pipelines, one of which is APA's pipeline, which moves natural gas to Sydney. The cogeneration customers that will be discussed are downstream typically of the Jemena Gas network.

CHAIR: Just starting with a question about planning new cogeneration systems, at what stage would a potential operator contact one of your companies to connect them to the gas supply system, assuming they are a reasonably large connection? If they were small obviously it may be a slightly different process to if they were larger, but typically what is the stage and what is the process, if there is a standard process, to connect a cogeneration plant to an existing gas supply?

Mr MARTIN: It is really about the proponents approaching us with information as to what their requirements are. Normally our current contractual framework is very much set up as a linear supply chain where we contract with the retailers for gas transportation and the retailers then contract with their individual end customers. That is the way Jemena Gas Networks stand in service offering this set-up. What we generally find is that when people are kicking tyres, the proponents of different technology and developers very often they will come along and they like to have conversations with us earlier. So we encourage people to come along and get indicative terms from us and to find out whether there is capacity, if there are any obstacles to connection. This is not cogen specifically; this is any large industrial user.

It would be wise for anyone to come along and talk to us to understand what the locational issues are, if any; we do that on an indicative basis probably 18 months to two years ahead—it can be as far ahead as that—of actually getting the first gas. But when we really get into putting a contract in place for a connection is when they have a retailer engaged, and usually we find that businesses will go and get their whole supply chain lined up much closer to their operations starting, and that is really the time when there are parties out there who are willing to contract with us for the connection and the revenues over time to justify our investment in making that connection. Typically, we would probably expect to see those formal requests for a contractual offer to come to us within six months before the connection, which is really too late if they are trying to plan a whole development. That is why we encourage that indicative process upfront.

CHAIR: How much would it cost typically to develop and maintain a gas supply to a cogeneration plant if one does not already exist? Obviously it is going to be in a reasonably established area—we are not talking about creating major new pipelines to a far-flung location, but typically how big an operation and what sort of scale of cost and development would it involve?

Mr MARTIN: It really does depend upon the locations. For large industrial loads we really cannot plan efficiently to expand a network just in case those sorts of loads come along. Cogeneration loads that we are seeing, small ones are probably around 20 or 30 terajoules per annum, so that is 20,000 to 30,000 gigajoules per annum. A typical residential house customer might use 20 gigajoules per annum. When you look at that

difference in scale between what a conventional house will use for natural gas versus one of these big industrially sized point type loads, we can really only plan for those when they come along to us and tell us their capacity requirements and where their location is. That is when we will see how much it is going to cost to get the connection to them.

CHAIR: Will you provide a range of scenarios just to make it a little bit more practical and understandable for the Committee? How big an operation might it be? Will you provide an example at each end of the spectrum?

Mr MARTIN: It is hard to do. At the lowest end of the cost it is going to be $100,000, say, with a steel main in the area with sufficient capacity for them and you get a service to them and a large meter set to them, probably talking about $100,000 or in that order. If you are talking about extending a steel main 10 kilometres through the Sydney central business district then you are talking into the millions of dollars. You have got to look at each one on a case-by-case basis to work out what it is going to be.

Mr GAYEN: I would reinforce those remarks. We have just concluded arrangements to connect the new Royal Adelaide Hospital and that is not a significant distance away from existing infrastructure but new high-pressure steel mains are required and major roads in and around the central business district which have a lot of varied infrastructure have to be crossed. That infrastructure will be costing millions.

CHAIR: In terms of trying to minimise costs, expense and time to connect does it make sense, and if so what are the benefits, to make some sort of standard design for cogeneration engines to connect to the gas supplier?

Mr MARTIN: From Jemena Gas Networks perspective I guess we have got a range of standard operating pressures and we will tell those to the different proponents who come along. So as long as they can fit to that standard range of operating pressures then that is probably as much as we can really standardise as far as the gas delivery goes. I do not think forcing single proponents into one particular type of machine would create any great efficiency.

CHAIR: When they approach you initially do you make available a standard specification document, if there is one, or is it as we have heard from another witness, a case of drip-feeding information in a painstakingly drawn out process that is not terribly consolidated? I do not say that in an accusatory way it is just that the Committee has heard about it from a previous witness in relation to an electricity network distribution, not gas.

Mr MARTIN: There is a difference in dealing with proponents who do not understand anything about the industry to dealing with proponents who deal in the gas industry all the time and the ones who are dealing with us all the time. They will understand all those different pressure regimes and the like. For the new people coming in then I guess we cannot tell them what they need to be thinking about or trying to second guess everything they need. That is why we have this indicative process where we can sit down with them and start talking those things through. If they are installing gas turbines it is quite different to installing a reciprocating cogeneration unit. Most of the ones that we have been dealing with recently have been reciprocating cogeneration units which tend to fit our distribution pressures much better.

CHAIR: When you provide up-front advice or guidance is there scope for consolidation of information whether they be specifications, guidelines, indicative information that is required, costings and those sorts of things? It seems as though cogeneration and trigeneration operators have a lack of education, guidance or information available up-front. That is a theme that has come from some comments to the Committee. I note that the submission from Jemena in particular notes on page that there has been a "mixed success in achieving design levels of gas demand and plant utilisation". In that context are gas demand and plant utilisation given sufficient focus during the cogeneration planning phase? If that is something you provide some advice on, can it be consolidated and can other information up-front to assist in that planning process?

Mr MARTIN: Our comment was really about an observation that some of the proponents have come along with different levels of skill and experience and what we are seeing is that we will take the information from them to say what are their capacity and pressure requirements and the like and we very much rely upon the people connecting to the network to tell us that, as far as the defined capacity parameters will be for the information that we need.

Once we take that information we then go and build the network, build the connection point for them and set up commercial arrangements on that basis. I guess what we are seeing is that 25 per cent of the time within recent connections the actual level of consumption that site gets to is dramatically different to the sort of design that they were intending to get when they started off. I guess we are not privy to see why that is, or to explain it all, but it is certainly an indicator to us that it is not that straightforward, that sort of technology, and that they are obviously dealing with various technical challenges to get these developments up. That population of connections that we are looking at, is conventional cogeneration before you get into the precinct, supply and distribution sort of environment which adds another level of complexity.

CHAIR: If there were a significant increase in cogeneration systems running on natural gas, would the current network, in general, be sufficient or would it require significant augmentation? How would it affect the ongoing maintenance of the network?

Mr MUSSON: Because the individual cogeneration sites may well require infrastructure upgrades to be supplied in the first place, I think it is a matter of degree. The gas network is designed with certain parameters to supply a variety of different loads with decreasing sized infrastructure as you get to the extremities of the network. By far the majority of consumers connected are residential consumers to the point where residential consumers are connected to fairly small diameter plastic infrastructure. If we are talking the need for a higher capacity steel infrastructure, that is not laid speculatively; it is laid based on supplying specific needs. If what we are talking about is a significant increase in demand, it would require a commensurate increasing in network design in order to supply the required capacity.

CHAIR: With gas pipelines does it reach a situation as occurs with the electricity network where there is peak demand pushing the system to its very limit? If so, is that generally at the small pipeline end or is it at the big pipeline end?

Mr MUSSON: I think it varies based on the area because the network evolves on the basis of demand that consumers place on that network, and through the way that the geography of the State evolves.

CHAIR: There may be a need to upgrade big pipes as well as extend small pipes?

Mr MUSSON: That is right.

Mr MARTIN: It depends upon the size of the loads we are talking about. If you are thinking about, "How much will it cost for these cogeneration installations?" It depends on what sort of electrical capacity you are trying to put in, what sort of location you are trying to put in, and the bulk of Jemena's gas network high capacity infrastructure is based around its high-pressure pipeline which runs from Wilton up to Newcastle through Western Sydney. The further you get away from that the pipes get smaller so if are trying to put cogeneration infrastructure a long way away from that main backbone then you are more likely to have to augment some of the radial pipes going out there.

Mr BART BASSETT: The Committee has heard that there is uncertainty regarding house supply arrangements for cogeneration systems may interact with the existing gas market arrangements. Are plans in place to deal with any interruptions in gas supply which may affect cogeneration operators, particularly those of priority customers such as hospitals, nursing homes et cetera?

Mr MUSSON: The gas network, as part of its operating arrangements, has a load curtailment program where in times where supply will not meet demand, in order to protect the safe supply of the commodity and protect the integrity of the network in doing so, load shedding may well be necessary in those emergency situations. There is a priority of customers from hospitals on one extreme through to interruptible loads on the other extreme that are shed in order to achieve the reduction in demand that is required in order to maintain integrity of the network. The basis under which the customer would be using the product, whether they were a hospital, whether they did have an interruptible load, regardless as to whether it was a cogeneration based load, would be a determinant in terms of what their priority would be in relation to that scheme.

Mr BART BASSETT: Do cogeneration operators usually receive a cheaper tariff for their gas supply? Would that depend on the size of the cogeneration system itself and would it be viable for cogeneration operators to negotiate on the term contracts to lock in cheaper prices or would that be specific to cogeneration or is that just across industry in general?

