LEGISLATIVE ASSEMBLY OF NEW SOUTH WALES

Public Accounts Committee

REPORT 14/55 – MARCH 2014

POLYGENERATION IN NEW SOUTH WALES

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PUBLIC ACCOUNTS COMMITTEE

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The motto of the coat of arms for the state of New South Wales is “Orta recens quam pura nites”. It is written in Latin and means “newly risen, how brightly you shine”.

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Terms of Reference

That the Committee inquire into and report on the installation and use of cogeneration/trigeneration technology in New South Wales and in particular:

i whether the current regulatory framework can adequately support the utilisation of cogeneration/trigeneration precinct developments;

ii the operation of cogeneration/trigeneration technology in other jurisdictions and the applicability of the technology to New South Wales;

iii the economic viability of cogeneration/trigeneration technology in New South Wales including the impact of future gas prices on the running costs of cogeneration/trigeneration systems;

iv any financial, public safety and/or other risks to prospective cogeneration/trigeneration customers;

v any supply security and reliability issues associated with cogeneration/trigeneration, especially for residential customers of these systems;

vi the ability of existing regulatory arrangements at the New South Wales and national level to address issues which may be identified;

vii any other relevant matters.

Chair's Foreword

Energy generation is becoming increasingly relevant for businesses and residents with recent electricity price rises.

Polygeneration offers an alternative to relying on grid electricity. It allows businesses to generate their own energy output on site, for both heating and cooling purposes, and have a stable, reliable and affordable electricity supply.

Polygeneration is relatively new to NSW. However, its popularity has gained momentum as large new developments consider its inclusion as a cost saving and environmentally friendly energy alternative. Its supporters, nevertheless, highlight difficulties in embracing this technology and a lack of incentives for its use.

The NSW Public Accounts Committee (PAC) has attempted to consider feedback from both polygenerators and those contemplating its future use. The PAC acknowledges the benefits of polygeneration to the energy mix. It takes pressure off the distribution networks, is more energy efficient and provides a more secure energy supply. It is clear that there are many regulatory hurdles and disincentives to considering polygeneration as an alternative energy supply. I would like to assure those that made representations to the committee that we are sympathetic to this and support change.

Nevertheless, the PAC is also keen to stress the need for responsible planning for polygeneration systems. The PAC received evidence from the City of Sydney that it had hoped to create a number of polygeneration precincts in the City but that these plans had stalled due to a number of factors, including the NABERS rating of a building supplied by polygeneration sourced electricity, uncertain electricity prices, and the slow speed of regulatory reform, particularly with regard to cost-reflective network access fees.

The PAC recognises the City of Sydney's plans to lower emissions as commendable but finds it reckless to spend significant amounts of ratepayers' money (at least $10 million according to an ABC 7.30 report) based on incorrect assumptions or when hoping to operate in more preferable circumstances. Given that the City of Sydney provided the PAC with 15 significant recommendations for regulatory change to improve the economic viability of polygeneration in the City, it is questionable as to whether polygeneration was a viable option at this time, on the scale desired. Also, proposed savings for network access for polygeneration operators may lead to these operators being effectively subsidised by more remote customers to cover any shortfall experienced by the network operators.

The PAC has made a number of recommendations primarily involving regulatory change and network integration issues to help polygeneration become another viable energy generation option for many users. Its intentions are to enable business to access information about the viability of polygeneration for their particular set of circumstances, make connecting to the grid easier and simplify retail licensing arrangements for smaller polygeneration operations considering selling excess energy back into the grid.

One role of the NSW Government is to generally encourage alternative energy solutions, but the PAC does not recommend government providing financial incentives to favour

development of polygeneration systems. It does not support automatic discounting of network use/access by users of polygeneration systems. Nor does it support 'picking winners' with alternative energy solutions and is mindful of the problems that can arise when particular technologies are given favourable treatment, as was the case with the previous government's Solar Bonus Scheme.

To encourage the adoption of polygeneration systems for small scale developments the PAC is recommending a number of regulatory and administrative changes. These include: mandatory standards for polygeneration networks in NSW; promoting information booklets that are available from the NSW Office of the Environment and Heritage about the feasibility of polygeneration; considering issues around the supply, cost and efficiency of gas; consideration of grid connections and selling excess electricity back into the grid; simplified retail licencing agreements for smaller polygeneration operators; and providing clarity around exclusive dealing agreements.

Polygeneration is a complex alternative to grid supplied electricity. There will always be issues around safety and supply within a precinct, the reliance on gas, the effect of a carbon (or other) tax on its viability and its need for a steady energy demand from consumers to make it economically feasible. The issue of connecting to the grid and the ability to onsell electricity remains a regulatory challenge. The Committee is confident, however, that if the NSW Government adopts its recommendations, the path for potential developers of polygeneration should be smoother, more predictable and more encouraging.

Mr Jonathan O'Dea MP
Chair

Executive Summary

Cogeneration and trigeneration, or polygeneration as it is called in this report, is a method of energy generation which generates more than one form of energy from a single fuel source. Most common is cogeneration, which involves generating electricity and capturing the consequential waste heat to distribute in a usable form. In a trigeneration system, this waste heat can also be fed through absorption chillers or other devices to produce cold water.

A polygeneration system can be set up to supply electricity, heat (and cold water if produced) to a single building or a number of buildings in a precinct.

Polygeneration is not a new technology and is being used extensively in a number of countries. There are examples of successful polygeneration systems operating in Australia, including in New South Wales, but its use is not as widespread as in other countries. The Committee was asked to inquire and report on polygeneration in New South Wales including the regulatory framework, financial viability and risks for prospective customers.

Chapter One explains the background to the establishment of the inquiry, its terms of reference and how it was conducted. **Chapter Two** details cogeneration, trigeneration, polygeneration and the operation of these technologies in other jurisdictions both in Australia and overseas.

Chapter Three discusses some of the general benefits and risks of polygeneration, including environmental and financial issues.

Polygeneration offers a number of benefits which, it was argued, would become apparent in New South Wales if it becomes more widespread. Some of these benefits are as follows:

- Deferral of network investment – as a form of decentralised (or local) energy generation, polygeneration has the potential to reduce the need for new network infrastructure and the upgrading of existing infrastructure. This can be achieved if polygeneration systems are built in appropriate locations, and can reduce demand on the traditional electricity network. Given that network charges form a large portion of electricity bills, reducing the amount spent on network infrastructure could lead to significant savings for all energy consumers.

- Improved energy efficiency – As heat that would otherwise be lost in traditional energy generation is harnessed as a useful form of energy in polygeneration systems, they are extremely energy efficient. This has the potential to save on fuel costs and reduce emissions. Also, the majority of polygeneration systems run on natural gas, which is a less emission intensive fuel than coal.

- Supply security – A number of polygeneration systems have been configured to run independently of the electricity grid. This means that should the grid supply fail for any reason, polygeneration customers will still receive their energy supply. This was the case for polygeneration consumers in the United States following the damage and power losses caused by Hurricane Sandy in 2012.

Given the expense of establishing a polygeneration system, the major risks for polygeneration operators relate to the economic viability of a project. A key consideration for polygeneration operators is the balance between the value of the electricity and the thermal energy produced, and the capital and fuel costs used to produce them. If using electricity from the grid is cheaper than using gas as a fuel, polygeneration is a less feasible option.

Polygeneration systems are most effective when there is a constant and predictable demand so they can run close to full capacity. Where demand is more variable, polygeneration is not always a suitable option.

Precinct-scale polygeneration energy supply to various customers is a relatively new development in New South Wales and during the inquiry concerns were raised that there are insufficient protections to ensure energy supply to customers, particularly in the case of unexpected gas supply interruptions.

The Committee recognises the potential benefits of polygeneration but sees it as part of a suite of alternative energy generation methods. It does not therefore recommend incentivising polygeneration over other forms of energy generation but supports removing barriers where appropriate, while ensuring that consumers are protected.

The Committee was pleased to see that the NSW Government has recently launched an information guide and an interactive tool to assist businesses ascertain whether polygeneration is a feasible option, and recommends that this be further promoted. The Committee also makes recommendations to ensure that polygeneration systems meet relevant standards and that plans are put in place to deal with gas supply shortages for polygeneration systems, that supply vulnerable customers.

Chapter Four further explores some environmental aspects concerning polygeneration, especially as it relates to the National Australian Built Environment System and other programs.

Many polygeneration operators submitted that there needs to be proper recognition of the lower carbon intensity of polygeneration in order to encourage its use, and that this is not available under the current NABERS arrangements. Following some confusion surrounding the use of polygeneration and its recognition under NABERS, in 2012 the Office of Environment and Heritage clarified that only a polygeneration system located in a building which directly supplies that building would improve that building's energy efficiency star rating. Such a polygeneration system will reduce the amount of grid sourced electricity required by the building and therefore improve its energy efficiency.

However, where another building purchases polygeneration sourced energy which is supplied through the electricity grid, that building's energy efficiency star rating will not be upgraded as the building itself is not more efficient. The Office of Environment and Heritage indicated that a building's emission savings attributable to polygeneration sourced energy will be formally recognised following the development of a robust measure by an industry-led steering committee.

The fact that the majority of polygeneration systems run on gas and can operate at a high efficiency also has environmental implications, and the Committee makes recommendations

to further promote gas efficiency, such as the inclusion of gas savings in the Energy Savings Scheme. Further, the Committee recommends that the NSW Energy from Waste Policy Statement be reviewed and that renewable gas be separately accredited if it is injected into the gas grid to assist polygeneration systems seeking to operate on renewable gases.

Chapter Five discusses some of the issues encountered by polygeneration operators in connecting to the traditional network.

Concerns for polygeneration operators included the ongoing charges for using the network. A number of issues regarding the connection process appear to have been analysed as part of the Australian Energy Market Commission's (AEMC) draft rule determination on connecting embedded generators. This draft rule was recognised as improving the situation for connecting a polygeneration system by providing more information to all parties, aiming to create more predictable timeframes for various stages of the connection process and encouraging discussion between connection applicants and network service providers. The Committee therefore supports the AEMC's draft rule.

Some polygeneration operators found it unfair that they do not receive a discount on their network fees, even if they only use the network occasionally during low-peak times. The Committee did not support the argument for a discount to be offered to polygeneration operators. However, the Committee does recommend improvements to the connection process for polygeneration systems, for example, through the updating of the NSW Service and Installation Rules. The Committee also recommends that polygeneration be considered as part of the National Principles for Feed-in Tariff Schemes, and that the Government provide further information on virtual private wire networks, which are likely to benefit polygeneration operators.

The Committee also welcomes the Government's changes to network businesses licensing conditions which will remove the incentives for over-investment in the network. These licensing condition changes aim to encourage network operators to seek alternatives to building new infrastructure. Polygeneration operators may benefit from these changes if they can demonstrate that a system relieves pressure on the network, and are able to negotiate payments from the network operators.

Given the proposed rule changes from the AEMC and the new conditions for network businesses, the Committee considered that further changes could be counterproductive if introduced before other proposals take effect.

Chapter Six examines matters associated with polygeneration systems which seek to export excess energy or operate within a precinct. **Chapter Seven** concerns the retailing of energy by polygeneration systems and issues relating to consumer protection.

The current charges to use the electricity network to supply nearby buildings were raised by those polygeneration operators who intend to supply energy within a precinct, or retail energy that they generate. It was argued that network fees should be lower because the energy does not have to be transported as far as from remote generators. However, the Committee noted that this is an issue across the state and that distance-based network charges are not used in other situations.

Nevertheless, the Committee did accept the argument that retailing energy generated by polygeneration systems - particularly smaller ones - can be a complex process, and recommends that simplified retail licencing conditions be introduced, provided that safety arrangements and customer protections are maintained.

The fact that polygeneration is an emerging technology in NSW, particularly in the sphere of energy retail, raised some concerns about the potential for exclusive dealing. This was a particular concern in relation to distribution of thermal energy by polygeneration operators. The Committee noted these concerns and recommends that polygeneration is an area which would benefit from further attention from the Australian Competition and Consumer Commission. The Committee also recommends that consumers of polygeneration sourced thermal energy be properly protected through expansion of the powers of the Energy and Water Ombudsman to cover the provision of thermal energy in the form of hot and chilled water. A further recommendation is that the Independent Pricing and Regulatory Tribunal be given the power to regulate the price of thermal services in a manner similar to the regulation of other energy services.

List of Findings and Recommendations

Glossary

ABBREV.	Organisation/Definition
ACCC	Australian Competition and Consumer Commission
ACL	Australian Consumer Law
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CCHP	Combined Cooling, Heat and Power
CHP	Combined Heat Power
CTTT	Consumer, Trade and Tenancy Tribunal
DNSP	Distribution Network Service Provider
DUoS	Distribution Use of System (charges)
EPA	Environment Protection Agency
ESS	NSW Energy Savings Scheme
EUA	Environmental Upgrade Agreement
GW	gigawatts
GWe	gigawatt electrical
GWh	gigawatt hours
IPART	Independent Pricing and Regulatory Tribunal
KW	kilowatt
KWe	kilowatt electrical
MW	megawatts
MWe	megawatt electrical
MWh	megawatt hour
NABERS	National Australian Built Environment Rating System
NEM	National Electricity Market
NER	National Electricity Rules
OEH	NSW Office of Environment and Heritage
RET	Renewable Energy Target
SCER	Standing Council on Energy and Resources
SGA	Small Generation Aggregator

Chapter One – Conduct of the inquiry

CONDUCT OF THE INQUIRY

1.1 On 3 July 2013, the Hon Chris Hartcher MP, then Minister for Resources and Energy, wrote to the Chair of the Public Accounts Committee, requesting that the Committee conduct a review into matters associated with the installation and use of cogeneration and trigeneration technology in NSW. Mr Hartcher suggested that the Committee could consider issues relating to consumer protection, safety, reliability, pricing and particularly the regulatory framework concerning precinct level developments.

1.2 At its meeting on 15 July 2013, the Committee resolved to adopt the terms of reference for an inquiry into cogeneration and trigeneration in NSW with the following terms of reference:

> That the Committee inquire into and report on the installation and use of cogeneration/trigeneration technology in New South Wales and in particular:
>
> i whether the current regulatory framework can adequately support the utilisation of cogeneration/trigeneration precinct developments;
>
> ii the operation of cogeneration/trigeneration technology in other jurisdictions and the applicability of the technology to New South Wales;
>
> iii the economic viability of cogeneration/trigeneration technology in New South Wales including the impact of future gas prices on the running costs of cogeneration/trigeneration systems;
>
> iv any financial, public safety and/or other risks to prospective cogeneration/trigeneration customers;
>
> v any supply security and reliability issues associated with cogeneration/trigeneration, especially for residential customers of these systems;
>
> vi the ability of existing regulatory arrangements at the New South Wales and national level to address issues which may be identified;
>
> vii any other relevant matters.

1.3 The Committee resolved to call for submissions by 4 September 2013.

Submissions

1.4 The Committee placed an advertisement in the Sydney Morning Herald and the Sydney Central Courier on 24 July 2013, calling for submissions to the inquiry by 4 September 2013. The Committee also advertised the inquiry on its website and wrote to relevant organisations.

1.5 The Committee received 44 formal submissions to the inquiry, which were published on its website. Three submissions were not published by the Committee, at the request of the authors. A full list of submissions is included at Appendix One.

Public hearing

1.6 The Committee held a public hearing on 21 October 2013 at Parliament House, Sydney. Representatives of the following organisations appeared to give evidence at these hearings:

- Office of Environment and Heritage – NSW;
- NSW Distribution Network Service Providers;
- City of Sydney;
- NSW Trade and Investment;
- Property Council of Australia;
- APA Group;
- Jemena Gas Networks (NSW) Limited; and
- Energy Efficiency Council.

1.7 A full list of witnesses who appeared before the Committee can be found at Appendix Two. A transcript of the evidence provided is available on the Committee's website.

Visit of inspection

1.8 On 18 October 2013, a delegation of the Committee visited two trigeneration sites in the Sydney CBD. First, the Committee visited Origin Energy at 20 Bond Street where they met with representatives from Origin and were given a tour of the trigeneration plant. The Committee then visited 161 Castlereagh Street where they met with representatives from GPT and Grocon before inspecting the trigeneration facilities which are part of the Legion House development at that address.

Chapter Two – Introduction to cogeneration, trigeneration, and polygeneration

2.1 This Chapter will introduce the concepts behind cogeneration, trigeneration and polygeneration and also explore some of their uses overseas and across New South Wales. This chapter relates to the inquiry's term of reference concerning the operation of cogeneration and trigeneration in other jurisdictions and its applicability to NSW.

COGENERATION, TRIGENERATION AND POLYGENERATION

What are cogeneration, trigeneration and polygeneration?

2.2 In the simplest terms, cogeneration is the production of both electricity and heat by some form of engine or turbine. The generation of electricity will usually also produce heat. Ordinarily this heat is released as waste but in a cogeneration system, it is harnessed and both the electricity and heat are made available for distribution in a usable form.[1]

2.3 Cogeneration is also sometimes referred to as combined heat power (CHP).

2.4 For trigeneration, a third element is added so that it produces heating, cooling and electricity. This is most commonly achieved by feeding some of the thermal energy through an absorption chiller, or another device, to create cold water. The system therefore produces heat, electricity and chilled water for distribution in a usable form.[2]

2.5 Trigeneration is also sometimes known as combined cooling, heat and power (CCHP).

2.6 These forms of energy are then supplied to a building (or number of buildings) to match the demand. In order for this energy to be properly utilised and distributed, systems must be constructed which ordinarily consist of three components. These are:

- a generating unit which outputs electricity and thermal energy (for example heat);
- a distribution network conveying electricity and thermal energy to premises in a defined area or precinct; and
- an installation that conveys the electricity and thermal energy within the premises for use by various appliances or equipment.[3]

[1] Submission 17, Kinesis Pty Ltd, p2.

[2] Submission 8, City of Sydney, p7.

[3] Submission 44, NSW Trade and Investment, p4.

2.7 The Committee received evidence suggesting that although polygeneration is currently becoming more common in NSW, it is not a new technology. Origin Energy stated that 'cogeneration is an established technology that has been used globally since the 1880s'.[4]

2.8 In various evidence presented to the Committee, the terms 'combined heat and power', 'cogeneration', 'combined cooling, heat and power', and 'trigeneration' have all been used to describe various systems.

2.9 The term polygeneration is also used generally to describe any systems which simultaneously produce any combination of electricity, useful heat, cooling and other forms of energy. Throughout this report, the term polygeneration is used to refer to both cogeneration and trigeneration. It is used here as a generalised term, unless a particular distinction is to be made.

On-site and precinct polygeneration

2.10 Polygeneration projects are usually set up as on-site or precinct facilities. There are some significant differences between these two arrangements which will be explained here and discussed further throughout the report.

2.11 In an on-site polygeneration facility, electricity and heating/cooling is provided to a single building by a polygeneration plant located in that building or on the same property.

2.12 On the other hand, precinct generation involves a local polygeneration plant which distributes electricity and heating/cooling to any number of separate properties, and may or may not also export surplus electricity or heat to the existing grid where available. These facilities are often owned and operated by a utility company or local government agency who meters and charges customers for energy drawn from this distribution network.[5]

2.13 Most issues raised during the inquiry affected both models of polygeneration, which is reflected throughout the report. Where issues relate to specifically on-site or precinct based systems, this will be made clear.

Distributed generation

2.14 In the course of the inquiry, the subject of distributed generation was raised by several stakeholders. Distributed generation is defined as an electric power source connected directly to the distribution network or on the customer side of the meter.[6]

2.15 Distributed generation is seen as an alternative to the more traditional transmission network model where electricity is generated in a removed location, usually by large power stations, and transmitted to where it is needed. Distributed generation has a number of potential benefits which will be covered further in this report as they relate to polygeneration.

[4] Submission 13, Origin Energy Limited, p1.

[5] Submission 14, Name suppressed, p7.

[6] Ackermann, Thomas, Andersson, Göran, and Söder, Lennart, 'Distributed generation: a definition', *Electric Power Systems Research*, 57 (3), 2001 pp195-204.

2.16 Since polygeneration systems will usually provide energy to the buildings they are housed in or other nearby locations, they can be seen as a form of distributed generation. The Committee received evidence on the wider benefits of distributed generation and also some of the difficulties it can encounter. This, however, was outside the scope of the inquiry which focusses on polygeneration. Therefore distributed generation will only be discussed when it is directly relevant to polygeneration systems and not in a wider sense.

POLYGENERATION OVERSEAS

2.17 The inquiry's terms of reference required the Committee to examine the operation of polygeneration overseas and its applicability in NSW. Polygeneration systems have been installed in a number of countries across the world. Some of these countries have also introduced measures to incentivise the use of polygeneration.

The United States of America

2.18 The United States of America (US) were early adopters of polygeneration technology and by 2006 polygeneration was responsible for generating nine per cent of all energy in the US.[7] The US Department of Energy also 'established Eight Clean Energy Application Centers with the aim of developing the required technology application knowledge and educational infrastructure necessary to lead on CHP [combined heat and power] and reduce any perceived risks associated with their implementation'.[8]

2.19 In 2012, the U.S. Obama administration recognised combined heat and power (CHP) in Government-sponsored clean energy policy. Its focus was on the US manufacturing sector to enhance energy efficiency by expanding CHP.[9]

2.20 New York City currently hosts the largest polygeneration network in the US at Co-op City in the Bronx, a large housing development. The polygeneration system supplies electricity, heating and cooling to 60,000 residents in 15,372 high-rise apartments, seven clusters of townhouses, three shopping centres, schools, churches and other public buildings.[10]

2.21 A strategic planning document for New York City released in 2007, and updated in 2011, includes an increased use of polygeneration to improve energy efficiency in New York City and reduce greenhouse gas emissions. The document sets a target of 800MW of new installed decentralised energy generation, which is to be achieved primarily by new on-site polygeneration installations.[11]

2.22 In its submission, the City of Sydney cited a number of other cities in the US that have large decentralised energy networks:

[7] Submission 5, Total Environment Centre, p5.

[8] Submission 5, Total Environment Centre, p5.

[9] The White House, 2012 Executive Order – Accelerating Investment in Industrial Energy Efficiency: <http://www.whitehouse.gov/the-press-office/2012/08/30/executive-order-accelerating-investment-industrial-energy-efficiency>, viewed 10 January 2014.

[10] Submission 8, City of Sydney, p19.

[11] PlaNYC, The City of New York, April 2011, p113.

> Other major decentralised energy networks exist in Indianapolis, Philadelphia, Baltimore, Chicago, Detroit, Houston, Las Vegas, Miami, San Francisco, St Paul and Seattle.[12]

2.23 It is worth noting, however, that there are significant differences in the US energy market when making comparisons to Australia. As one submission pointed out:

> Unlike in the UK and Australian context, where power generators have been historically government-owned entities, in NYC [New York City] energy has been provided by private companies which creates a substantially different context in terms of investment decisions and uptake of new generating technologies.[13]

The United Kingdom

2.24 The United Kingdom (UK) government is also acting to promote and support the adoption of polygeneration technology. In addition to setting progressive targets to source government electricity use from polygeneration, there are also financial incentives and grant support.[14] The UK Department of Energy and Climate Change has also set up 'CHP Focus' which is an online source for information and support surrounding polygeneration, in addition to a free helpline which offers expert guidance.[15]

2.25 Polygeneration is seen as a key part of the UK's commitment to reducing its greenhouse gas emissions. The Committee was informed that, 'the UK exempts companies that invest in CHP from its Climate Change Levy, and expects this single incentive will deliver around 7 GW of new generation capacity, and reduce emissions by 3.2 million tonnes of carbon dioxide'.[16]

2.26 In order to qualify for various benefits, including the Climate Change Levy exemption and business rate exceptions, polygeneration systems in the UK must be certified under the Combined Heat and Power Quality Assurance Scheme. This Scheme sets standards for polygeneration systems in terms of their energy efficiency and environmental performance based on the fuel used, the power generated and the heat supplied.[17]

2.27 Polygeneration is currently being used to supply electricity and heat to 23 government buildings, including Downing Street, the Ministry of Defence, the Foreign and Commonwealth Office, the Department for Environment, Food and Rural Affairs, the Horse Guards and the Treasury.[18]

2.28 Polygeneration is also an important part of London's future planning, as part of the plan to increase the amount of energy provided by distributed generation in the city. The City of Sydney noted that targets set out in the London Plan and the Mayor's Climate Change Action Plan 'saw 106 cogeneration/trigeneration,

[12] Submission 8, City of Sydney, p19.

[13] Submission 14, Name suppressed, p38.

[14] Submission 7, Name suppressed, p3.

[15] UK Department of Energy and Climate Change, <http://chp.decc.gov.uk/cms/>, viewed 10 January 2014.

[16] Submission 7, Name suppressed, pp3-4.

[17] Submission 23, Dalkia Energy Solutions, p5 and 6, and UK Department of Energy and Climate Change, <http://chpqa.decc.gov.uk/>, viewed 10 January 2014.