Mr MARTIN: I guess we do have some reference tariffs there, speaking for Jemena Gas Networks; I cannot speak for the APA structure. We have a set of reference tariffs that are designed for reference services. For reference services the tariffs are grouped by the types of ultimate end users, so one tariff is set up for gas transportation of residential-type developments and then other tariffs are for the industrial sectors. For a normal conventional industrial site that has a cogeneration plant installed, it is just another part of the supply to the industrial site. We cannot see whether they are using it for an oven or a cogeneration unit or whatever is there at the industrial site.

At the other end of the spectrum where you get into the precincts or the idea of the precincts, we really do not have a reference tariff for that arrangement but in all cases whether a reference tariff is there or not we are always willing to negotiate and encourage natural gas growth because natural gas is a fuel of choice, so we are always encouraging and open to understand where the reference tariffs do not meet particular end users' needs and if we can have a negotiation around that to come up with a negotiated arrangement to reasonably meet our requirements and their requirements, that is what we will do.

Mr GAYEN: I would concur with those remarks from an APA perspective in the networks we operate around the country. Our standard position is to offer the industrial customers the industrial tariff but where they have come to us seeking particular arrangements—a cogent project might have a project life of 15 or 20 years—we have certainly entertained and succeeded on occasions in negotiating arrangements that are suitable to ensure that our contribution to that project succeeding happens. Yes, so we will also negotiate with project clients.

Mr BART BASSETT: One of the answers you gave earlier was where you entered into arrangements with reciprocating cogeneration plants compared to gas turbines. I have only seen reciprocating cogeneration plants. Can you tell us where a gas turbine may be operating and in what situation it would operate? Where would they decide to use that?

Mr MARTIN: I am no expert but they are a much larger capacity; it is more a commercial size, industry-size electricity generation when you get into gas turbines. They are much larger engines.

Mr GREG PIPER: I just go back to the City of Sydney's submission, which has been a fairly significant part of the considerations today. They raise some concern that gas suppliers are charging cogeneration operators higher tariffs when they are supplying thermal energy for domestic water heating. Apparently this is due to a disagreement on whether the cogeneration operator is a single customer or whether the hot water customers are also included. Can you comment on whether or not that is correct? Is that occurring?

Mr MARTIN: I do not want to get into the commercial area but it is very much a principle that I alluded to earlier that our reference tariffs are about grouping customers into efficient bands for pricing. From a distribution perspective it is not practical to price to each individual point. You have got 1.2 million customers. You have got to group them into efficient bands to price. Gas distribution is about transportation through the network to the end customers so we have a whole bunch of consumer protection measures, Fair Trading measures around metering, all that sort of arrangement that fits the standard market framework. When we have had proponents saying that they want to establish an operation where you have a commercial operator in between the distribution network and the end customer, that raises questions for us: where do our responsibilities start and where do your responsibilities start?

Have we still got Fair Trading consumer protection issues or is that being transferred across, but also is the third party operator, the commercial operator, picking up those responsibilities? With respect to pricing, what is the right tariff? What is the efficient pricing to put with that group if we are extending the network or growing the network to follow urban growth? Should that be done at an industrial rate or is the right cost of service to be done at the same rate that all residential expansion is done at?

Mr GREG PIPER: However, it would be a consideration that a cogeneration operator would need to take when pricing the viability of their proposal?

Mr MARTIN: Most definitely, and when we have sat down with them, what we are very careful to do is to encourage the expansion and encourage greater gas utilisation but also being cognisant of the cost of service where the same cost of service relates to other services that we are also providing.

Mr GREG PIPER: We have been talking natural gas, and I assume you are transporting most of it, which is coming in from outside of the State obviously. There are questions about renewable gases and whether

or not you have an interest in renewable gas production or transportation. Can you comment on your experience and in relation to suitability of the network to carry renewable gases, as well as experience with the system in Germany where they are injecting renewable gas into the grid?

Mr PEGG: We are always looking for new customers and suppliers of gas. We always have our eye on the market. That is an emerging market, which has had some success overseas. It needs to be done on a fairly large scale to be economical when it is competing against traditional gas and coal and methane gas.

Mr GREG PIPER: Well, we are talking traditional gas, natural gas; we are not talking necessarily about coal seam gas [CSG]. I understand that APA's gas sources are probably not CSG?

Mr PEGG: Some of them are but predominantly it is conventional natural gas. The types of gas you are referring to are alternative sources such as piggeries that are pumping in methane and things like that.

Mr JOHN WILLIAMS: Bio-digester.

Mr PEGG: Yes, we encourage all new suppliers of gas and we are happy to ship anyone's gas as long as it meets certain specifications and the counterparty is credit worthy.

Mr GREG PIPER: Would something similar be feasible in New South Wales. I suppose the answer is yes, it would be, given certain criteria?

Mr PEGG: Yes, APA does not buy the gas; we do not actually own the gas; we just transport it. We offer service for the wholesalers of the gas and retailers of the gas. We are happy to ship whatever as long as it meets the technical standards.

Mr JOHN WILLIAMS: A number of submissions have raised the issue of gas prices making cogeneration a more difficult proposal as it becomes less financially viable. Can anything be done to incentivise cogeneration to counteract the difference between gas and electricity pricing?

Mr PEGG: We could make comments on that. APA and Jemena have worked with Australian Pipeline Industry Association [APIA], our industry body, responding to the white paper and looking at initiatives to encourage new supply of gas to come on and new supply of gas will reduce price. Currently in the market there is some uncertainty around gas prices that have been brought on by demand for liquefied natural gas [LNG] exporting. We are working together with other industry proponents to look at ways we can stimulate new supplies and that is building infrastructure out to new gas fields or piggeries if we can get them to come on board. There are definitely incentives that governments can provide.

One of the things that we are trying to promote is natural gas standards on a level playing field so that it has the potential to provide significant carbon reduction capability. At the moment it is excluded from schemes like renewable energy target [RET]. We would like to see it compete on a dollar per tonne abatement basis in a scheme that could mirror something like the NSW Greenhouse Abatement Scheme [NGAS] or something like that whereby basically it is the cost on a dollar per tonne basis where gas is displacing coal or other fuels, so there are certainly things that can be done at both Federal and State level to encourage that.

Mr JOHN WILLIAMS: Given the difficulties of connecting cogeneration systems to the grid and exporting excess energy, should the focus be on smaller solutions serving individual buildings? Would this have benefits for the gas supply industry?

Mr GAYEN: Perhaps I could make an observation from our experience and that is that the cogeneration projects that we have historically observed to be the most successful are those which are well suited to the host site; that there is an appropriate balance between demand for electricity with that site and the heating and cooling load. They are probably amongst the most successful projects, and the least successful projects we observed were those where the project proponent has perhaps a poorer quality host site, requires the export of electricity and commits to their project before they have established arrangements with the electricity network, so we have observed that spectrum of outcomes in the past.

Mr BART BASSETT: You transport gas and you do not mind where you get it from as long as it meets certain requirements. If you cannot answer this question today, you can take the question on notice and provide us with some information. Leaving CSG out of this—this is a general question—is there too much

regulation or a lack of regulation for you to be able to negotiate with, for instance, a landfill operator or a piggery, as that has been used as an example? Are there any areas in that space that need attention to make it more efficient and effective to get supply from those sources? Do you want to take that question on notice?

Mr GAYEN: Yes, we will take it on notice.

Mr BART BASSETT: I would be interested in that response because earlier today I raised the capacity for doing that.

Mr JOHN WILLIAMS: In relation to alternative fuels, when measured does the gas generated out of a methane biodigester and natural gas burn at an equivalent rate or are there variations? Does one provide more heat or British thermal units [BTUs] than the other?

Mr MUSSON: That is true for any varying source of gas; even different natural gas wells supply varying heating values. It comes down to the chemical composition of the commodity presented to the network.

Mr JOHN WILLIAMS: At any one time you cannot guarantee that where you are sourcing your gas from is going to provide the same range of heat per unit, there are going to be variations?

Mr MUSSON: That is right. Speaking from a network perspective the heating value of each independent source of gas is measured in order to determine the heating value of the gas entering the network. A calculation is then made in terms of the heating value being supplied to a consumer. Essentially, gas meters measure in volume whereas the gas commodity is billed in energy and that heating value is required to do the conversion. From Jemena Gas Networks' perspective, because there is more than one source of gas into the network already with varying heating values, a calculation is made to ensure that the heating value of the gas is correct when it is being presented to a consumer.

Mr JOHN WILLIAMS: If we look at Germany, for example, they are mixing natural gas with what they are taking off the farms and it is coming down the same pipeline and mixing together; does that create a problem?

Mr MUSSON: No.

Mr MARTIN: It is not just the heating value and the energy content of the gas but the combustion characteristics. There are Australian and international standards that all the appliance manufacturers need to comply with and test all their appliances to that particular specification. If the injection of these other gases causes the gas in the network to vary from that specification then potentially all the appliances have not been tested to that new specification and that becomes a safety issue and appliance efficiency issue.

CHAIR: I want to finish with a couple of questions about gas security, which has been an issue in New South Wales. Is there realistically any risk of a cogen or trigen plant, which runs on gas, not being able to source gas? Put aside the price of the gas. Is there a risk of the gas not flowing in the next decade to any customers in New South Wales?