[18] Submission 8, City of Sydney, p20.

including six fuel cell CHP and six biomass CHP systems … form part of the development applications in the first year of operation of the new planning instrument'.[19]

2.29 Another prominent example of polygeneration in the UK is in Woking where, as of 2010, Woking's polygeneration plants supplied 24GWh of heating per annum to over 1,250 buildings and electricity to a further 5,000 buildings.[20]

The European Union

2.30 In 2004, the European Union (the EU) adopted the CHP Directive. This directive recognised the benefits of polygeneration and aimed to 'facilitate the installation and operation of electrical cogeneration plants … in order to save energy and combat climate change'.[21]

2.31 This has resulted in polygeneration projects receiving government support and being included in renewable energy incentive schemes.[22] The directive also binds the member states to specific actions, for example: analysing and reporting on the national potential for high-efficiency cogeneration; identifying and reducing regulatory and non-regulatory barriers to cogeneration; and streamlining and expediting relevant procedures.[23]

2.32 The European Union currently generates eleven per cent of its electricity from polygeneration sources which is a higher proportion than wind, solar and biomass combined, in terms of the amount of electricity generated.[24]

2.33 The country with the highest proportion of electricity generated from polygeneration is Denmark with 60 per cent. They are followed by the Netherlands and Finland. Germany has a polygeneration capacity of 21 GWe, which is the highest capacity in the EU. Germany has also legislated to set a target of doubling electricity generated from polygeneration to 25 per cent by 2020.[25] One incentive to achieve this target is that plant operators can obtain tax relief provided their plants achieve efficiency levels of at least 70 per cent. This aims to further encourage innovation and improvement of polygeneration technology.[26]

2.34 The CHP Directive defines high efficiency polygeneration as providing energy savings of more than 10 per cent when compared to the separate production of heat and electricity. There are also similar energy efficiency formulas used in

[19] Submission 8, City of Sydney, p20.

[20] Submission 14, name suppressed p32.

[21] European Commission, Energy, <http://ec.europa.eu/energy/efficiency/cogeneration/cogeneration_en.htm>, viewed 10 January 2014.

[22] Submission 5, Total Environment Centre, p4.

[23] Submission 5, Total Environment Centre, p4.

[24] Submission 7, Name suppressed p3.

[25] Submission 8, City of Sydney, p19 & 20.

[26] Submission 7, Name suppressed, p3.

Spain, France and Italy for polygeneration systems to qualify for specific benefits such as the premium export tariff in France and Spain.[27]

2.35 According to the International Energy Agency, the expansion of polygeneration in France, Germany, Italy and the UK will 'effectively double the existing primary fuel savings by 2030'.[28] This would increase annual energy savings from European polygeneration systems from 156,000 GWh to 465,000 GWh, thereby significantly reducing greenhouse gas emissions.[29]

Asia

2.36 Many of the larger cities in the Asian region also use polygeneration as part of their energy mix.[30]

2.37 Polygeneration was introduced to Japan in 1970 and the Heating Industry Act 1972 recognises polygeneration heating/cooling networks as a third utility alongside gas and electricity utilities. The largest polygeneration precinct in Japan operates in Greater Tokyo.

2.38 Singapore has installed around 1,600 MWe of polygeneration as part of the Singapore Green Plan. The polygeneration systems are used to provide cooling energy and help reduce Singapore's emissions and energy imports.

2.39 The Korea District Heating Corporation supplies electricity, heating and cooling to more than 1 million households and 2,000 customers of commercial and public buildings over a 1,433 km distribution network in the Greater Seoul Metropolitan Area.

2.40 China currently generates more than 28 GWe of electricity through polygeneration and has recently announced plans to deliver 50 GWe of electricity from polygeneration by 2020, including 30 GWe of gas-fired polygeneration to replace systems fuelled by coal.

2.41 More than 60 per cent of urban central heating in China comes from decentralised energy networks, including polygeneration, which services more than 330 cities.

POLYGENERATION AROUND AUSTRALIA

2.42 According to the City of Sydney, polygeneration in Australia is less developed than in many countries.[31] Nevertheless, there are already active polygeneration systems across Australia. The following are examples of substantial polygeneration in other jurisdictions in Australia.

2.43 The Queensland Children's Hospital Energy Plant is a polygeneration system that will provide cooling, heating, power and steam to the Queensland Children's

[27] Submission 23, Dalkia Energy Solutions, pp5-7.

[28] Submission 7, Name suppressed, p4.

[29] Submission 8, City of Sydney, p20.

[30] Information on Asian cogeneration primarily taken from Submission 8, City of Sydney, p21.

[31] Submission 8, City of Sydney, p21.

Hospital in Brisbane.[32] It is scheduled for completion by mid-2014 and will also supply the nearby Academic and Research Facility.

2.44 As part of the Victorian Government's Revitalising Central Dandenong initiative, the Dandenong Precinct Energy Project was established. This 2MW cogeneration system, which is proposed to increase to 6MW, will supply electricity and hot water to provide heating and cooling to buildings of varying ownership within a precinct. The project intends to offer substantial sustainable and environmental benefits to building owners and tenants.[33]

2.45 Since 2003, the Coopers Brewery in South Australia has operated a polygeneration system which produces 4.4MW of electricity and generates up to 21 tonnes of steam per hour.[34]

Polygeneration in NSW

2.46 There are also polygeneration systems active in NSW. In addition to those plants the Committee visited mentioned earlier in this chapter, the following examples were brought to the attention of the Committee:

- A cogeneration system which produces electricity and heats swimming pools at the City of Wagga Wagga's Oasis Aquatic Centre[35];
- A cogeneration plant which is installed at the North Sydney Council's Olympic Pool[36];
- A trigeneration system which now powers the Maitland City Bowls, Sports and Recreation Club[37];
- In 2006, the first installation of cogeneration technology for a residential development in Australia was installed in a 132 unit residential block in Chatswood[38]; and
- The City of Sydney have resolved to design a trigeneration system to service Sydney Town Hall, Town Hall House, the Queen Victoria Building and other nearby buildings.[39]

2.47 When considering how applicable the overseas experiences are to the situation in New South Wales, the climate of various locations must be a factor. Cogeneration systems are simpler than trigeneration systems and can be seen as an easier option for investors. In many of the countries mentioned above, the demand for

[32] Floth Sustainable Building Consultants, QCHEP, <http://www.floth.com.au/5-portfolio/qchep>, viewed 6 March 2014.

[33] Origin Energy, Dandenong Revitalisation Fact Sheet, <http://www.originenergy.com.au/files/Dandenong_Revitalisation_FactSheet.pdf> , viewed 6 March 2014.

[34] AGL, Coopers Brewery Cogeneration Facility, <http://www.aglblog.com.au/wp-content/uploads/2013/12/Coopers.pdf> viewed 6 March 2014.

[35] Submission 1, Wagga Wagga City Council, p1 and Submission 17, Kinesis Pty Ltd, pp2-3.

[36] Submission 26, North Sydney Council, p1.

[37] Submission 3, Home Loan Experts, p1.

[38] Submission 17, Kinesis Pty Ltd, p3.

[39] Submission 8, City of Sydney, p23.

heating is a lot greater than it is in Australia in general and New South Wales in particular, where there is also a greater demand for cooling. Therefore, a cogeneration system becomes more viable. This was pointed out to the Committee by Gosford City Council:

> Council notes that all existing examples of district heating schemes are located in cold climates in Europe and North America; very different to the NSW climate. The few examples of district cooling schemes typically rely on low cost renewable energy sources such as cold water from deep water bodies or snow melt.[40]

2.48 Trigeneration systems can provide cooling but the most common method is through absorption chillers which is not a very efficient use of the heat energy produced. This has been recognised, however, and according to Mirvac, has led some developers to investigate alternative cooling methods to maintain the feasibility of a cogeneration project. They stated that:

> NSW has higher cooling demand and lower heating demand. Therefore in NSW we convert waste heat to cooling using absorption chillers. This is an extremely inefficient process and in fact new projects are now looking to electric chillers and discharging the waste heat. Therefore the system needs to be sized on electricity load.[41]

Committee comment

2.49 The Committee recognises that polygeneration systems are in operation in a number of countries across the world and are considered safe and reliable. Polygeneration is recognised as an important part of diversifying energy supply by various governments who are acting to encourage its growth.

2.50 Yet, the Committee notes that where polygeneration is particularly incentivised by governments, this also comes with appropriate conditions.

2.51 The Committee is pleased to see that innovative practices are being introduced to match the Australian situation and the increased demand for cooling rather than heating. If polygeneration continues to become more popular, it is likely that further ideas and innovations will be introduced and trialled. While Australia has a different climate to many northern hemisphere countries, this should not be seen as a major barrier to the adoption of polygeneration technology.

[40] Submission 2, Gosford City Council, p1.

[41] Submission 43, Mirvac Limited, p2.

Chapter Three – The benefits and risks of polygeneration

3.1 This Chapter will examine the reasons why polygeneration may be chosen as a form of energy supply and incentives to install a polygeneration system. It also examines some of the risks involved in polygeneration and details some of the difficulties which may be encountered by a polygeneration operator. The Chapter covers the inquiry's terms of reference relating to financial, public and other risks to customers and also supply security and reliability issues associated with polygeneration. It also examines some of the issues surrounding the economic viability of polygeneration, particularly with regard to future gas prices.

POTENTIAL BENEFITS OF POLYGENERATION

3.2 Polygeneration is an emerging technology in NSW with the potential to deliver significant emissions reductions, protect consumers from rising energy bills and reduce peak demand.[42] Polygeneration projects also offer a means to take direct action to reduce emissions.

3.3 Investors and customers alike consider polygeneration systems in buildings beneficial for a number of reasons, including energy efficiency and environmental improvements, leading to lower running costs and higher rental yields. For instance, the Property Council of Australia advised the Committee that there is a growing demand for 'green' technologies such as polygeneration because of:

- Tenant preferences – higher grade buildings have lower vacancy rates;
- Financial gain – lower operating cost, higher rental and capital yields;
- Healthier workplaces – better air quality and thermal comfort;
- Corporate social responsibility – obligations to be sustainable businesses;
- Environmental leadership – CEOs' and directors' direction;
- Government procurement and leasing policies – green leases; and
- Government programs – Clean Energy Future package and the carbon price, and the Commercial Building Disclosure scheme.[43]

Economic benefits

3.4 Polygeneration seems economically attractive for a number of reasons. According to the City of Sydney there are three key advantages to polygeneration. Firstly, it has the potential to provide relief from electricity network augmentation. Secondly, it can offset future investment in centralised generation. Thirdly, in contrast to electricity, which must be consumed as soon as it is produced or

[42] Submission 9, Clean Energy Council, p2.

[43] Submission 35, Property Council of Australia, p2.

stored in expensive batteries, thermal energy can be more economically stored. This is a particularly useful buffer against extreme electricity peak demand instances.[44]

3.5 Research conducted by the International Energy Agency found that an increase in power generated by polygeneration, as projected in their 'Accelerated CHP Scenario' could lead to a 7 per cent reduction in overall capital investment in the power sector by 2030. These savings largely occur through voided transmission and distribution network investment.[45]

3.6 Evidence provided to the Committee suggested that the City of Sydney's Interim Trigeneration Master Plan could generate a financial benefit 'in the form of deferred network costs of more than $200 million by 2020 and more than $1 billion by 2030'.[46]

Deferral of infrastructure investment

3.7 Evidence provided to the Committee shows that deferral of infrastructure investment is a vital benefit of polygeneration. The evidence indicates that a number of advanced countries are moving away from centralised energy – due to network charges that are causing price increases – and are therefore experiencing declining energy costs, making them more competitive.[47]

3.8 By contrast, the networks in NSW spent $17.4 billion in the current five-year period, which has resulted in increased electricity bills, with half of the electricity bills covering network charges.[48]

3.9 In fact, some stakeholders claimed that network augmentation has been the main reason for recent electricity price rises. If polygeneration systems lead to a reduced need to make these network augmentations, it may have a benefit for consumers. The Energy Efficiency Council told the Committee that:

> With over $40 billion spent on augmenting the grid in a five year period, network augmentation has been the main factor driving up national electricity prices in recent years. Reducing network augmentation could reduce further rises in electricity bills. [49]

3.10 By matching supply with times of peak energy demand, polygeneration technology has the potential to reduce the need for network infrastructure and overcome the limitations usually associated with wind and solar power, such as the intermittent nature of these forms of generation.[50]

3.11 However, many operators of polygeneration units may wish to be connected to the grid to provide back-up supply, or to enable exporting of excess energy. As a

[44] Submission 8, City of Sydney, p7.
[45] International Energy Agency, *Cogeneration and district energy*, France 2009, p15.
[46] Institute for Sustainable Futures in Submission 8, City of Sydney, p25.
[47] Mr Jones, City of Sydney, Transcript of evidence, 21 October 2013, p28.
[48] Mr Jones, City of Sydney, Transcript of evidence, 21 October 2013, p28.
[49] Submission 39, Energy Efficiency Council, p7.
[50] Submission 5, Total Environment Centre, p3.

result, this imposes network costs and can reduce any anticipated savings in networks costs.[51]

3.12 The NSW Distribution Network Services Providers (DNSPs) advised that, the fact that polygeneration systems usually request to connect to the network supply for standby or back-up purposes to cover maintenance or failures means that the network must be 'maintained as though the customer was using them'.[52]

3.13 Therefore, NSW DNSPs emphasised that while greater levels of polygeneration has the potential to lead to network investment deferral, it is currently of limited benefit because embedded generators such as polygeneration:

- cannot – for technical reasons – be relied on for network support;
- generally seek a network supply as a back-up system;
- have no contractual obligations to operate at the times they are needed; and
- require upgrading of the shared network to accommodate for their operation.[53]

3.14 However, if an effective cost reflective pricing system was introduced and more polygeneration systems were connected to the network in the future, the DNSPs suggested that they would become more familiar with the effects of such systems on the network, allowing for greater potential for network investment deferral. The DNSPs told the Committee that:

> … network support contracts may become more common place and workable. This would result in more efficient outcomes to consumers through network deferrals and better utilisation of existing electricity assets.[54]

3.15 In December 2011, the Australian Energy Market Commission (AEMC) issued a final rule in relation to network payments to embedded generators which, as the NSW DNSPs explained, 'determined that the level of compensation for embedded generators should be reflective of the benefits they provide to the transmission network'.[55] This means that DNSP payments to polygeneration operators should reflect the extent to which they defer investment. Polygeneration operators have also argued that they should pay reduced network charges as they also do not rely on the traditional electricity grid for the supply of energy. This issue is discussed further in Chapter Five.

Boosting competitiveness and creating jobs

3.16 In addition to potential savings on network expenditure, evidence provided to the Committee suggests that investing in polygeneration can contribute to more economic benefits, such as boosting a country's competitiveness. The Energy Efficiency Council argued that, 'if Australia were to raise its rate of energy

[51] Submission 44, NSW Government Trade and Investment, p8.
[52] Submission 32, NSW Distribution Network Service Providers, p4.
[53] Submission 32, NSW Distribution Network Service Providers, p4.
[54] Submission 32, NSW Distribution Network Service Providers, p5.
[55] Submission 32, NSW Distribution Network Service Providers, p8.

improvements by just one per cent per annum, it would boost GDP by $8 billion by 2020 and $26 billion by 2030'.[56]

3.17 Furthermore, the Energy Efficiency Council argued that by increasing competitiveness, 'energy efficiency enables businesses to retain and expand their workforce'.[57] For instance, research conducted in the US found that each dollar invested in energy efficiency generated US$2.32 in local economic activity, US$0.82 more than an equivalent expenditure in petroleum and gas bills.[58]

3.18 According to the Energy Efficiency Council, enhancing energy efficiency in Australia would create approximately 75,000 jobs by 2030, including for builders, engineers and manufacturers.[59]

Energy efficiency

3.19 Closely related to the economic benefits of polygeneration is another important advantage – increased energy efficiency gains. This is particularly evident when compared to traditional forms of energy generation. Typically, a coal generator in NSW operates at about 32 per cent efficiency while 78 per cent is lost as heat. If polygeneration technology is in place and heat is used onsite, efficiency increases from 32 per cent to 80 per cent. This implies that polygeneration is beneficial where it delivers much higher efficiency of fuel use.[60]

3.20 The reason for higher efficiency of polygeneration is the fact that waste heat, which would otherwise be lost, is captured and used in a number of ways, including hot water, space heating and space cooling.[61] Another reason for higher efficiency of polygeneration – in cases when electricity is generated on site – is the absence of transmission losses. With remote power stations, these can amount to 10 per cent or more.[62]

Energy affordability – a social benefit of polygeneration

3.21 Energy efficiency has an important flow-on social effect – more affordable energy. This is particularly significant if polygeneration becomes more common and some of the benefits are seen on a wider scale. The Energy Efficiency Council highlighted key effects which could lead to cheaper energy for consumers should polygeneration become more popular, including efficiency of fuel use and lower electricity prices:

> First, these systems improve the efficiency of fuel use. Second, where they defer network investment, they will reduce electricity prices for all users. Third, by

[56] The Climate Institute 2013, *Boosting Australia's Energy Productivity Report* in Submission 39, Energy Efficiency Council, p7.

[57] Submission 39, Energy Efficiency Council, p7.

[58] National Renewable Energy Laboratory 1995, DOE/GO-10095-196, Energy Efficiency Strengthens Local Economies, U.S. Department of Energy, Washington, in Submission 44, Energy Efficiency Council, p7.

[59] Submission 39, Energy Efficiency Council, p7.

[60] Mr Murray-Leach, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p55.

[61] Submission 8, City of Sydney, p7.

[62] Submission 8, City of Sydney, p8.

> reducing demand, particularly during peak times, they can reduce wholesale electricity prices.[63]

3.22 Energy affordability is particularly important when set against the evidence provided to the Committee, which suggests that high electricity prices impact most on community members who are least able to pay:

> The Independent Pricing and Regulatory Tribunal found that households in the lowest quartile can pay up to 10 per cent of their income in electricity costs, while households in the top quartile pay less than 4 per cent.[64]

Reduction in emissions

3.23 Another crucial benefit of polygeneration is associated with reductions in emissions. Polygeneration technology has the potential to deliver significant emissions reductions.[65] According to the Clean Energy Council, polygeneration is 80 per cent more efficient than conventional, coal powered energy generation and produces 60 per cent less carbon emissions.[66]

3.24 The International Energy Agency suggests that 41 per cent of energy-related global greenhouse gas emissions is attributed to the electricity sector.[67] Australia's greenhouse gas emissions, which are associated with electricity production, grew nearly 50 per cent between 1990 and 2006, and account for nearly half of all greenhouse gas emissions.[68] In NSW, black coal thermal generation, which is one of the most CO2 emission-intensive fossil fuels available, accounts for over 70 per cent of energy generation in the state.[69]

3.25 Evidence provided to the Committee shows that the City of Sydney's Interim Trigeneration Master Plan could reduce carbon emissions from electricity supply by around 18-26 per cent (compared to 2006 levels) across the City of Sydney area.[70]

3.26 A concrete example in NSW is North Sydney Council's installation of a cogeneration plant at North Sydney Council's Olympic Pool, which will reduce CO2 emissions by 367 tonnes per annum and contribute to achieving Council's sustainability targets.[71] Furthermore, if a polygeneration plant uses renewable gas, the electricity produced can be carbon neutral.[72]

Supply security

3.27 Another significant advantage of polygeneration systems with underground networks is their ability to provide a high degree of security of supply when the

[63] Submission 39, Energy Efficiency Council, p7.
[64] Submission 8, City of Sydney, p4.
[65] Submission 9, Clean Energy Council, p2.
[66] Submission 25, Sustainable Business Australia, p1.
[67] International Energy Agency in Submission 14, Name supressed, p21.
[68] Garnaut, R, *The Garnaut Climate Change Review*, Cambridge University Press, Melbourne, 2008, p155.
[69] Submission 14, Name suppressed, p2.
[70] Institute for Sustainable Futures in Submission 8, City of Sydney, and p25.
[71] Submission 26, North Sydney Council, p1.
[72] Submission 17, Kinesis Pty Ltd, p2.

electricity grid fails, for instance in extreme climate events. For example, while Hurricane Sandy caused damage and power losses across the United States in 2012, consumers who were connected to polygeneration systems still continued to receive their energy supply.[73] Given increasing natural disasters, the City of Sydney observed that polygeneration is emerging as a 'practical climate change adaptation as well as climate change mitigation measure', providing customers with reliable security of supply.[74]

POTENTIAL RISKS OF POLYGENERATION

Environmental risks

Nitrous oxides (NOx) emissions and air quality

3.28 Some by-products of polygeneration such as emissions of oxides of nitrogen (NOx) can adversely affect local and regional air quality and therefore need to be appropriately managed.[75]

3.29 It is important to consider the implications of polygeneration technology on both the outdoor and indoor environment. For instance, CETEC Professional Scientific Solutions explained that it conducted a number of scientific studies to demonstrate that 'the exhaust gases, including nitrous oxides (NOx) and nitrogen dioxide produced and exhausted from co/trigeneration systems, are significant and can raise ambient levels above those recommended by EPA [Environment Protection Authority] levels'.[76]

3.30 The impact polygeneration technology could have on NOx emissions, hence air quality, has also been noted in other countries. CETEC noted international research suggesting that extensive development of polygeneration technology would imply the relocation of 'the source of some of the NOx emissions produced by the power generating sector for a very few, very large point sources outside the city to many, small point sources inside the city'.[77]

3.31 The potential impact of polygeneration technology on air quality in urban areas needs to be noted against the findings that in the period from 1992 to 2008, NOx emissions from industry in Sydney have increased by 51 per cent and were projected to grow a further 13 per cent by 2016.[78]

3.32 CETEC commented that the effects of the development of polygeneration technology on environmental air quality 'may be exacerbated in locations where there may be exposure of individuals who are potentially sensitive and/or immune-compromised', such as schools, hospitals and aged care facilities.[79]

3.33 While control mechanisms such as adsorption filtration on air intakes may limit the effect of the emissions on indoor air quality, these do not manage the risk of

[73] Mr Jones, City of Sydney, Transcript of evidence, 21 October 2013, p20.
[74] Submission 8, City of Sydney, p31.
[75] Submission 44, NSW Government Trade and Investment, p18.
[76] Submission 12, CETEC Pty Ltd, p2.
[77] Submission, 12, CETEC Pty Ltd, p2.
[78] Submission, 12, CETEC Pty Ltd, p3.
[79] Submission, 12, CETEC Pty Ltd, p3.

indoor air quality of neighbouring buildings. As a result, the development of polygeneration technology implies the need for the development of mechanisms to deal with the current emissions from the exhaust systems.[80]

3.34 Although there is the potential for an increase in polygeneration systems to lead to higher NOx emissions, the NSW Environment Protection Agency (EPA) already has strict controls on the acceptable levels of NOx emissions. These controls appear to be sufficient and are already stricter than many other countries that are also aiming to maintain acceptable air quality.[81] Sustainable Business Australia pointed out that: 'It is important to note that the EPA's present regulatory approach is more stringent than requirements in many European cities'.[82]

3.35 While most stakeholders recognised the problem of NOx emissions and supported the general principle of emission standards, polygeneration is not a significant contributor to NOx pollution. The Energy Efficiency Council explained that 'the vast majority of nitrogen oxide (NOx) emissions in Sydney come from motor vehicles and industry'.[83]

Potential increased reliance on fossil fuels

3.36 Evidence provided to the Committee indicated that investment in a polygeneration system – unless it runs on renewable fuels such as biogas – implies additional demand for fossil fuels, normally natural gas, which has significant environmental implications.[84]

3.37 On the other hand, if a decentralised system is to run on renewable fuels such as biogas, there would be a need for the establishment of biofuel supply infrastructure.[85] This is due to the cost of transporting renewable fuel. Therefore, it is suggested that on-site generation of biofuel – such as in the food industry – seems most efficient.[86] In Germany and Poland, for instance, farmers are paid to grow a crop that is not food, which is then digested into gas, cleaned and put into the pipeline, and farmers receive feed-in tariffs.[87]

Financial risks

Economic viability of polygeneration

3.38 In addition to the environmental risks, evidence provided to the Committee outlined potential financial risks associated with polygeneration.

3.39 Before going ahead with a polygeneration project, there are a variety of factors which must be considered. These include:

[80] Submission, 12, CETEC Pty Ltd, p3.

[81] Submission 39, Energy Efficiency Council, p13.

[82] Submission 25, Sustainable Business Australia, Appendix 1, p5.

[83] Mr Murray-Leach, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p69.

[84] Submission 2, Gosford City Council, p1.

[85] Submission 2, Gosford City Council, p1.

[86] Mr Murray-Leach, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p69.

[87] Mr Helps, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p70.

a) Electrical and thermal loads are unknown;
b) Returns through sale of energy are uncertain;
c) Investment is required up front while returns can take time to occur as buildings develop and energy demand increases; and
d) When connecting several buildings, streets and underground infrastructure are built in advance of buildings. This requires large upfront investment for uncertain timing of returns.[88]

3.40 In order for polygeneration technology to be economically viable, it needs to operate efficiently. Polygeneration systems operate best when they are operating at a high level. For this reason, they are not suitable in situations where there is a variable demand unless they are partnered with other technologies.[89] According to Prendergast Projects:

> Cogeneration systems greatly lose their benefit of efficiency once they are operating at under 70% utilisation. For these reasons they are not suitable as a standalone technology to service a building, factory or precinct. … Cogeneration is generally not suitable to commercial or residential buildings. Electrical and thermal demands of such buildings vary over the year, during the week and during the day.[90]

3.41 Furthermore, polygeneration operates most efficiently when it is not generating excess energy and also runs at full capacity. A way to achieve this is to create a polygeneration system with multiple smaller engines. These engines can come online as they are required and help to meet demand better than one large engine. Deniliquin Council stated that:

> We would recommend using multiple (up to 5) engines instead of one big one, as this creates multiple demand points of maximum efficiency, whereas one big engine is only efficient at 80% of full demand. At low demand the large engines are less efficient than grid power. Five small engines can stop and start as building demand fluctuates up and down.[91]

3.42 Some stakeholders suggested that the importance of supply and demand in polygeneration systems made them less suitable for new developments despite the amount of planning undertaken. If a development is not able to accurately estimate the demand for energy, a polygeneration plant will not be able to operate in optimum conditions and it will become unviable. Similarly, if demand changes significantly over time due to more or fewer tenants, this can have an adverse effect on the viability of a polygeneration system. Prendergast Projects stated that:

> Cogeneration is a plug-in technology that optimally services known and existing loads. It is difficult to estimate electrical and thermal loads of new buildings. Such estimations are normally done to assess the worst-case scenario, and ensure enough plant capacity exists. This does not suit cogeneration as if demand is lower than expected, it can only operate at limited times through the year.[92]

[88] Submission 31, Prendergast Projects Pty Ltd, p6.
[89] Submission 31, Prendergast Projects Pty Ltd, p3.
[90] Submission 31, Prendergast Projects Pty Ltd, p3.
[91] Submission 24, Deniliquin Council, p1.
[92] Submission 31, Prendergast Projects Pty Ltd, p3.