Mr PEGG: I think Australia has an abundance of gas reserves and it is just a matter of commercialising those reserves and bringing them to market. There is an efficient gas transmission and distribution network to bring it to market from various fields and it is a matter of unlocking those reserves.

CHAIR: You did not answer the question. I would answer it myself by saying: No, there is not, it is a question of how much you want to pay for it. Disagree with me if you wish. If you are moving gas over a significant distance from South Australia to Gladstone Queensland, how much efficiency of gas, drawing a parallel with electricity, do you lose in transmission of gas in a pipeline? If so, how much? Relative to the cost of the gas when purchased what percentage is the transport cost? In other words, what is the difference in cost between gas at the point of extraction to where it might end up?

Mr PEGG: It is becoming a smaller part of the pie as prices increase to liquefied natural gas [LNG] parity. It is roughly10 per cent of cost in a transmission pipeline and then distribution costs if it needs to go through that.

CHAIR: Are you losing any of that?

Mr PEGG: Transmission pipelines do not leak. You will get some minor leaks at compressor stations where the gas is compressed, but it is very small.

Mr GAYEN: There is inefficiency in compression. Often you use a small part of the gas stream to drive the compressor which compresses the rest of the gas. Across a 1,000-kilometre pipeline—this is a little beyond my expertise—that inefficiency would be of the order of a few per cent.

CHAIR: There is an element of personal opinion in this question: There is some talk of a gas reservation policy in New South Wales—which I do not personally support at all—but it seems to me a de facto way of reserving gas to New South Wales, whether it be for cogen or trigen plants or whatever else. To ensure that there is a proper gas pipeline or network for transporting the gas to New South Wales is, of itself, an incentive to have gas. Putting aside where the market might go in terms of export parity, there will always be a differentiator in terms of transport, whether it is 10 per cent or whatever else. There is also a physical constraint in the sense that you have to actually take the coal seam gas from the Pilliga to Gladstone. If you have the pipeline to New South Wales that is an incentive to supply gas to New South Wales and potentially supply it at a more cost effective rate. Would you like to comment on that?

Mr PEGG: If there is existing brownfield infrastructure it should always be cheaper if you are bringing on a new supply of gas and if it is a shorter distance as well. The gas that is exported will require some greenfield and potentially some brownfield expansion as well because it is a larger market. Inherently it is going to be more expensive to ship it to Gladstone than Sydney. There is a transportation cost benefit in the total delivered price bringing it to Sydney.

CHAIR: I am stretching it a little here but it is an area we have looked at in other contexts and which is not totally irrelevant to cogen and trigen in the sense that most of it is gas powered: Is there a suggestion, pressure or moves on foot to ensure that some of the nonconventional gas sources that you alluded to that might be tapped are pipelined to Sydney or New South Wales as opposed to Gladstone or elsewhere?

Mr PEGG: There are plenty of gas reserves in Australia as long as people need hot showers and industry is hooked up to gas the retailers will continue to sell gas and continue to use our infrastructure to supply it.

CHAIR: I was probably extending beyond the purview of the inquiry to ask that and you are not going to answer, which is fine. Thank you all very much for appearing before the Committee today. The Committee may wish to send you some additional questions in writing the replies to which will form part of your evidence and be made public. Are you happy to provide written replies to any further questions?

Mr MARTIN: Yes.

Mr MUSSON: Yes.

Mr GAYEN: Yes.

Mr PEGG: Yes.

(The witnesses withdrew)

ROBERT WILLIAM MURRAY-LEACH, Chief Executive Officer, Energy Efficiency Council, and

ROBERT DOUGLAS THOMSON, President, Energy Efficiency Council, affirmed and examined:

SIMON RICHARD HELPS, Vice President, Energy Efficiency Council, sworn and examined:

CHAIR: I welcome those attending before the Committee from the Energy Efficiency Council, Mr Rob Murray-Leach, Mr Thomson and Mr Helps. Thank you for appearing before the Committee today to give evidence. Can you confirm that you have been issued with the Committee's terms of reference and information about standing orders that relate to the examination of witnesses?

Mr HELPS: Yes.

CHAIR: Do you have any questions about those or anything else of a procedural nature?

Mr HELPS: No.

Mr MURRAY-LEACH: No.

Mr THOMSON: No.

CHAIR: Would you like to make an opening statement before we proceed with formal questions?

Mr MURRAY-LEACH: I am the chief executive for the Energy Efficiency Council, which is the peak body for commercial and industrial energy efficiency that includes cogeneration and demand management. We see cogeneration as one of a range of technologies aimed at improving the efficiency of energy supply and energy use. We look at it within those terms.

Mr THOMSON: I am the president of the Energy Efficiency Council. There is a real need for the industry to be successful. My day job is as group general manager of a consultancy called Energetics Pty Limited. We work with large businesses and government to help them to understand their energy use and to find ways to implement new strategies and to improve what they are doing.

Mr HELPS: I am the vice president of the Energy Efficiency Council. I look after the section of the council that specialises in cogeneration projects. I run a consultancy business called Cogen Advice, which assists people who are looking at developing, implementing and running cogeneration and trigeneration projects and embedded generation projects. That keeps me very busy.

Mr MURRAY-LEACH: I will address some of the key points we want to raise. Of course, we are then happy to answer questions. Our long-term focus for consumers is balancing supply and demand side strategies, which is very much in line with the national electricity objective. Our view about how to best grow the energy efficiency sector is that having the right policies in place leads to slow and steady progress by delivering benefits to energy consumers more generally and to our clients. We strongly oppose short-term, chop-and-change policies and over-subsidising because it leads to negative outcomes in the long term.

We believe that cogeneration is site specific. In some locations it delivers significant benefits to consumers and to the network more generally, but in other places it is not the right technology. We are very much about finding the right locations to install the technology. The benefit of cogeneration where it is appropriate is that it delivers much higher efficiency of fuel use. A standard coal generator in New South Wales generally operates at about 32 per cent efficiency. Of the energy in that fuel, about 78 per cent is lost as heat. With cogeneration heat is used onsite and the efficiency increases from 32 per cent to about 80 per cent.

Another benefit is that in the right location network augmentation can be deferred, and that benefits consumers more widely. It can also improve energy security by increasing the number of generators. After the recent super storms in the United States some of the only places that had energy were those with distributed generation. It is also highly responsive, which is very good in terms of balancing supply and demand in the energy network and it is a relatively mature technology. Where it is a suitable technology, it has multiple benefits. Where is it not suitable, we do not believe it should be installed. We believe in markets when it comes to gas prices. The relative cost of gas and electricity affects where cogeneration makes sense. In some places gas

price rises have made cogeneration uneconomic, but in other locations it is economic. For example, if someone uses gas for heating or industrial processes, adding cogeneration is a useful strategy for dealing with increasing prices because it gets more out of each unit of gas. However, in other locations it will not make sense.

We believe that if the market is working effectively a business should be able to take gas and electricity prices into account and make a suitable investment for the future. Our focus and what we are interested in discussing with the Committee is the market failures, particularly given the problems with the network connection processes and prices for use and connection to the network. Our focus is having a New South Wales distributed generation ombudsman who would oversee the operation of the networks. We would like the New South Wales Government to endorse changes that provide networks with the right incentives to reap benefits from distributed generation. I can elaborate on the establishment of an optimum regulatory system for distributed generation and on selling of heat and electricity as retailers. There should also be a transitional support mechanism through the Energy Savings Scheme and a review of the nitrous oxide requirements. They are the high level points, but we are keen to focus on any areas that the Committee deems relevant. We thank the Committee for allowing us to appear this afternoon.

CHAIR: We will go through the questions, and to the extent that some of the areas are not specifically addressed we will address them at the end. A previous witness suggested that the efficiency of gas-powered cogeneration and trigeneration plants is close to 99.9 per cent. I may be comparing apples with oranges, but I have heard that the real figure is 80 per cent. Compared to the 32 per cent you mentioned, that is a consequence of picking up the residual energy that is otherwise wasted in transmission. Are any other factors relevant in explaining that difference between 32 per cent and 80 per cent?

Mr MURRAY-LEACH: No. It is largely about the physics concept of exergy; that is, the amount of energy you have and how much useful work you get out of it. It is the same with water efficiency as it is with energy efficiency. Ultimately, it is about asking what the consumer wants and what the energy user wants. Obviously they want energy services; they want warm homes, cool businesses and electricity for their appliances. They are looking for those services. Generators operate at 32 per cent efficiency in terms of electricity out. With a cogeneration system the electricity efficiency is slightly lower. However, you are using all the thermal energy that is normally wasted.

That is turned into a service that normally has to be reconverted to electricity and put back into a thermal service, and you lose efficiency as it is converted. The law of thermodynamics says is that every time you convert between sources you lose a lot of energy. To be honest, most of the energy from coal generators is lost to the atmosphere.

One of the changes we have seen and one of the reasons that cogeneration has emerged is that historically having large centralised systems was a lot more cost effective because of the technology. Given the changes in technology we have seen over time and the change in fuel prices, onsite generation has become a lot more cost effective.