3.43 While polygeneration systems can be expensive, the Committee heard that, in the long term the cost of fuel will make up the bulk of expenditure for a polygeneration system. According to Prendergast Projects:

> A cogeneration engine is typically 25% of the capital cost of a cogeneration installation due to the cost of installation, space, connections; pipework and ancillary plant … [however] over a 15-year term, 70% of the cost of cogeneration is the fuel. This is a much more important consideration compared to the cost of engines.[93]

3.44 Wagga Wagga City Council, for instance, installed a 229KWe cogeneration system at the Oasis Aquatic Centre. The project had a capital cost of less than $450,000 while the projected savings are $250,000 per year.[94] Furthermore, North Sydney Council's cogeneration plant at North Sydney Olympic Pool will save $58,000 on the pool's power bill. It is considered an economically viable project as it will pay for itself in less than 8 years.[95]

3.45 In November 2013, the NSW Government launched a 'Cogeneration feasibility guide'. The Government has also created a 'Cogeneration feasibility tool', to be used in conjunction with the guide, aiming to assist businesses in determining whether a polygeneration facility is technically and financially viable.[96]

Gas prices and economic viability

3.46 This section specifically explores the inquiry's term of reference regarding the impact of future gas prices on the running costs of polygeneration.

3.47 Another aspect to consider in the development of polygeneration systems is the price of gas. The feasibility of a polygeneration system is a balance between the value of the electricity and the thermal energy produced, and the capital and fuel costs used to produce them. If grid based electricity is significantly cheaper to use than using gas as a fuel, the viability of polygeneration decreases. According to the Clean Energy Council: 'The moderate price of natural gas and the rising price of electricity have historically supported co- & trigeneration development'.[97] However, if the differential between gas and electricity prices (the so called 'spark spread') changes, it will have an adverse impact on the development of polygeneration systems.[98] The APA Group highlighted this point to the Committee:

> Should electricity prices remain fairly stable, say due to the marginal cost of generation being set by coal-fired plant with a low carbon price, and the wholesale gas prices rise, the future viability of cogen and trigen projects is threatened.[99]

3.48 Evidently, gas prices directly impact the financial viability of polygeneration systems. Uncertainties related to future gas and electricity prices, supply

[93] Submission 31, Prendergast Projects Pty Ltd, p6.

[94] Submission 1, Wagga Wagga City Council, p1.

[95] Submission 26, North Sydney Council, p1.

[96] Eco-Business, <http://www.eco-business.com/news/nsw-government-launches-cotrigen-guide-business/>, viewed 3 December 2013.

[97] Submission 9, Clean Energy Council, p3.

[98] Submission 16, APA Group, p8.

[99] Submission 16, APA Group, p8.

shortages and choke points in the natural gas distribution system could be considered significant risks in the development of polygeneration technology.[100] According to the Australian Energy Market Operator (AEMO) NSW gas prices will increase more than 250 per cent in real terms over the next 15 years.[101]

3.49 Furthermore, Macquarie Generation also argued that rising gas prices will make polygeneration much less financially viable for a prospective operator as they will not be able to recover their costs. According to Macquarie Generation, when taking into account the recovery of fixed costs, variable operating and maintenance costs, fuel costs and earning a return on the investment, and using a gas price forecast from AEMO, an 'investor would need to earn contract revenues and spot sales of more than $126/MWh on the output of the new plant. This compares with an average NSW spot price of around $30/MWh (net of the fixed carbon price) in 2012-13'.[102]

3.50 By contrast, Prendergast argues that higher gas prices will not have a drastic effect on the development of polygeneration technology and may make it more feasible due to its energy efficiency.[103]

3.51 The Committee also received evidence stating that the price of grid supplied electricity is likely to fall in the next few years. The recent trend in NSW has seen a sharp increase in retail electricity prices but Macquarie Generation states that this is likely to stop in the near future. A slower increase in the price of grid-supplied electricity would make it more difficult to create a viable business case for a polygeneration system. Macquarie Generation highlighted a determination from the Independent Pricing and Regulatory Tribunal (IPART) which showed that:

> Regulated retail prices in the EnergyAustralia area should increase by no more than 3.2% in 2013 - 14. IPART expects that regulated retail prices will be capped at 1.8% in 2014-15 and forecasts a fall in retail prices of 6.9% in 2015-16.[104]

3.52 However, if electricity prices rise faster than gas prices, polygeneration will become a more attractive option. The Committee heard that a correctly sized polygeneration system can already supply power at half the grid price and according to Deniliquin Council:

> Looking at future gas and electricity prices (prepared by PME Consulting) the trend is for electricity prices to rise much quicker than gas prices. This will improve viability of gas powered trigeneration systems.[105]

3.53 Evidence suggests that since polygeneration systems represent a significant financial commitment, potential operators need to make suitable long-term plans. The viability of polygeneration will be affected by changing gas and electricity prices but if prospective polygeneration operators are able to

[100] Submission 2, Gosford City Council, p2.
[101] Submission 30, Macquarie Generation, p2.
[102] Submission 30, Macquarie Generation, p3.
[103] Submission 31, Prendergast Projects Pty Ltd, p7.
[104] Submission 30, Macquarie Generation, p5.
[105] Submission 24, Deniliquin Council, p1.

formulate a suitable plan, they should be able to continue operating. While discussing potential price fluctuation in the future, Mirvac stated that:

> Co/trigeneration projects typically have a fourteen year timeframe and operators will need to look at long term energy price projections to get a balanced picture of the costs and returns through the life of the project. Operators will need to create an energy procurement strategy to offset some of the fuel cost risks, for example, synchronise electricity and gas purchasing to lock in the spread between the two fuels.[106]

Public Safety Risks

3.54 The safety and integrity of the traditional electricity network is primarily regulated by the Electricity Supply (Safety and Network Management) Regulation 2008, which deals with a number of key issues including public safety, system integrity, bushfire risk management and customer installation safety.[107] The Department of Trade and Investment explained that part of the risk management system ensures that, 'operators must have a safety management strategy in place that includes an analysis of hazardous events, emergency procedures and standards of practice for working on or near the network'.[108]

3.55 Connection processes for polygeneration systems are treated in the same way as other load customers. Therefore there are a set of standards which must be met before connection to ensure that any risks to the system operators, prospective customers, and other network users are minimised. If these standards are not met or should standards lapse, DNSPs will refuse to connect or disconnect systems where appropriate. The NSW DNSPs told the Committee that they seek to treat embedded generators in the same manner as any load customer seeking to connect to its network:

> In order to facilitate the connection of embedded generators, we have developed a set of standards which set out the technical requirements and processes required to safely connect embedded generators to the network. These are designed to address risks to our customers, and prospective cogeneration/trigeneration customers and the community in general.[109]

3.56 The technical requirements which must be met by the proponent include the following:

- Safety to customers, people working on or near the electricity network and the general public;
- Protection of equipment, including our network and other customer installations; and
- Reliability and quality of supply to all customers.[110]

[106] Submission 43, Mirvac, p3.
[107] Submission 44, NSW Government Trade and Investment, p10.
[108] Submission 44, NSW Government Trade and Investment, p10.
[109] Submission 32, NSW Distribution Network Service Providers, p5.
[110] Submission 32, NSW Distribution Network Service Providers, p6.

3.57 Nevertheless, connecting a polygenerator to the grid is associated with a number of risks. NSW DNSPs emphasised that the network generators have traditionally not been designed to deal with two way flow of electricity (meaning that they have been designed to distribute, not receive energy), implying a risk when they connect generators to the grid. This is more the case when connecting a generator that can export electricity to the network than connecting a generator that will not export.[111]

3.58 A particular risk to public safety that was brought to the attention of the Committee was the potentially dangerous situation created by private thermal infrastructure within public roads. Mirvac noted the lack of regulation concerning such private infrastructure and told the Committee that:

> Where new services such as hot and cold water are run through public roads by a third party operator, Mirvac is concerned about the risk of incidents, such as pipe failure and geysers of very hot or very cold water where there is private ownership of services.[112]

3.59 The potential safety risks of hot and chilled water networks were also recognised by the NSW Government. They pointed out that:

> None of the Acts or regulations relating to water covers its use as an alternative form of energy. While the pressurised closed loop networks that provide hot and chilled water do not pose the same risks to the public as electricity or gas distribution networks, the issue of public safety remains worthy of consideration.[113]

Supply reliability risks

3.60 Electricity is an essential service and any unplanned loss of supply may result in serious impacts on the community. Therefore, mandatory network design, planning and reliability standards for DNSPs were introduced in August 2005 and are implemented through licence conditions.[114] However, the Department of Trade and Investment indicated that 'no such standards apply to trigeneration networks' and therefore may pose a supply reliability risk.[115]

3.61 Furthermore, if a polygeneration system operates without connection to the grid, this could cause difficulties should there be a failure in supply for any reason. Connecting a customer to the main network in the case of a failure of a polygeneration system could be difficult and expensive and may take a significant amount of time, leaving the customer without electricity. Similarly, an interruption in the thermal energy network would be difficult to manage.[116]

3.62 Some concerns were raised with the Committee that should a polygeneration system fail, there may be difficulties in providing back-up heating and cooling. In the case of such a failure, it is likely that a state utility would step in as a provider

[111] Submission 32, NSW Distribution Network Providers, p6.
[112] Submission 43, Mirvac, p3.
[113] Submission 44, NSW Government Trade and Investment, p11.
[114] Submission 44, NSW Government Trade and Investment, p12.
[115] Submission 44, NSW Government Trade and Investment, p13.
[116] Submission 44, NSW Government Trade and Investment, p13.

of last resort but the space requirements of heating and cooling infrastructure make back-up systems difficult to install or retrofit. According to UrbanGrowth NSW:

> On a practical level there will be no space for the required infrastructure unless a back-up system has been previously planned for and built. It is highly unlikely that commercial grade back-up air conditioning would sit in the building or that the planning provisions of the building would allow for additional equipment on the roof of the building after occupation.[117]

3.63 Furthermore, where a polygeneration system has an arrangement which allows for the export of excess energy to the grid, a failure in the system could have a detrimental effect on other customers supplied by that section of the grid. The NSW Government told the Committee that:

> … the failure of a grid-connected trigeneration system to export to the grid might also impact on the reliability of the main electricity network in that area by reducing the amount of electricity available. The main electricity network could require upgrading to meet the demand created by importing electricity from other sources.[118]

3.64 Evidence provided to the Committee suggests that due to the long-term nature of polygeneration projects there is a risk that customers who choose to change their supplier could have an effect both on the project and on other customers in a precinct situation. In addition to potentially facing difficulties in disconnecting from a polygeneration system, the NSW Government observed that 'the communal nature of the obligations means the disconnection of one customer from the trigeneration network may unfairly burden the remaining participants'.[119]

Reliability of fuel supply

3.65 Obviously, if the gas supply becomes unavailable for any reason, gas-fired polygeneration systems will no longer be able to operate. It is worth noting the evidence received from the Department of Trade and Investment which states that the 'reliability of gas supply will sometimes be beyond the control of the gas transmission and distribution network operators'.[120]

3.66 If there is an interruption in the gas supply, a polygeneration system could be required to supplement a reduced supply with alternative fuel sources or move to a more limited generation. According to the Department of Trade and Investment:

> During supply disruptions, gas is allocated through commercial contracts and load shedding. The NSW Government has response plans in place to deal with longer

[117] Submission 42, UrbanGrowth NSW, p3.

[118] Submission 44, NSW Government Trade and Investment, p14.

[119] Submission 44, NSW Government Trade and Investment, p9

[120] Submission 44, NSW Government Trade and Investment, p12.

term shortages. The Short Term Trading Market is also in operation, wholesaling gas to Greater Sydney, Newcastle and Wollongong. [121]

3.67 There is currently a lack of certainty, however, on how this may affect supply to polygeneration systems and evidence from the NSW Government recognised that management may be needed to deal with gas supply shortages to polygeneration systems. Furthermore, NSW Government highlighted that this would be particularly important when residential or priority consumers such as hospitals and nursing homes are affected.[122]

Committee Comment

3.68 The Committee acknowledges the potential benefits of polygeneration including:

- Economic advantages, which could result in savings, greater competitiveness and more jobs;
- Social advantages by improving energy affordability;
- Environmental benefits, leading to reduction in emissions; and
- Supply security in extreme climate events.

3.69 The Committee recognises the potential risk of nitrous oxides emissions from polygeneration plants on air quality, but notes that the current regulation of nitrous oxides is appropriate, particularly given their relatively stringent nature and the actual effect that polygeneration has on air quality as opposed to other emitters.

3.70 The Committee recognises that a number of factors impact the economic viability of polygeneration and need to be assessed before a decision on a plant is made. In particular, the Committee considers that the development of polygeneration technology appears more viable in an environment where simultaneous and balanced electrical and heating/cooling loads coexist in close proximity.

3.71 The Committee commends the NSW Government for developing the 'Cogeneration feasibility guide' and the 'Cogeneration feasibility tool'. The Committee considers that these tools will assist businesses in determining whether a polygeneration facility is technically and financially viable.

3.72 The Committee notes that high gas prices, including the prospect of gas shortages can reduce the commercial incentives for the development of polygeneration technology. However, the Committee considers that while the viability of polygeneration will be affected by changing gas and electricity prices, if prospective polygeneration operators are able to formulate a suitable plan, they should be able to continue operating.

3.73 Overall, the Committee considers that cogeneration technology is well established, having operated internationally for many years. As such, the risks concerning the continuation of supply, safety issues and financial consideration

[121] Submission 44, NSW Government Trade and Investment, p12.

[122] Submission 44, NSW Government Trade and Investment, p12.

are manageable provided they are identified and work is done to minimise them prior to the installation of a polygeneration system.

3.74 The Committee noted with concern that mandatory network design, planning and reliability standards for DNSPs, which were introduced in August 2005 and are implemented through licence conditions, are not in place for polygeneration networks and therefore may pose a supply reliability issue.

3.75 The Committee recognised that management is needed to deal with gas supply shortages to polygeneration systems, particularly when hospitals and nursing homes are affected.

RECOMMENDATION 1

The Committee recommends that the NSW Department of Trade and Investment, Regional Infrastructure and Services develop and implement mandatory network design, planning and reliability standards for polygeneration networks across NSW.

RECOMMENDATION 2

The Committee recommends that the NSW Office of Environment and Heritage promote its recently developed 'Cogeneration feasibility guide' and 'tool' to businesses, government departments and public sector agencies across NSW.

RECOMMENDATION 3

The Committee recommends that the NSW Department of Trade and Investment, Regional Infrastructure and Services develop an emergency plan, outlining procedures to respond to gas supply shortages and unforeseen interruptions to gas supply, particularly to polygeneration systems in hospitals and nursing homes.

Chapter Four – Resource efficiency and sustainability

4.1 One of the key benefits of polygeneration, as discussed in Chapter 2, is energy efficiency. Evidence provided to the Committee suggests that there are a number of ways to enhance resource (and hence energy) efficiency in NSW. This includes recognising the greenhouse benefit of offsite polygeneration systems in the NABERS Energy greenhouse gas performance rating; acknowledging reduced gas consumption under the NSW Energy Saving Scheme (ESS); and extending the Environmental Upgrade Agreements (EUAs) to include the implementation of environmental improvement works in new developments, including precinct polygeneration. The Committee also received evidence which presented a number of measures to enhance resource sustainability in NSW.

4.2 This Chapter will discuss the regulatory frameworks surrounding these issues as per the inquiry's terms of reference relating to the current regulatory arrangements in NSW and at a national level.

RESOURCE EFFICIENCY & RECOGNITION OF POLYGENERATION

National Australian Built Environment Rating System (NABERS)

4.3 The National Australian Built Environment Rating System (NABERS) measures the environmental performance of Australian buildings, tenancies and homes. Mr Tom Grosskopf, Director, Metropolitan Branch, Regional Operations, Office of Environment and Heritage NSW told the Committee that it is administered by the NSW Office of Environment and Heritage and is 'a routine feature of government policies, industry programs and commercial property agreements'.[123] Aspects of NABERS measures include the energy efficiency, water usage, waste management and indoor environmental quality of a building or tenancy and its impact on the environment.[124] Using verified performance information, such as utility bills, the measures are converted into a star rating scale from one to six stars. Practically, the idea of NABERS implies that the less energy a building draws from the electricity grid or gas network, the higher its NABERS rating is.[125]

4.4 Moreover, the NABERS system is a market signalling mechanism – buildings with higher NABERS ratings have better investment and rental returns, directly impacting the business bottom line.[126] To assist with the identification of more energy efficient buildings, the NABERS energy efficiency star rating is required by law to be disclosed at the point of sale or lease for office buildings over 2000m^2.[127]

[123] Mr Grosskopf, Director, Metropolitan Branch, Regional Operations, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p2.

[124] Submission 44, NSW Government Trade and Investment, p15.

[125] Submission 44, NSW Government Trade and Investment, p15.

[126] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p2.

[127] Submission 44, NSW Government Trade and Investments, p17.

4.5 In July 2010, NABERS introduced a ruling relating to the proportioning of energy used by precinct polygeneration.[128] According to the City of Sydney, the effect of the ruling was that it 'incentivised more energy efficient precinct-scale decentralised energy systems over less efficient stand-alone building-based systems'.[129]

4.6 The Office of Environment and Heritage told the Committee that since July 2010, NABERS 'has had specific rules in place to recognise the environmental benefits of onsite co/trigeneration systems in commercial buildings using the NABERS Energy ratings'.[130] As a result, 'the number of co/trigeneration projects being developed in the commercial building sector has grown significantly'.[131]

4.7 In 2012, NABERS implemented a new ruling that, according to City of Sydney, 'overturned its previous ruling in July 2010'.[132] Yet, Mr Tom Grosskopf, Director, Office of Environment and Heritage NSW, reported that the ruling was a clarification and was based on the rationale that the 'NABERS is first and foremost a building rating tool'.[133]

4.8 There are differences in the way onsite and precinct polygeneration systems are treated under the NABERS system. A building with an onsite polygeneration system which directly supplies the building with electricity and thermal energy reduces that building's use of grid electricity and gas.[134] This makes a building more energy efficient. As explained by the Department of Trade and Investment, 'systems will improve a building's energy efficiency star rating'.[135]

4.9 Where a building is supplied by a polygeneration system located elsewhere, such as in a precinct system, it will not necessarily use less energy. The Department stated that a precinct polygeneration system:

> … has no impact on how much energy a building actually uses. Purchase of co/trigeneration electricity through the grid will help a building to improve its greenhouse performance star rating, but will have no impact on its energy efficiency star rating.[136]

4.10 Therefore, Mr Grosskopf explained that: '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'.[137]

4.11 Following the clarification of the NABERS ruling, many developers and polygeneration proponents felt that there was not sufficient recognition of the

[128] Submission 8, City of Sydney, p13.
[129] Submission 8, City of Sydney, p13.
[130] Submission 44, NSW Government Trade and Investment, p16.
[131] Submission 44, NSW Government Trade and Investment, p16.
[132] Submission 8, City of Sydney, p13.
[133] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p3.
[134] Submission 44, NSW Government Trade and Investments, p17.
[135] Submission 44, NSW Government Trade and Investments, p17.
[136] Submission 44, NSW Government Trade and Investments, p17.
[137] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p3.

environmental benefits of polygeneration supplied energy.[138] This makes polygeneration a less attractive proposition. This view was summarised by Mirvac, who felt that the real savings made by a customer who purchases energy supplied through polygeneration are not recognised:

> Currently no environmental recognition is received for low carbon power attributed to the premises for electrical or thermal precinct grid connections. There is no recognition of the real saving of a customer's carbon intensity who has purchased co/trigeneration. Mirvac would like to see carbon reduction made attributable to the buildings connected to the precinct system. [139]

4.12 In addition to the NABERS energy efficiency star rating, there is the NABERS greenhouse gas performance star rating. This rating is primarily to allow buildings to compare the emissions from their energy use with other buildings.[140] There is no requirement for the mandatory disclosure of this rating although Mr Grosskopf noted that, 'there is nothing to stop somebody also disclosing at the same moment of the transaction their rating with green power as well'.[141]

4.13 Following the clarification of the NABERS ruling, Mr Tom Grosskopf reported the announcement of the NABERS National Steering Committee 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'.[142] He continued:

> An industry-led steering committee has now been established to develop a robust measure that will standardise, validate and audit the greenhouse gas emissions attributable to these energy transfers.[143]

4.14 The Department of Trade and Investment advised that: 'NABERS has publicly committed to recognising the greenhouse benefit of offsite co/trigeneration systems in the NABERS Energy greenhouse gas performance rating once this industry standard is agreed and introduced'.[144] It is expected that this measure will be finalised in October 2014.[145]

NSW Energy Savings Scheme

4.15 Another measure to enhance energy efficiency in NSW, which was suggested by the evidence received, is the extension of the NSW Energy Saving Scheme (ESS) to recognise gas savings.

4.16 The purpose of the Energy Savings Scheme (ESS) is to create financial incentives for organisations to invest in energy saving schemes in order to reduce building

[138] Submission 13, Origin Energy, p3.
[139] Submission 43, Mirvac, p2.
[140] Submission 44, NSW Government Trade and Investments, p17.
[141] Ms Sam McLean, Senior Team Leader, Commercial Buildings, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p3.
[142] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p3.
[143] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p3.
[144] Submission 44, NSW Government Trade and Investment, p17.
[145] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p7.

electricity consumption in NSW.[146] Under this scheme, buildings that reduce electricity consumption by installing, improving or replacing equipment may qualify for energy savings certificates. These certificates can then be sold to liable entities, electricity retailers.[147]

4.17 While the ESS applies to savings delivered from reduced electricity use, the City of Sydney claimed that, 'the eligibility of energy efficiency projects which reduce gas consumption is unclear'.[148]

4.18 The City of Sydney reflected that 'some of the efficiency benefits offered by thermal energy produced from trigeneration may be eligible for energy savings certificates under the scheme'.[149]

4.19 In its response to the Questions on Notice, the Office of Environment and Heritage NSW stated that 'gas savings are not currently recognised under the Energy Savings Scheme'.[150] Furthermore, the Office stated that 'the Energy Efficiency Action Plan commits the Government to investigate market-based mechanisms for promoting gas efficiency, one option being to include gas in the ESS'.[151]

4.20 The City of Sydney proposed that projects which reduce gas consumption be recognised under the ESS. This, they argued, would enable building owners to 'claim energy saving certificates where they connect to a thermal energy network supplied by trigeneration to displace gas'.[152]

4.21 The Energy Efficiency Council also recommended that financial support could be given to polygeneration under the Energy Savings Scheme but only if the project adhered to specific requirements, for example, that a polygeneration plant:

(i) Exceeds a minimum threshold of efficiency (e.g. 50 per cent), with additional incentives for cogeneration units as their efficiency increases beyond this threshold.

(ii) Is below 30 MW and runs for more than 2,000 hours per year.[153]

Environmental Upgrade Agreements

4.22 In order to enhance resource, and hence energy, efficiency in NSW, the Total Environment Centre proposed extending Environmental Upgrade Agreements to include new buildings.[154]

[146] Submission 8, City of Sydney, p13.
[147] Submission 8, City of Sydney, p13.
[148] Submission 8, City of Sydney, p13.
[149] Submission 8, City of Sydney, p13.
[150] NSW Office of Environment and Heritage, Response to the Questions on Notice 1, p1.
[151] NSW Office of Environment and Heritage, Response to the Questions on Notice 1, p1.
[152] Submission 8, City of Sydney, p13.
[153] Submission 39, Energy Efficiency Council, p13.
[154] Submission 5, Total Environment Centre, p4.

4.23 The NSW Environmental Upgrade Agreement (EUA) legislation has encouraged environmental improvement works in buildings, including the $26.5 million trigeneration precinct at Central Park in inner Sydney, the largest EUA implemented in Australia so far.[155]

4.24 However, the City of Sydney noted that the Local Government (Environmental Upgrade Agreement) Act 2010 and Regulations 2011 only apply to existing developments.[156] As a result, a number of commercial landlords have successfully acquired funding through an EUA to install a polygeneration system by demonstrating that this will lead to improved efficiencies.[157]

4.25 The City of Sydney argued that the EUA legislation should be extended to include new buildings and contribute to the sustainability of new residential apartments and commercial building.[158]

RESOURCE SUSTAINABILITY & POLYGENERATION

4.26 There are a number of polygeneration systems around the world that operate on renewable energy and the Committee also received evidence which proposed measures to enhance resource sustainability in NSW.