Mr HELPS: The development in the technology applied to large central thermal plants has not necessarily improved its efficiency at the same rate as small generators. We have large thermal coal plants in regional areas and they were built because it was a lot more efficient to do something on a large scale. At that time, small generation was significantly less efficient. The development of small generation technology has been driven by markets outside Australia, predominantly in Europe. That equipment is now markedly more efficient and by collocating it at a site that has a thermal or cooling load, you get the benefit of the other side of the equation as well. I suggest that 80 per cent is probably a more realistic number for embedded generation.

CHAIR: I said I may have misunderstood the comment, but it is important to hear your comments.

Mr THOMSON: Mention was made of transmission losses. One of the things about cogeneration or trigeneration is that generally the energy is created close to where it is used and we do not get the same losses.

CHAIR: As you are probably aware, this Committee last year undertook an inquiry into the economics of energy generation and made a number of recommendations about demand-side management and energy efficiency. We did not necessarily start the inquiry with that in mind, but I point it out to indicate that the Committee is predisposed to look at those sorts of issues. The fact that you have highlighted them is a good thing. I refer to your comment that some sites are not suitable for cogeneration. The Committee has received a

great deal of evidence about suitable sites. I would like you to be the devil's advocate and provide more information about why a site might not be suitable and some of the dangers.

Mr MURRAY-LEACH: We are brutal commercial realists. Therefore, we recommend that our clients adopt technologies that will benefit them. That will vary for a range of technologies, such as lighting, heating and generation. Cogeneration is a very safe technology, so it does not present any real concerns in that regard. Obviously, like any technology, it needs to be treated appropriately. The real focus is that in some locations there is a very stable heat load. The main thing is you have technology to use the waste heat. If you do not have a lot of use for that waste heat you will waste it, the efficiency will be very low and you would be much better off buying it from the grid or using another electrical generation technology.

Mr THOMSON: Or a different technology.

Mr MURRAY-LEACH: First, is there a good thermal load at that location?

Mr HELPS: A consistent thermal load. You might have a site with a very high short requirement for thermal load, which would not necessarily suit a cogenerator.

Mr MURRAY-LEACH: That is why industrial applications are often suitable. They have a need for heat throughout the year irrespective of climate and a need for an electrical load throughout the year. Second, you need to look at the network around it. There are two issues. Firstly, when you connect cogeneration you have certain fault levels on the network. In some places the cost to upgrade the network to make it suitable for cogeneration, particularly for export, would be uneconomic for energy consumers in general and if those costs are passed on appropriately, it would be uneconomical for the proponent as well.

In other locations if you put in cogeneration you would probably have low augmentation costs, but you might deliver a lot of benefits in terms of reducing the need to augment the network at that location, because you have taken a huge load off that network in that location. If you look across the map, there will be locations and different types of use where it would be really beneficial. In other places it would not be dangerous but the cost will exceed the benefit. We would recommend that people look very carefully at those costs and benefits. It will be a site-specific application.

Mr THOMSON: It may not be just the user's costs and benefits. It could be the broader network costs and benefits influenced by the implementation of a cogeneration system.

CHAIR: To the extent that it is not the user's responsibility or economic gain and it is the overall network, how would you advocate for broader planning of those sorts of issues? City of Sydney has tried to do it in a contained geographic sense. I would query whether there was an incentive for Ausgrid to do that. Is there a drive for the State Government to do it? How do you see that happening strategically in an ideal world?

Mr MURRAY-LEACH: I am a big believer in price signals, and getting the appropriate information on price signals to the market generally helps. If somebody is putting in cogeneration at Parliament House, if you reduce the need for Ausgrid to spend $5 million on poles and wires. It is therefore appropriate for there to be a price signal to Parliament House that this would be a good thing to do at that location. A proposed change has come through the Australian Energy Market Commission saying that Ausgrid would have to provide that information on locations. We believe there are two things in the world: nice rules and guidelines and enforcement of them. There is a pretty strong view that there has been limited law enforcement by the AER [Australian Energy Regulator] of the letter and the spirit of the law in this area. We believe the New South Wales Government, as the owner and potentially the seller of the network assets, should put in a New South Wales ombudsman with a proactive role in making sure the networks are doing the right thing in setting up market frameworks and letting the market rip in that space.

Mr HELPS: Networks, transmission networks in particular, have had an incentive to look at non-network solutions for providing services. They have a requirement to look at something other at what they would normally do. We have not necessarily seen that deliver optimal outcomes to date, given that businesses making money out of building and operating poles and wires tend to want to build and operate poles and wires. That does not mean that the mechanism could not be better utilised. To date, the biggest problem has been the timing of non-network solutions tending to be a longer process than conventional business. It worked to a point to identify a problem and a normal solution and then before investing having an obligation to look at something

else. That something else did not have the same period of time to be engineered, procured and delivered and the net result has been building more poles and wires.

Mr THOMSON: There is very little differentiation between constrained and non-constrained areas. There are no incentives to drive urgency or leverage to put in place private infrastructure rather than public infrastructure.

CHAIR: On incentives, the Committee recognises that cogeneration plants can be expensive to develop and construct. I agree with your comments that there should be price signals based on the value being created and not necessarily on subsidising fuzzy Green notions while recognising there is an environmental cost in that value assessment. In light of that, is there sufficient support —such as loans, grants or other financial incentives, which are justified—for organisations wanting to become cogeneration operators?

Mr MURRAY-LEACH: I will put the carbon element to one side. Our view on that is that price signals are the right way to go, whether through a carbon price or through the Emissions Reduction Fund. That would provide the carbon price signal. The price signals for the network costs and benefits are not there right now. Those price signals are distorted. The cost of connection is not there. The cost of use and tariffs around that are not there. For example, the cost of connection is determined by the maximum drawdown on the network in a period of time. If you are large industrial company and you take your cogeneration unit down for one evening every six months to do maintenance, you will be charged for the full whack of having drawdown, even if that is in the middle of the night in spring.

CHAIR: For that day.

Mr HELPS: No, for that year.

Mr MURRAY-LEACH: Your using that limit will determine it for a year. It is totally appropriate if you are doing that drawdown on the hottest day in Sydney and everybody has their air-conditioners on then you should be charged for that being your peak, because that was your load on the network at a peak time. If it is off-peak it is not having the same effect and it is not having the same cost drivers on the network. Those costs are really distorted at the moment. We have been talking to Minister Macfarlane for some time about a review of the way both energy users and generators are charged for use of the network to make sure it is cost reflective. The second thing is fair charges for connection to and use of the grid. We see a real role for the New South Wales ombudsman to oversee this and make sure that when proposals come up the costs of connection are fair and any network benefits are passed on. At the moment, trying to drag these out of a monopoly is not easy for small companies.

A lot of new financial products are available. There are some really exciting movements there. The market failures talked about are often not market failures in terms of access to finance. Market failures are imperfect information in the way that markets for those financial products work. We are starting to see a lot of shifts and some very exciting developments in the banks, the CEFC and Low Carbon Australia, before it catalysed a lot of changes. The big thing that is missing is the transitional issue. We do not believe in subsidies where they are not appropriate, but there is a transitional change in the market. It will take quite a long time to get the network changes, pricing changes and energy market changes through. We have talked about appropriate pricing laws and the market for the past 20 years and we are still not getting closer to it, although there is some movement.

Mr HELPS: Predominantly embedded generation has been natural gas-fired. There are some schools of thought on how that might change, but root sources of energy are the coal-fired generators with the benefit of being first movers with an existing sunk-asset value. At the other end of the scale you have renewable generators with a renewable energy certificate attached to their electricity. There has been encouraging growth in that space. Looking at it on a tonnes of carbon basis, those are the two ends of the spectrum and natural gas-fired generation sits in the middle with nothing in effect. There are barriers around gas connections, network connections and myriad well-documented hurdles.

Where there have been incentive programs—New South Wales Government that delivered a generator at Charlestown Square Shopping Centre, Tooheys Brewery, Westfield Centre, Centrepoint and I cannot remember the fourth one—and all four are good, sound projects. Projects were delivered under CTIP, a complementary measure under the carbon tax. Those programs were somewhere between 30 and 50 per cent of capital cost. My thumbnail statement is: Somewhere between 30 and 50 per cent of capital cost compensation is

enough to get people to drive through those barriers and deliver projects. Whether that is the right metric, we have not seen a lot of movement in deep-embedded cogeneration and trigeneration without that kind of support, unless it is an absolute no-brainer.

Mr MURRAY-LEACH: There is a range of barriers. Ultimately we want to see those barriers in the energy market taken down. If we wait for that, it will take quite some time. As a transitional mechanism, we recommend inclusion of cogeneration in the Energy Savings Scheme. We also review that with the energy market and if those rules and the cost-effective pricing are brought in, claw them back. Our view is that is where we ultimately want to get to. These things need to stack up. If they stack of properly and deliver benefits to energy users and to the network more broadly they will stay around. If they do not they will be pulled out, and we do not want the reputational damage from that.

Mr THOMSON: Ultimately you are looking for a net benefit to society from these sorts of changes. If the subsidies help to provide that net benefit then we would recommend them. You would not want to over subsidising without a net benefit.

CHAIR: We have been down the path of subsidising certain technologies based on philosophical dramas. With the greatest respect, I understand you have a business to run.

Mr HELPS: It is not good business to advise your customers to do dumb things.

CHAIR: The committee has received evidence on the NABERS system as it relates to cogeneration suppliers and customers. Do you have any comments on the system and whether its focus should stay the same in looking at buildings? If so, should there be another scheme? If not, how should NABERS change?

Mr MURRAY-LEACH: We are strong supporters of NABERS. It is a great scheme. I was in California a couple of years ago and asked what Australia is doing really well in the energy efficiency space. I answered that there were two programs where we are world leaders and one of them is NABERS. The important thing about NABERS is that it is based on a really great piece of economics by George Akerlof. In the 1970s he won the Nobel Prize for a work called "The market for lemons". He said there is no way for a market to work unless people can tell quality. If in the second-hand car market you cannot tell the difference between a good car and a lemon, the price will go down and will undervalue the quality of the better car. The value of NABERS is to tell tenants and building owners about the building's energy efficiency quality. That gives it a market value, because it gives the ongoing running costs of the building.

We are very firm believers that NABERS has its value and it has started to move the building market because both tenants and building owners respect it. So the first thing for us is integrity of NABERS is absolutely paramount; that is our number one. Cogeneration as an onsite system can be already be accounted for quite well in NABERS. The problem with NABERS—not a problem but it is a feature of NABERS is that it is focused on that building envelope and that boundary. So when you get imports or exports of energy across there the only way you can deal with that is to run through the Green Power scheme for electricity, for renewable energy; there is not an equivalent for cogen. We basically had our arm twisted behind our back by the New South Wales and Federal governments to start working—

Mr HELPS: We did not complain too much.

Mr MURRAY-LEACH: —to look at a system for trying to see if we could do similar thing for cogen. We were saying, "What is the emissions intensity of this cogeneration?" and that way a building owner can have a look at that fairly and say this is how much carbon is in that energy coming across the boundaries both in thermal and electrical energy.

Mr HELPS: It is about apportioning the CO2 emissions from the products of cogen.

Mr MURRAY-LEACH: We are in the middle of that process at the moment. We set up a steering committee because our view is that it is always best to just get things independently done, which includes the New South Wales Government, the Federal Government, the Property Council, the City of Sydney and various other players and we are just commissioning some work to get that done. That should be complete—it is a long process consulting with people, as you know—about mid next year, and that should see that system up in place, or at least the bare bones of that system up in place.

CHAIR: It is a new system that will sit alongside NABERS rather than trying to replace or change NABERS.

Mr HELPS: It is to account for the use of cogen.

CHAIR: It is consistent with a comment I made earlier today in terms of a personal opinion. Can you give us some guidance, albeit I know you have got a long process but our process is not quite as long as that? If we were able to give you some support for that concept then there is a window that we would need to get some further information on that. Perhaps you could take that on notice.

Mr MURRAY-LEACH: We will take that on notice.

CHAIR: Anything else on notice you wanted to talk about?

Mr HELPS: NABERS is not a tool for motivating people to do cogeneration. NABERS is a tool for calculating the CO2 emissions of a building. If those CO2 emissions are reduced by doing cogeneration that is a good thing, but it is not an incentives program; it is a ratings program.

CHAIR: Understood. The committee has also heard concerns that cogeneration can lead to an increase in NOX emissions. What can be done to reduce the NOX emissions of cogeneration systems and given that you support an increased use of cogeneration how do you propose to manage the potential increase in emissions?

Mr MURRAY-LEACH: The first thing is that the main source of NOX in New South Wales by a country mile—

Mr HELPS: Light year might be a better calibrator.

Mr MURRAY-LEACH: I have a background in this space—it is vehicle emissions; that is the number one source by a very long way. The proportion exuded by cogen would be 0.000—it is miniscule. However, there was a standard introduced quite some time ago which is not only higher than any of the standards we are aware of in Australia but higher than pretty much all the ones in Europe.

Mr HELPS: There is only one equivalent to it and that is California.

Mr MURRAY-LEACH: Which has a similar—if you have not been to Los Angeles—

Mr HELPS: Photochemical fog.

Mr MURRAY-LEACH: Our view on that one is that the standard needs a bit of a review to see if it is appropriate. We are not saying it is wrong but it is, as I said, one of the world's highest standards by a long way.

Mr HELPS: Just to calibrate this, there is a default position in the Sydney Basin and the Illawarra of 250 milligrams of NOX per metre cubed normalised. This is half the European standard and it runs in the face of the fundamental driver that we are putting these pieces of equipment in to reduce CO2 emissions and by imposing a 250 milligrams on these engines you are actually reducing the engine's ability to reduce CO2 because we are putting more fuel into the engine to reduce the NOX, which means that the engine is less fuel efficient. Then this becomes even more perverse because under the current rulings if you are above, let us call it, 3 megawatts of output, you need to have post treatment on where you spray, effectively, liquid nitrogen into the exhaust of the engine to nitrify the remaining NOX to bring it down to 50.

So we have gone from the global standard of being 500, Sydney's default is 250 and then we are trying to drive it to 50 by effectively putting more nitrogen into the exhaust. That does two things: The thing that we are using to nitrify the exhaust creates a huge amount of CO2 in its own production—it is, effectively, liquid urea—and so we are then devaluing the CO2 abatement potential of the project even further for what by DECW standard is maybe four or five hours a day on 12 days of the year. If New South Wales was trying to fix that problem in a more appropriate way you could put vapour collectors on petrol bowsers and achieve the same results. There is some quite disproportionate skewing going on.

Mr MURRAY-LEACH: So in summary, the NOX emissions from cogeneration can be dealt with; technologies can be put on to reduce them further, but the question is are we using a hammer to fix a walnut

problem? I have worked in policy for a long time and you are always saying, "What is the material issue and what is the solution that is going to deal with it at least cost?" As I say, we think it is worth having a good review and looking at is this an appropriate solution or are there better more cost-effective ways of dealing with NOX levels within the Sydney Basin.

Mr HELPS: In rough terms it adds 10 to 15 per cent to the capital cost and it increases operating costs by a similar number depending on the size of the project.

Mr JOHN WILLIAMS: The committee has received evidence that there are concerns the reliability of cogeneration and particularly the protection of customers should the cogeneration operators suffer financial or other failure. What protection should be put in place to protect energy consumers from any potential failures?

Mr MURRAY-LEACH: I suppose we are in a state where one of the coal generators just went under and carried on operating. I suppose I am of the same view around cogeneration that if it is a valuable asset, if it is delivering a valuable service it will carry on running even if an operator goes under, and we have certainly seen that this last two weeks.

Mr HELPS: We have had two biomass generators in the Northern Rivers operate for the last 3½ years whilst in receiver's hands. There is commercial and then there is—

Mr THOMSON: Once again, it is about market ways of dealing with it.

Mr MURRAY-LEACH: I suppose from a market perspective, as I said, receivership is used. We have seen it in the large generation sector operating perfectly. There are often threats about lights going off, which is not one I am particularly concerned about myself, where there is a commercial case. There is also, of course, the other issue, which is a technical issue of time down. Cogeneration time up is generally around 98 per cent point something—

Mr HELPS: The rolling average you would expect somewhere around 97 per cent of up time, taking into account unscheduled and scheduled shutdowns for the engine. Most of the embedded generation that we would be looking at in this sort of context is not required to run 100 per cent of the time anyway or at least if there are multiple units it is not required to run—

Mr THOMSON: You would have redundancy in place there.

Mr HELPS: You would have redundancy in place anyway to try and cover the shape of the load at the site and that theoretically reduces that 97 per cent anyway, and the site is more than likely going to have effectively full redundancy from the existing electricity network, it is going to have boilers on site to cover when the engine is down for service anyway, and chillers on site. So there is some duplication of plant, which in reality makes the site more reliable if it has an embedded generator than less reliable.

Mr MURRAY-LEACH: There is some work looking nationally at the future of the grid and one of the things they found is that obviously there have been a range of heat effects recently reduce reliability of the grid, and the same with natural disasters. What we have actually seen is from a multisite perspective if you look across the whole grid having islands of district generation improve quite substantially the reliability of the grid. What you might see is on a particular island if something goes down then you are obviously going to reduce the reliability but across the whole grid there are very, very significant benefits. As I said, that is what they found recently in the US where they have had district energy.

Because there are different things: there is cogeneration as technology, but there is also district energy, which can be a whole range of different technologies which is just providing heat or electricity in a microgrid and they have had an established industry around district energy. I cannot remember which Marilyn Monroe film it is but the dress and their heating systems—

CHAIR: *Some Like It Hot*?

Mr MURRAY-LEACH: I cannot remember which one it is but you know the famous scene. That is a district energy system that has been in operation in New York—

Mr THOMSON: Since before the turn of the century—1900.

Mr MURRAY-LEACH: It has had it for a long time and what they found in the US is that after the superstorms those areas with district energy systems were by far and away the most reliable, because when you think about the connection of the transmission and distribution line, if those break you have lost a lot of power, as we have seen recently. The reliability issues for every generation need to be looked at on a site specific basis but we are pretty confident around how that works both in a site specific and our network light.

Mr JOHN WILLIAMS: You probably just answered the question I am going to ask you now but it is a little bit different. How would you propose to offer backup power in a precinct generation system?