4.27 In its consideration of ways to enhance resource sustainability in NSW, evidence presented to the Committee highlighted the international experience and best practice. For instance, in early 2013, the German Government strengthened its support policies for Combined Heat Power (CHP) by providing tax relief to CHP plant operators, on the condition that their plant achieves efficiency levels of at least 70 per cent.[159] Moreover, Germany has the largest renewable gas grid injection program in the world – farmers are paid to grow a crop that is not food, which is then digested into gas, cleaned and put into the pipeline, and receives feed-in tariffs.[160] As a result, more than 10 per cent of total farm income in Germany is now derived from renewable gas grid injection.[161] Not only did Germany discover that renewable gas was cheaper than natural gas and therefore benefited economically, but it also benefited environmentally as the waste did not go to landfills.[162]

4.28 The NSW Office of Environment and Heritage stated that there are some alternative fuels which have the potential to be used in polygeneration including biogas, combustion of solid biogas and other liquid fuels:[163]

> … Sites with large volumes of organic waste can have good potential of producing biogas for electricity generation and heat generation. For example, Sydney Water

[155] Submission 8, City of Sydney, p43.
[156] Submission 8, City of Sydney, p43
[157] Submission 25, Sustainable Business Australia, Appendix 1, p4.
[158] Submission 8, City of Sydney, p43.
[159] Submission 7, Name suppressed, p3.
[160] Mr Helps, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p70.
[161] Mr Jones, City of Sydney, Transcript of evidence, 21 October 2013, p29.
[162] Mr Jones, City of Sydney, Transcript of evidence, 21 October 2013, p29.
[163] NSW Office of Environment and Heritage, Response to the Questions on Notice 3, p2.

> has at least four biogas cogeneration units operating at their waste water treatment plants in NSW.
>
> …Direct burning technology is well established in Australia. For example, bagasse produced in sugar mills is burnt in boilers to produce steam which is used to produce electrical energy, drive the mills and pumps and meet process heat requirements.
>
> …Liquid fuels, such as diesel, ethanol and LPG are generally too expensive to be viable for cogeneration applications.[164]

4.29 Should renewable gases become more common, this was not seen as a particular problem for the gas distribution networks. APA Group told the Committee that, 'in regard to 'renewable' gas … APA would treat that gas stream, just like any other gas stream transported on our pipeline system, with respect to product quality and gas transportation services'.[165] APA also stated that 'we encourage all new suppliers of gas … We are happy to ship whatever as long as it meets the technical standards'.[166]

4.30 A number of submissions pointed out that polygeneration systems can run on biogas, which has the potential to be a plentiful resource in NSW as a by-product of green waste and meat and poultry processing.[167] Furthermore, it has been suggested that there is great potential for using waste as a fuel source as it is a renewable source and removes the waste from landfill. For instance, Lismore City Council highlighted a project that it was developing which 'will have the capacity to divert 29,000 tonnes of organic waste from the region's landfills, remove 48,000 tonnes of carbon, and generate 6000 MWh of renewable energy'.[168]

4.31 In order to further explore opportunities to use alternative fuels in polygeneration systems, it may be necessary to review current regulation. An area in which the legislation is overly restrictive is that of creating energy from waste. According to Sustainable Business Australia:

> The proposed NSW Energy from Waste Draft Policy Statement is, at present, unnecessarily prescriptive and counter-productive in generating renewable gases from waste and avoiding waste going to landfill.[169]

4.32 Furthermore, in order to make biofuels more viable, it was suggested that the types of wood waste which are allowed to be used as fuels are extended. While stressing the need to maintain biodiversity principles and environmental protection, Sustain Northern Rivers Energy Working Group pointed out that:

> Extending [the] legislation to include wood waste from uncontaminated construction and demolition waste and timber pallets would provide other feed stocks. Current legislation prevents this in most circumstances.[170]

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[164] NSW Office of Environment and Heritage, Response to the Questions on Notice 3, p2.

[165] Mr Josh Hankey, Government Policy Manager - Networks Commercial, APA Group, Answers to questions taken on notice, 11 November 2013, p1.

[166] Mr Adam Pegg, Head of Environmental Development, APA Group, Transcript of evidence, 21 October 2013, p52.

[167] Submission 5, Total Environment Centre, p6.

[168] Submission 27, Lismore City Council, p2.

[169] Submission 25, Sustainable Business Australia, Appendix 1, p1.

4.33 In March 2014, the Government amended the *Protection of the Environment Operations (General) Regulation 2009*. This amendment changed the definition of 'native forest biomaterial' to allow invasive native species and biomaterial from native forestry operations to be used in electricity generation, provided the biomaterial is obtained in accordance with specified conditions.

4.34 Finally, the City of Sydney emphasised the need to update the Gas Act and Regulations 'to enable renewable gas injection into the gas grid to be separately identified/accredited and able to be directly purchased by consumers via a renewable gas purchase agreement'.[171] This, the City of Sydney argued, 'would not only address waste and landfill issues, but could also develop into a much bigger renewable energy mining and export opportunity'.[172]

Committee Comment

4.35 The Committee acknowledges the importance of maintaining the integrity of the NABERS system.

4.36 The Committee noted NABERS does not specifically recognise commercial off-site polygeneration plants and therefore there is a lack of incentive for their development.

4.37 The Committee recognises that the NABERS team, the NSW Office of Environment and Heritage and the NABERS National Steering Committee are working to develop and provide a nationally consistent scheme for certifying low emissions electricity which is produced by commercial, larger-scale, off-site polygeneration plants, by the end of 2014.[173]

4.38 The Committee notes that the NSW Energy Saving Scheme (ESS) does not currently recognise gas savings. The Committee is pleased that the Energy Efficiency Action Plan commits the Government to investigate market-based mechanisms for promoting gas efficiency, with one option being to include gas in the ESS.

4.39 The Committee notes that natural gas is the most common fuel for polygeneration systems, but considers that the polygeneration systems which can run effectively on alternative fuel sources should be further examined.

4.40 The Committee notes the evidence suggesting that the proposed NSW Energy from Waste Draft Policy Statement may be counter-productive in generating renewable gases from waste and avoiding waste going to landfill. The Committee considers that the NSW Office of Environment and Heritage should clarify the situation as laid out in the Statement.

4.41 The Committee acknowledges the calls to extend the types of wood waste which may be used as fuels. The Committee welcomes the recent amendment of the Protection of the *Environment Operations (General) Regulation 2009* to allow

[170] Submission 28, Sustain Northern Rivers Energy Working Group, p1.

[171] Submission 8, City of Sydney, p45.

[172] Submission 8, City of Sydney, p45.

[173] Mr Grosskopf, Office of Environment and Heritage NSW, Transcript of evidence, 21 October 2013, p3.

more biomaterial to be used as fuel in electricity generation. This will improve the viability of polygeneration systems which seek to operate on biofuels.

4.42 The Committee notes the evidence suggesting the need to enable renewable gas injection into the gas grid to be separately accredited and supports this suggestion.

RECOMMENDATION 4

The Committee recommends that the NSW Department of Trade and Investment, Regional Infrastructure and Services publicly report on the outcome of its investigation of market-based mechanisms for promoting gas efficiency.

RECOMMENDATION 5

The Committee recommends that gas savings be included in the Energy Savings Scheme.

RECOMMENDATION 6

The Committee recommends that the NSW Office of Environment and Heritage conduct a review and publicly report its findings on whether the proposed NSW Energy from Waste Draft Policy Statement is discouraging the generation of renewable gases from waste.

RECOMMENDATION 7

The Committee recommends that the Minister for Resources and Energy initiate a review of the *Gas Supply Act 1996* and relevant Regulations to enable renewable gas injection into the gas grid to be separately accredited.

Chapter Five – Connection considerations for polygeneration in NSW

5.1 Most polygeneration systems will be connected to the traditional electricity network at some point, whether to help them distribute the energy they generate or to provide back-up in case of system failures. The Committee received evidence that many polygeneration operators in NSW had difficulty during the connection process and also that there was a lack of understanding between relevant parties.

5.2 This chapter will discuss the connection process for polygeneration systems and some of the considerations involved should a polygeneration system connect to the national grid at any point. This relates to the inquiry's terms of reference regarding the economic viability of polygeneration and the relevant regulatory frameworks.

THE CONNECTION PROCESS

Connection assessment factors

5.3 Any polygeneration system which seeks to connect to the grid could have some effect on the network. In order to ensure that the connection is suitable and carries no risk, the Distribution Network Service Providers (DNSPs) must investigate the connection prior to it taking place. Currently, the connection process can vary in terms of time; the stakeholders involved; the amount of information to be provided; and the studies required. Some of the key factors examined by the DNSPs as part of the connection process are:

- the capacity of the generator seeking to connect;
- whether the generator is seeking to export electricity; and
- whether existing assets need to be altered or additional connection assets installed in order to enable the embedded generator to safely connect to the network.[174]

5.4 The larger a polygeneration system, the longer the connection process will usually take as there are extra studies to perform and the process is more complicated. A larger system will also have a greater effect on the network than a smaller one. Similarly, it will take longer to connect a system which also seeks to export energy as there is additional work to be done by the connection authority, which is the relevant DNSP.[175]

[174] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy, and Essential Energy, p6.
[175] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy, and Essential Energy, p6.

Connection requirements and assistance

5.5 Moreover, there are several requirements for a prospective polygeneration operator to meet before they can connect to the network. These include:

- *Electricity Supply Standard ES11* (which) outlines the requirements for the connection of embedded generators.
- *Network Standards NS194* (which) outlines technical requirements for the connection of embedded generators.
- *Generator connection agreement* (which) sets out the general conditions for connection as well as the operating and maintenance protocol to be followed by the embedded generator.[176]

5.6 Information is made available to assist those who wish to connect a power generation system to a distribution network. The NSW DNSPs told the Committee that a document has been developed to assist prospective generators hoping to connect to Endeavour Energy's distribution network. There is also the option of requesting technical assistance to assess initial connection requirements prior to lodging a formal application. The DNSPs explained that: 'This includes master planning for major projects or subdivisions, embedded networks, asset relocations and embedded generator connections'.[177]

5.7 Nevertheless, evidence provided to the Committee suggested that connecting polygenerators to the grid is a difficult process and presents one of the major obstacles to the development of polygeneration technology in NSW.[178]

Difficulties in connecting

The lack of standardised technical rules

5.8 The technical rules concerning connecting to the electricity grid are set out in the Service and Installation Rules of NSW. Currently, however, these Rules only deal with stand-by and small-scale generation. The Department of Trade and Investment stated that:

> There are no uniform rules defining how a trigeneration system with significant capacity might be connected. This means the technical requirements for each new proposal are negotiated individually with the relevant DNSP.[179]

5.9 A prospective polygeneration plant operator will therefore have to make a connection application to the relevant network owner that supplies the area. There is also a requirement to obtain approval from the Local Government Authority and the relevant state Environment Protection Authority.[180]

[176] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy, and Essential Energy, p9.
[177] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy, and Essential Energy, p9.
[178] Submission 11, Energetics Pty Ltd, p2.
[179] Submission 44, NSW Trade and Investment, p14.
[180] Submission 29, TransGrid, p3.

5.10 Chapter 5A of the National Electricity Rules sets out the National Connections Framework which includes a negotiating framework but the Department notes that 'it does not specify the technical or commercial terms for connecting a larger embedded generation unit, such as a trigeneration unit to the grid or to another trigeneration network'.[181] They suggested, however, that this should not be a major problem as polygeneration operators should be in a position to be able to negotiate with DNSPs:

> As the operators of these systems are likely to be commercial entities that can negotiate on an even footing with a DNSP, there should be no need for further action in this area.[182]

5.11 However, a number of prospective polygeneration operators told the Committee that the lack of clear standards and regulations in regard to the network connection process is a significant barrier to polygeneration in NSW.[183]

Lack of a uniform connection application process

5.12 The Property Council of Australia informed the Committee that in the experience of many of their members, the connection process lacked certainty in how to proceed and that it was a drawn out, time consuming and costly process:

> … the connection process outlined in the NER lacks certainty around the requirements for a successful application, application timeframes or the cost of connection. Applications to Distribution Network Service Providers (DNSPs) are assessed on a case-by-case basis, with inconsistent outcomes.[184]

5.13 The Property Council highlighted the following issues as the main barriers in the connection process for developers who wanted to commit to polygeneration:

- Inefficient, case by case connection process;
- No clear and binding timelines;
- No standard information requirements;
- Diverse technical requirements;
- Significant connection and network augmentation costs; and
- Different connection terms amongst DNSPs.[185]

5.14 As each of the DNSPs has their own guidelines and requirements, connecting a polygeneration system to a distribution network implies highly variable and unclear processes and costs. These difficulties encountered by polygeneration

[181] Submission 44, NSW Trade and Investment, p14.
[182] Submission 44, NSW Trade and Investment, p15.
[183] Submission 9, Clean Energy Council, p1.
[184] Submission 35, Property Council of Australia, p4.
[185] Submission 35, Property Council of Australia, pp4-5.

operators in connecting to the grid led some stakeholders to call for an automatic right of connection for polygeneration systems.[186]

5.15 The Australian Energy Market Commission did not support an automatic right of connection but did suggest that DNSPs should provide more information on generating plants that meet specific access standards.[187]

5.16 Alternatively, there was evidence supporting the streamlining of the connection process in order to support the development of polygeneration technology.[188] A number of stakeholders called for a more standardised process, potentially applied nationally.[189]

5.17 However, the Committee also heard arguments that the complex nature of polygeneration systems makes a uniform connection process a less viable option. The systems can operate in significantly different circumstances, such as network capacity and generation loads, which require detailed investigation and precise modelling. TransGrid told the Committee that:

> … thorough analysis needs to be undertaken on a 'case by case' basis and close collaboration is required with both prospective and existing generator proponents with distribution network service providers in particular.[190]

5.18 Another option to facilitate the connection process is to make more information available to the polygeneration operators. As previously noted, the Service and Installation Rules of NSW do not specifically deal with the connection of polygeneration systems. When asked whether these Rules could be amended or expanded to cover polygeneration systems, Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment told the Committee that:

> … 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.[191]

Lack of uniform technical design standards of polygeneration systems

5.19 A possible solution presented to the Committee to improve the situation with regards to the diversity of polygeneration systems was to develop a consistent suite of standardised designs particularly for smaller polygeneration systems.[192]

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[186] See, for example, Submission 5, Total Environment Centre, p3 and Submission 35, Property Council of Australia, p7.