Mr MURRAY-LEACH: Generally what you find really depends on the precinct and the nature of the precinct. I will probably turn to you guys to give technical examples of this, but what you find is a mixture of generally skinny connection for some grid supply is sometimes used as an option, in which case you should be paying fully for that service. Then there is also an opportunity of having multiple redundancies in the system and multiple generators. But I will turn to you guys.

Mr HELPS: If we are talking about some of the real precincts that we have in this country at the moment, things like islands off the Queensland coast or further, which are, in effect, a precinct in themselves, mine sites in Western Australia—any place where there is no grid connection, the risk mitigation scenarios that they employ in those sites are smaller, multiple units so that you have some built-in redundancy and multiple machines—N plus one. So what you require plus one or what you require plus two to cover that. When you come to closer to civilisation you have the benefit of a network and it becomes a more commercial exercise in working out how big your pipe to the outside world really needs to be relative to what your capital spend is onsite, and that is a commercial exercise undertaken by the—

Mr THOMSON: Then there is the final one of having emergency supplies—portable units or whatever that can be brought in if there is that need. That is basically the third level of redundancy available.

Mr HELPS: And in any situation most customers will have emergency power scenarios and embedded cogen and trigen generally does not augment that. If you look at something like a data, for example, it will make commercial decisions about its level of power reliability and then it will make a cogen or a trigen business solution about its operating. One is 8,754 hours a year and the other one is the six hours where something is not happening on the grid, and there are two separate things.

Mr MURRAY-LEACH: It is a very good question because obviously there is a technical commercial issue that is normally resolved very easily and people deal with that every day in large-scale generations and small-scale generations. As I said, cogen is exactly the same. There is an issue which I think is an issue in terms of the way people present it, which is some building owners and other energy users would love an idea where they basically say, "We will just back up off the grid and we will take all our demand off that at no charge", which, as I said, there are appropriate price signals; if you are backing up off the grid then you are using it and you should pay an appropriate charge when you use that service—at the time you use it and when you use it. But at the same time there is a bit of an extreme the other way which is some people make this story up that cogenerators expect to get back up off the grid and expect to have that completely done. It is simply not true. But, as I said, if the price signals are appropriate then commercial reality would rule.

Mr HELPS: Commercial effect of pricing and network use is probably the killer. Being able to back up off the network and then having to pay for that back up, irrespective of when it happens—if it happens at 11 o'clock at night and there is nothing else going on the network, currently you pay as if it is happening for the one hottest hour of the year, which seems to be completely out of kilter.

Mr JOHN WILLIAMS: Have you considered the possibility of an interruption to gas supply on the running of any cogeneration system?

Mr HELPS: In the work that I do with my customers it is always taken into consideration but it is something that would impact in the same way that maintenance on the engine would. It alters the business case for the operation of the embedded generator but it does not necessarily make or break a project, so to speak. If you were doing risk mitigation planning for a project there is reliability of the gas network. It is not hard to look through that and say in New South Wales there is gas that comes from Bass Strait, there is gas that comes from South Australia, there is local gas and there is some people who have a vested interest in delivering that to me. Subject to Fred down the road putting a backhoe through the pipe it should be pretty good. If it is off, if goes

down, at the extremity of that you have other issues in the electricity network because you do not have gas peakers. There is a whole heap of things. I lived through quite an uncomfortable couple of weeks in Victoria when Longford did not supply. Unfortunately, Victoria was in a position where it in effect had one source of supply.

Mr JOHN WILLIAMS: I was there for the grand final weekend when that happened.

Mr HELPS: It was a bit smellier than normal. New South Wales does not have those problems but definitely gas supply risk is something, but it is not something that will make or break a project.

Mr THOMSON: I do not think gas supply risk is just solely a cogeneration issue either. If you look outside of cogeneration, manufacturing uses gas for heating, steam and peaking plants. Also within commercial operations they use gas at the moment as well. It is a broader issue than just cogeneration. Yes, it does affect it and as a result we need to look at the priorities about where that gas gets used.

Mr HELPS: In some businesses if the gas goes off they have got some serious problems, like 20 ton of glass in a furnace that you now have to dig out before you can start it again.

Mr JOHN WILLIAMS: Would liquefied petroleum gas [LPG] be a backup to have on standby?

Mr MURRAY-LEACH: People can do a variety of strategies to back up.

Mr HELPS: LPG is not a replacement for town gas, particularly in embedded generators. Liquefied natural gas [LNG] is. There are some very technical reasons why a gas reciprocating engine runs on town gas and it does not run on LPG or propane or butane or syngas. The gas that we take out of the pipe has a very narrow window of its characteristics and it is actually corrected to be that. That allows us to supply one piece of equipment to effectively any point in Australia that is on our normal gas network and know that it will run to a specification. That is not the case in the Northern Territory and it is less the case in Western Australia where they have different gas specifications.

Mr MURRAY-LEACH: I am aware of quite a few cogeneration systems that have come on board with renewable fuels at the site. If you are at an abattoir, if you have some effluent you can use that to create a biogas to feed that. That system has to be tuned to exactly that. It is tuned to what is coming out of the pigs or whatever is coming out of the animal carcasses. If you fed that back into the gas grid you would have to do quite a lot to it.

Mr THOMSON: And with those sorts of systems you tend to blend the biogas with natural gas as well to maintain that consistency because there are variations from the biogas itself.

Mr BART BASSETT: Can you elaborate on the suggestion that would allow cogeneration operators to retail directly to customers provided they charge prices that are similar to those charged by nearby energy companies? Has there been any feedback from the United Kingdom on that sort of thing?

Mr MURRAY-LEACH: I will explain it but I am a little bit lost without a whiteboard. If you have seen those graphs of where energy prices come from, the biggest chunk by a long way is always the networks. We have set up a system that basically says that to have effective competition in energy pricing you have to have competition between multiple retailers. That is a benefit where people are on grid. But what we are forgetting is that with that requirement and the requirement for people to connect to the network and have a variety of supply is while you are putting in a requirement for competition amongst what is now the smallest part of the energy bill you are mandating no competition for the network charge. From a consumer's perspective they are getting minor variations in the top between three offers but no variation in the network charge. Whereas if you look at somebody going off on to an island system you will often find as well that the retail energy component might be higher but the network component will be really tiny. You are not giving people the choice of that competition.

Mr HELPS: We have cases of that in Australia with Horizon in Western Australia and Ergon in Queensland and ETSA in South Australia all running embedded island systems as a retail business where you do not have a choice. You move to this town, this is where you get your power from and this is what you pay for it.

Mr MURRAY-LEACH: Our proposal is the same as that done in the United Kingdom. It basically says if you can demonstrate to the consumer that you are offering them stability of price and it is comparable to the offers that are out on the market you can opt out and you can go into that sort of regulation. So you opt into a regulation system where you actually have your price regulated by comparison to your competitors in a nearby location. Mr Helps can probably comment on how that is going in the United Kingdom. My understanding is that it is working fine.

Mr HELPS: It is a different energy market but the fundamental concept has been working quite well. There might need to be some structural changes to the market here in Australia to allow an equivalent system to work, but we put some proposals forward that might allow us to make some smaller changes and get a similar outcome without necessarily getting the same.

Mr THOMSON: The reason behind all of this is for the implementation of a cogeneration system to a number of customers there is a commitment in terms of capital employed; there is that need for certainty over a longer period of time that you actually reap the rewards of that investment. At the moment with the requirements for direct competition that certainty is not there and it just creates a lot more risk for the actual investment of the capital. That is why we are proposing that where there is a large amount of capital employed you actually provide that certainty to the owner of the assets. As long as they are competitive in the marketplace then they can actually make use of those assets rather than making 50 per cent use of them and not being able to deploy the rest of that, which reduces the efficiency of the operation of the cogeneration or trigeneration system.

Mr HELPS: In short, we want to give people the right to opt out of retail competition to be able to see a significant benefit. That benefit allows somebody to invest with some certainty that those customers are always going to be there for them and somebody is not going to come in and steal them and devalue the sunk asset of the site.

Mr MURRAY-LEACH: Another way of looking at it is you are shifting from retail competition to network competition. At the moment there is no competition in your network but there could be retail competition of giving people the option of saying that I am actually genuinely going to go into a competitive situation of being on and off network. The other thing you are doing is adding in a requirement for price competition. You are getting somebody's price set by what the market is doing but not the opportunity to jump around, but then you are giving people the opportunity to jump off the network monopoly.

CHAIR: It raises a lot of issues particularly with our country constituents about whether you start charging people network costs of tens of thousands of dollars because that is what it actually costs.

Mr BART BASSETT: Would there be a benefit in devising a standardised connection process, including a number of rules and requirements for potential cogeneration operators to fulfil, before entering into discussions with distribution network service providers?

Mr MURRAY-LEACH: That is a really good question. There are two components for that. There is the process for connection and the Australian Energy Market Commission is actually going through a rule change at the moment which should set up, we think, a pretty appropriate process. The challenge with that process is in the current system there is very little oversight of that process. That is where we think that New South Wales Ombudsman would oversee that process to make sure that the network and the provider are going through a fair process. There is a second question which is what would a standard connection look like. With high end, very big pieces of equipment—some of these big systems can get up to 20 megawatts but the one at Sydney is 9 megawatts.

Mr HELPS: Sydney Airport is 11.6 megawatts and cost somewhere around $45 million.

Mr MURRAY-LEACH: When you are talking that big there is no way that can be a standard process. It is like any large generator on the network. You need to look at the costs of connection, you need to make sure the electricity grid is still functioning properly. When you are talking about that big end stuff, it is always going to have to be done on an individual assessment. There is second question though saying with the small systems, would you be able to have some standard connections? If you unit looks like this, you can connect it by only attaching these three pieces of equipment, it would give you an appropriate connection and deal with that properly. They do have that system in place in Germany. It is quite a long process. That is being looked at by the Federal Government.

Mr HELPS: It has taken them 15 years to get it.

Mr MURRAY-LEACH: We really love the idea of there being a standard connection criteria for certain types of generator and saying if your generator looks like this you can connect it no matter of the issue. To be honest, we are probably a long way away from that as a dream. So our view would be about making sure that the process of negotiation between the network company and the cogenerator is a quick, transparent and fair process.

Mr HELPS: And all the things that can be standardised and I am going to say tick a box but that is a bit crude—all the things that are known and are constant between multiple sites should be a given rather than the current process where every time somebody goes to connect, everything is by negotiation.

Mr THOMSON: There is no time frame associated with it.

Mr HELPS: There is no time frame and there is a material benefit to the distribution network owner to not have the generator in.

Mr MURRAY-LEACH: The AEMC has got a process that will come into place we understand late this year which should deal with New South Wales for a period of time until the national energy consumer framework is signed, in which case a new rule change has to come in and that will probably be done late next year. The key thing we think the New South Wales Government will be able to do would be putting in that Ombudsman to make sure those are fair dealings and speedy and should address that.

Mr BART BASSETT: Based on what you have just said, given the difficulty of connecting cogeneration systems to the grid and exporting excess energy should the focus be on smaller solutions serving individual buildings?

Mr MURRAY-LEACH: No.

Mr HELPS: We need to be really clear that there is a big difference between connecting to the grid and exporting. One is a commercial transaction and one is a technical requirement. Irrespective of whether you export electricity from the site or not, you still have to go through the same connection process.

Mr MURRAY-LEACH: Because you need to keep the grid stable. If you are connected and your load is swinging widely around, even if it is not exporting off the site you are causing big problems. You need to go through that anyway.

Mr HELPS: One of the major issues with embedded generation—and the word "embedded" means that you are inside the network, deep inside the network—is that it is below commercially viable to export electricity from the site because in Australia we have an energy only energy market. In effect, in reality electricity is worth the same amount of money in any place in the State. That value is set by an auction, which the major generators participate in on half hour intervals.

Mr BART BASSETT: We have seen it operating.

Mr HELPS: The prevailing price in that market on average over the whole year for the State of New South Wales is less than the cost of gas to burn in an engine. If you exported electricity from an embedded generator in North Sydney you would be giving them a kilowatt and some money. There is actually a commercial restraint from exporting from a site, not a technical one.

Mr MURRAY-LEACH: The reason is that there is site-specific value in cogeneration, which is very high. One of the things is you are avoiding network costs, you are also delivering benefits so that is likely to have multiple dimensions in terms of time supply, security supply, heat output and various other components.

Mr HELPS: When you are behind the meter.

Mr MURRAY-LEACH: When you are behind the meter. As soon as you export you lose all the value of all those other benefits. It does make sense in some locations to do that. There are people who do that.

Mr HELPS: Renewable generators tend to be the only people who do that because they get a renewable energy certificate for $35 or $40 to put their electricity into the grid. We see that in wastewater treatment plants and landfills.

Mr MURRAY-LEACH: Let us come back to your question because it is a really good question. Do we think the focus should be on smaller units because of the greater simplicity or industry standardisation? I am a big believer in an appropriate size for the location. Some buildings the appropriate solution can be a micro-system, some solutions you are looking at the real benefits of having a precinct system, and there are real benefits in a precinct because if you have multiple buildings you have got some industrial, you have got some offices, you have got some households, for example, they are all going to be needing heat and electricity at different times which actually allows you a much more stable flow. So you do not have day/night flows. If you can focus on a mini cluster of buildings it is actually a lot more efficient and also it is capitally much more efficient to have one large unit than multiple small ones because you can size it to the right level.

Mr THOMSON: And also the implementation costs and all of those things.

Mr HELPS: Fundamentally it is a question about whether you have a centralised plant, whether you take plant out of houses and buildings and put in one place. Once you have done that engineering exercise and say, "Yes, there is some commercial benefit in centralising our plant into a precinct" the next question is: Does that plant warrant being a self-generator? Quite often that ordering does not happen. People say, "I want to be a self-generator" and then they go and engineer the plant and they put the cart before the horse rather than say, "Let's put all our plant in one place now. Now do we stack up as an embedded generator?"

Mr THOMSON: Yes, but part of that is also driven from the fact that the barriers to actually export heat and energy are so great that people say, "Look it is easier for us just to put in multiple smaller units and become self-sufficient."

Mr MURRAY-LEACH: Basically if the framework is transparent, you have got the right price signals, you have got an Ombudsman in place, the right size unit should be put into a precinct that is actually commercial appropriate for that precinct. But under the current laws, it can be such a nightmare people will often go for the small boiler in the basement types systems which are actually not the best systems. But if you have that good pricing law, market transparency and an Ombudsman you should have the right systems in place.

Mr BART BASSETT: The Committee understand what you mean by a preferred system and a current system.

Mr JOHN WILLIAMS: In this network obviously someone has to be the shock absorber when the demand for power slips off and you are running at X and all of a sudden the lights go out. Who takes the shock? You are generating the power that is not going to get utilised and it has got to go somewhere, where does it go?

Mr MURRAY-LEACH: If you are using on-site and you are getting variations in on-site use, you normally have multiple systems to deal with it. If you are exporting off, if you are using what generally you are using more on the site, and people around you go off—

Mr JOHN WILLIAMS: Are you talking about a precinct?

Mr MURRAY-LEACH: Yes, so within the precinct you would have multiple units going on and off—

Mr HELPS: And you would have some power coming from the grid anyway so the rate of change of load to the site would be like this, and the on-site generation and the grid would change to meet that.

Mr JOHN WILLIAMS: At some point you are going to push an excess back into the grid?

Mr HELPS: Not necessarily. One of the benefits of smaller generators, as in significantly smaller than what happens in the Hunter Valley, is they can change their output relatively quickly.

Mr MURRAY-LEACH: One of the major benefits of cogeneration is it allows you to respond to demands. Cogeneration is exceptionally responsive to the market because it is such a small system.

Mr GREG PIPER: In relation to the aspirations for the development of a cogeneration system, is there a sufficient pool of knowledge and specialised staff to develop and build these systems? Should there be more information available to prospective cogeneration operators to assist in the planning phase?

Mr MURRAY-LEACH: There are a lot of good people out there but a lot who do not even know what they are doing.

Mr HELPS: I was not going to say that.

Mr MURRAY-LEACH: For example, in commercial building retrofit we are actually just about to complete and agreed energy system that is being developed in conjunction with all the governments in Australia, the Property Council and all the users with the idea of saying, "The challenge for energy users, as if often the case, is actually not finding the right person but avoiding all the terrible advice that they are going to get out there." One advice we have given to New South Wales in the past, because there is actually some useful information coming out of the Office of Environment and Heritage on this, is actually to provide the appropriate level of advice which is: How do you find a good provider? What kind of questions? What kind of answers should they be able to give you?

There are a few competent people out there who can give advice but my God there is a hell a lot of people talking rubbish. So the key thing is making sure people go to advisers because there is a lot of very nice, well-meaning people who think it is a nice green technology. We would rather that every system is stuck in, is a good system and works really well. I think, in summary, there are a lot of good skilled people out there but the key thing is really making sure that energy consumers know how to get the right advice.

Mr HELPS: There is definitely is constraint.

Mr GREG PIPER: There is sufficient out there but the question is whether it is all good advice?

Mr MURRAY-LEACH: Yes.

Mr GREG PIPER: Should there be more good information available?

Mr MURRAY-LEACH: Yes. There is a balance there. The accreditation system we are developing for commercial buildings. There are a lot of very good people out there who can do building retrofits but you also need to have more people. The way you bring in more people is you set those standards and force those people who want to come into the sector to ramp up their skills. In that way you increase the quality and the number of people over time.

Mr GREG PIPER: They need to be accredited.

Mr MURRAY-LEACH: In the short term what we found, and this is what we did with commercial buildings, is while the system is being developed you gave advice to people about what questions they should ask good providers and that forces the providers to give sensible advice.

Mr THOMSON: It is not an easy subject; it is complex and it does require good depth of technical knowledge. There are lot of very good people in Australia, and there is also access to a lot of very good people internationally. It is a mature science around cogeneration and trigeneration, so it is not something that has just occurred. It is really about giving people the right information to be able to make the right decisions. It is not a hard thing but it is about helping people make those decisions.

Mr HELPS: It is multi-disciplined too. You need to understand electrical, mechanical, controls and hydraulics systems.

Mr GREG PIPER: And political.

Mr THOMSON: And political.

Mr HELPS: And have a good lobbyist on your team.

Mr GREG PIPER: To motivate investment in the area, would you support a feed-in tariff for cogeneration systems where energy is being exported to the grid?

Mr MURRAY-LEACH: I have to say I have a big problem with feed-in tariffs. I would use appropriate price signals say, for example, the network payments, that has got to be very site specific ultimately. The challenge is going to be developing that over a period of time. If we brought in an Ombudsman we could start to do that work in New South Wales and make sure that the right people are getting the right payments. That is our preferred solution. In the meantime I think it is going to take a while to develop so our view is that you provide transition assistance through the energy savings scheme. Feed-in tariff is a name some people try and gravitate around that. I think there are examples of where it has been used appropriately overseas. As a transitional mechanism it has been stepped down over time as the other market issues have been dealt with. So you can look at an example of Germany and a few other places where they have done that and it has actually worked really well.

Mr HELPS: They have been trying to achieve different things though and in different energy markets.

Mr THOMSON: Yes, I think it is about understanding what you are exporting. If it is just the electricity it is only part of the total energy package. So what happens with the heat? What happens with the cooling if that is the case? Is your system balanced? You would not run a system solely to feed into the network. So it is really about making the right decisions about sizing. If there is the need to reduce the amount of energy, à la export, it may be a matter of being able to wind back your system rather than necessarily feed-in.

Mr HELPS: If you look at the schemes that have been successful in Holland and Germany and Austria they have all had very good distributed generator feed-in structures, predominantly around renewables, although Holland is a natural gas one. They have all been done for reasons other than energy industry reasons, predominantly around keeping agricultural businesses viable in a market that has no longer got access to WTO credit subsidies. Those market distortions have allowed them to use the energy industry as a crutch, I suppose one could say, to hold it up. They have made some phenomenal energy market transformation but they have been done for reasons other than energy industry reasons. The United Kingdom is probably the only one that is specific for embedded cogeneration but it has a different energy industry over there that is more vertically integrated and so they can see the benefits.

Mr MURRAY-LEACH: It is also worth noting as well that there are various definitions of a feed-in tariff. The basic thing is actually if you do not have access to be able to sell to other customers off-site or to a retailer, you basically get fair value for your electricity rather than having to sell to the wholesale market. I am pretty sure that the feed-in tariff in for anyone exporting into the grid, it is not a premium feed-in tariff. The question is if you are going to premium feed-in tariffs, why are you doing it? How are you structuring it? How are you dealing with any distortions?

CHAIR: So you are not supporting a premium feed-in tariff but you would support a value-based feed-in tariff based on what the value of that is at the time of day and then the place?

Mr HELPS: That is with all the other marketing imbalances around network pricing, yes.

Mr MURRAY-LEACH: The key point is we prefer to focus on network issues but the challenge in a way is we are not holding our breath for that to be fixed overnight and that is where we think transitional support comes in. Our real view is that we should be focussing on some of the network issues as far as is possible.

Mr BART BASSETT: Are you aware of cogeneration systems which are able to run on renewable energy? Would they produce lower emissions that could both at the source and elsewhere where those renewables are coming from? It is a broad question.

Mr MURRAY-LEACH: I had the real pleasure of working on biomass fuels quite some time ago. The situation with cogeneration and these guys will be much more specific than me, the transport costs of that biofuel is really important. If you look at some cogeneration systems already in place that use biomass in Australia, several of the paper companies have them, they use excess woodchips. You have got the gas systems—sugar cane produces the excess husks and you burn that, cogenerate that, great, really low cost because you have got that waste on site, you have got an abattoir. If you are a particular system in a particular

location you have got access to that renewable fuel and that is fantastic. In other places the cost of transporting it around will be very, very high.

It can be quite a site-specific question. There are going to be some locations where it is already happening and it is great. There are other locations where it could happen in the future but the widespread application of renewable fuels, at least in the short term, is not looking like you are going to get every single system replaced. The basic reason is, I guess, natural gas prices will go up but they are still going to be a long way below biogas prices in the general market.

Mr HELPS: The fundamental killer for renewable gas is that the renewable gas that we have access to at the moment does not fit the characteristics of what is required to be put in the pipe and that asset cost to clean it and scrub it and pressurise it and put it in the pipe and transmit it to the point of generation is a barrier. Until you can fix that barrier or the market catches up and removes it, they are going to burn it on-site like they do now.

Mr THOMSON: Yes. That being said though, in the last 18 months with the now defunct Clean Technology Investment Program [CTIP] grants under the previous Labor Government, there were a number of food industries that were looking at using their waste to generate biogas—

Mr HELPS: On-site.

Mr THOMSON: —on-site and then use that for generation of heat and electricity. There is appetite for it but once again it comes down to really the economics of it all.

Mr MURRAY-LEACH: Yes, so it is basically the on-site use or, if you happen to be lucky enough to be—

Mr THOMSON: Or co-located next to a source.

Mr MURRAY-LEACH: Yes.

Mr JOHN WILLIAMS: Yes. We have a dairy that uses it.

Mr MURRAY-LEACH: Exactly. If you are in an area with some renewable resource or basically feedstock, as we call it, great; that is fantastic. But in terms of wide scale, it is going to be a while and it will be quite expensive.

Mr HELPS: If ever.

Mr JOHN WILLIAMS: On that matter, evidence given today led us to believe that this process was not that complex because it was a practice in Germany to put that in the pipeline. Are you aware of the German situation?

Mr HELPS: I have had some exposure to that market over a number of years. What is the polite-est way to put it?

Mr MURRAY-LEACH: Politely.

Mr HELPS: There are some significant market distortions which makes that technical solution commercially viable. That technical solution is not commercially viable in Australia and until we have those market distortions here, which I doubt we ever will, it will not be viable here, either.

Mr THOMSON: We have seen implementation of this type of technology. Sydney Water recently did significant use of biogas with Serra cogeneration units. It was driven not so much because of the economics. It was driven because of their carbon targets and looking at long-term investment around that. It really comes down to this: What are the key drivers for actually doing it? It is not necessarily just for the generation of energy. There may be other reasons for doing it.

Mr MURRAY-LEACH: In summary, we are very pro it, it is great.

Mr THOMSON: Yes.

Mr MURRAY-LEACH: We did not give you a definition of renewable fuels, which we can if you wanted us to take that in.

Mr BART BASSETT: No, that is okay.

Mr MURRAY-LEACH: But we are very pro. In site-specific locations, it is already happening and there is great opportunity there. There are more opportunities in the food industry.

Mr THOMSON: Yes.

Mr MURRAY-LEACH: There are a lot of opportunities where you are seeing waste being fed in. We are hopeful, but probably not hugely bear or bullish about short-term prospects for widespread use of renewable gases.

Mr HELPS: Those German and Polish examples are in markets where farmers are paid to grow a crop that is not food. That is the starting point. They then grow high-yielding maizes. They then digest them into gas and then they clean that gas and put it into a pipeline. Then it is generated and receives a massive feed-in tariff. They are getting support at—

Mr JOHN WILLIAMS: Both ends.

Mr HELPS: —both ends. We are not going to see that happen here.

Mr MURRAY-LEACH: There are potential technology developments that would happen. One of the things in Australia that will make the business case is what we call tertiary biofuels. There are different ways to create biofuels. The ethanol use you see pumped into cars is heavily subsidised and we would call that normally a primary biofuel. The technology required to really make this stuff wide scale in Australia is basically a way to digest woody waste—we have a lot of that—but that is quite a few years away. If that happens, that can change things; but, as I say, we would need to see a few technology changes for it to become widespread commercially viable.

CHAIR: Gentlemen, we have run out of time. I have let it run because you have been so insightful and useful in terms of the information that you have been providing.

Mr JOHN WILLIAMS: Yes, well done.

CHAIR: I did say to Mr Murray-Leach that he would have the opportunity of addressing briefly any issues that he felt had not been addressed that he wished to address.

Mr HELPS: Good luck.

CHAIR: Other than that, I am going to call it stumps. Is there anything that you wanted to particularly highlight?

Mr MURRAY-LEACH: No. I would really like to thank you for your time and your really good questions.

Mr THOMSON: Yes, thank you.

Mr HELPS: Yes.

Mr MURRAY-LEACH: If there is any further information you need from us, we will be happy to provide that. Thank you.

CHAIR: I thank all three of you for appearing before the Committee today. We may wish to send you some additional questions in writing, the replies to which would form part of your evidence and would be made public. We may have foreshadowed one or two things that have been taken on notice, such as the NABERS

issue, but if there is additional information required, would you be happy to provide a written reply to any further questions, which obviously would be part of your evidence and would be made public?

Mr MURRAY-LEACH: Yes.

Mr THOMSON: Yes, that is fine.

Mr HELPS: Yes.

CHAIR: Thank you very much. I also appreciate your flexibility as well as the time you have given us today. I thank Hansard in particular because I know they have gone above and beyond with short breaks. For those who have stayed—I know the City of Sydney has stayed for the duration—without inviting undue submissions, if there are other reflections or comments you wish to give us in writing, we are happy to receive those and indeed those of anyone else who is here. We will enter into a very short deliberative part of the meeting, and we will do that now.

(The witnesses withdrew)

The Committee adjourned at 5.20 p.m.