[187] Australian Energy Market Commission, Draft Rule Determination, National Electricity Amendment (Connecting Embedded Generators) Rule 2013, 27 June 2013, p46.

[188] Submission 11, Energetics Pty Ltd, p2.

[189] For example, Submission 16, APA Group, p7.

[190] Submission 29, TransGrid, p2.

[191] Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of evidence, 21 October 2013, p35.

[192] Submission 16, APA Group, p7.

5.20 The potential benefits of standardised designs include:

- improving connection process clarity and certainty;
- providing outcome predictability;
- reducing the cost of embedded generator connection; and
- ensuring nationally consistent and common industry practices in distribution network planning, design and operation.[193]

5.21 The Australian Energy Market Commission released its Reliability Panel Review of Technical Standards in 2009. This recommended twelve guiding principles on which to base a detailed review of the technical standards in the NEM.[194] However, the NSW DNSPs noted that, 'a comprehensive review of technical standards for embedded generators was deferred until there had been sufficient connections under technical standards to assess the appropriateness of the standards'.[195]

5.22 Kinetics advised the Committee, though, that one of the main benefits of polygeneration is its flexibility and that 'cookie cutter approaches are ineffective'.[196] Kinetics told the Committee that for a polygeneration system to be successful it needed to be adapted to its situation:

> Careful analytics, using sophisticated financial and technical modelling are needed to ensure that a particular technology, particularly cogeneration and trigeneration will be effective in a particular context.[197]

5.23 Other stakeholders pointed out that polygeneration operators should have the opportunity to choose the most appropriate system and also the most cost-effective for their needs:

> … 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.[198]

5.24 Another problem with uniform standards is that they can lead to unreasonable expectations among polygeneration operators. The NSW DNSPs told the Committee that even with uniform design standards used in other connections, there would still be a requirement for additional analysis which may not be recognised by applicants:

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[193] AECOM, Mid-Scale Embedded Generation Connection Standards – Feasibility Study Final Report, 12 June 2013, quoted in Submission 35, Property Council of Australia, p12.

[194] Australian Energy Market Commission, < http://www.aemc.gov.au/market-reviews/completed/reliability-panel-technical-standards-review.html>, accessed on 29 January 2014.

[195] Submission 32, NSW Distribution Network Service Providers, p8.

[196] Submission 17, Kinetics Pty Ltd, p4.

[197] Submission 17, Kinetics Pty Ltd, p4.

[198] Mr Neil Gordon, Manager, Asset and Network Planning, Ausgrid, NSW Distribution Network Service Providers, Transcript of evidence, 21 October 2013, p18.

> There seems to be a belief that "standardisation" will overcome the potential technical complexity and associated costs. Embedded generation will not be a case of tick the boxes and plug it in. … there is also a risk that proponents may believe that just because a connection has been made to work in one location, then it will simple in another location.[199]

Connection and augmentation costs

5.25 Connection and augmentation costs are another difficulty faced by polygeneration proponents.

5.26 If a polygeneration plant is connected to the distribution network, there are connection charges similar to those paid by other network customers. While these connection charges must be paid by polygeneration operators who want to connect to the grid, there are opportunities to recoup certain costs. The Property Council of Australia recognised the 'existing obligation in the NER for a connection applicant to be reimbursed for the use of assets that are funded by that connection applicant and provide services to other connections'.[200]

5.27 Despite this, problems with obtaining such a reimbursement were presented to the Committee. The Property Council of Australia told the Committee that they knew of no-one who had received a reimbursement of this kind. They suggested that the major difficulty in negotiating this payment with the relevant DNSP is:

> … because the ability of a connection applicant to enforce a reimbursement clause, given the applicant has no direct ability to observe the use of its asset, is very limited.[201]

5.28 When connecting to the network, polygeneration operators are also usually required to pay shared augmentation costs. While connection fees were largely accepted by polygeneration operators, shared network augmentation costs were seen by some stakeholders to be a major barrier. It was claimed that they add an unbearable financial burden to the project. According to the Property Council of Australia:

> Shared augmentation costs can be prohibitively expensive even for the largest businesses, which makes it virtually impossible for small to medium companies to invest in these technologies.[202]

5.29 The cost of network upgrades being borne by polygeneration operators was seen by some stakeholders as unfair when compared to regular upgrades which may be required for other reasons. The Energy Efficiency Council pointed out that:

> Currently, the last cogeneration unit that wants to connect to the grid before an upgrade is required to pay the full cost of the upgrade, despite the fact that other units may connect before or after the upgrade. In contrast, the costs of upgrades to

[199] Ms Pamela Henderson, Chief Engineer, Ausgrid, NSW Distribution Network Service Providers, Answers to questions taken on notice, 11 November 2013, p1.

[200] Submission 35, Property Council of Australia, p13.

[201] Submission 35, Property Council of Australia, p13.

[202] Submission 35, Property Council of Australia, p14.

> the grid to address rising energy demand are generally smeared across all energy users.[203]

5.30 The Property Council also argued that the current situation regarding shared augmentation costs penalises those generators which are the last to connect to the network. They told the Committee that the current application of shared network costs is:

> … penalising the connection that requires marginal augmentation without considering the impact of previous connections, or requiring future connections to offset the costs borne by the original proponent.[204]

5.31 This led some stakeholders to call for polygeneration operators to be exempt from contributing to shared network augmentation charges.[205] Alternatively, stakeholders suggested that a new system should be introduced which shares the charges more fairly amongst network customers.[206]

5.32 An issue to consider if polygeneration operators pay less or are exempt from contributing to shared network augmentation charges is how the shortfall would be covered. Some stakeholders raised concerns that an exemption or discount to polygeneration operators would lead to an increase in costs for other customers. For example, the Energy Networks Association stated that they supported a decision by the AEMC not to exempt polygeneration operators from shared network augmentation charges because:

> … the costs of network augmentation resulting from an embedded generation connection should not be borne solely by the network customer base through increased Distribution Use of System (DUoS) charges.[207]

5.33 One of the reasons that shared augmentation costs are problematic for polygeneration operators is that they are not always immediately apparent in the planning phase. The APA Group pointed out that the situation for prospective polygeneration operators would be improved if 'early advice to the project proponent of … network connection issues (e.g. the possible requirement for network augmentation) which drive … the ultimate cost of the connection' was made available.[208]

Australian Energy Market Commission Rule Change

5.34 A number of these issues were brought to the attention of the Australian Energy Market Commission (AEMC) by ClimateWorks Australia, Seed Advisory and the Property Council of Australia, who submitted a rule change request to the AEMC. On 27 June 2013, in response to this rule change request, the AEMC published its draft rule determination and draft rule on connecting embedded generators.[209]

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[203] Submission 39, Energy Efficiency Council, p10.

[204] Submission 35, Property Council of Australia, p7.

[205] Proposal to amend the National Electricity Rules for connecting embedded generators, p16, provided as Appendix A to Submission 35, Property Council of Australia.

[206] Submission 35, Property Council of Australia, pp13-14.

[207] Submission 34, Energy Networks Association, p1.

[208] Submission 16, APA Group, p7.

[209] Submission 21, Green Building Council Australia, p1.

This was the National Electricity Amendment (Connecting Embedded Generators) Rule 2013.

5.35 According to the AEMC, the new rule aims to 'provide a clearer and more timely process to connect embedded generators to distribution networks. The draft rule also provides greater clarity on the provision of information between embedded generators and distributors throughout the process to support efficient investment in embedded generation and distribution networks'.[210]

5.36 The changes made by the AEMC Draft Rule Determination were summarised by the Property Council, who highlighted the key features:

- Better certainty on timeframes and maximum limits at each stage, which should deliver connections within 4 to 6 months.
- Enquiry forms to be created and published by electricity distributors.
- Information packs to be provided by electricity distributors, including: distributor's technical standards, costs, application details, timing and a model connection agreement.
- Location specific network information for customers by distributors.
- Expert appraisal process for technical disputes with an independent engineer.
- Allowance for the development of a national technical standard(s), which will provide a foundation for a future automatic right of connection.[211]

5.37 The rule change has been supported by the majority of stakeholders.[212] The NSW DNSPs were particularly pleased to see that there is a proposed requirement for connection applicants to provide more information when lodging their inquiries. This will help to alleviate the problem which currently occurs if prospective polygeneration operators aim to connect to the network but are not clear on the type of connection they require. The DNSPs told the Committee that:

> Connection applicants can be uncertain or overly optimistic regarding what type of connection they require … or do not have a firm view of the type of generating unit and its technical characteristics that they are seeking to have connected. This uncertainty has subsequently resulted in an iterative and time consuming process at the inquiry stage of the connection process.[213]

5.38 The new rule, however, should lead to an improvement in the speed of connection as all parties are more aware of what is required of them. It will also bring issues to light earlier in the process. According to the DNSPs:

[210] Australian Energy Market Commission quoted in Submission 21, Green Building Council Australia, p4.

[211] Submission 35, Property Council of Australia, p9.

[212] See for example, Submission 21, Green Building Council of Australia, p1 and Submission 34, Energy Networks Association, p2.

[213] Submission 32, NSW Distribution Network Service Providers, p6.

> Providing this information will enable DNSPs to gain a better understanding of the connection applicant's connection requirements/objectives; and would assist in the early identification of technical issues which may necessitate further time or impact on the feasibility of the connection. Further, this should also reduce the level of iteration that occurs in the initial inquiry stage of connections, as DNSPs would have the necessary information to provide the connection applicant with a timely response.[214]

5.39 Similarly, prospective polygeneration operators were optimistic that the changes will lead to an improved process for connecting a polygeneration system to the network. On the subject of the draft rule change, the Property Council Australia submitted that it should address several of the issues which they had identified in the connection process:

> When implemented, these changes will improve connections for embedded generators through better information, greater certainty, and a faster, less expensive process.[215]

5.40 One aspect of the AEMC draft rule change is the introduction of a two-stage Connection Enquiry process. This is intended to improve communication between prospective polygeneration operators and help to identify any issues or concerns earlier in the process. For these reasons, the Energy Networks Association told the Committee that they supported this process:

> … the preliminary enquiry stage [will] be a key change that will address many of the issues that arise when applicants are attempting to connect embedded generation to the electricity network. This new process will ensure better communication and understanding of the applicant's connection service requirements and the DNSP connection services provisions.[216]

5.41 These rule changes, alongside the Standing Council on Energy and Resources consideration of a report entitled Mid-Scale Embedded Generation Connection Standards led the Energy Supply Association to conclude that sufficient work had been done in the field of connection issues for polygeneration systems.

> … these inquires cover the key areas affecting DG (distributed generation), including connection rights, costs and timing; technical standards and access to demand data, it is unlikely that any substantive barriers in the energy market will remain unaddressed.[217]

5.42 Other stakeholders were largely supportive of the majority of the changes introduced by the AEMC but identified areas where rules and guidelines could be further clarified or strengthened. For example, the Energy Efficiency Council were concerned that 'there will still be opportunities for [D]NSPs to introduce inappropriate delays, and the Rule Change will not provide guidance on the cost of connection studies, connection costs or augmentation costs'.[218]

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[214] Submission 32, NSW Distribution Network Service Providers, p7.

[215] Submission 35, Property Council of Australia, p9.

[216] Submission 34, Energy Networks Association, p2.

[217] Submission 41, Energy Supply Association of Australia, p2.

[218] Submission 39, Energy Efficiency Council, p10.

5.43 Similarly, the Property Council noted that the National Electricity Rules currently provide for connection applicants to be reimbursed for network augmentation costs in certain circumstances but this payment is rarely received. They suggested that further rule changes be introduced to 'ensure DNSPs are aware of their reimbursement obligations and that these obligations are enforced'.[219]

BACK-UP SUPPLY AND THE COST OF CONNECTION

5.44 As was previously discussed with regards to the deferral of network augmentation, a benefit of polygeneration systems is the reduced use of the electricity grid. Many polygeneration systems will connect to the grid as the simplest method of providing back-up in case of system maintenance or failure.[220]

5.45 The NSW Government points out that currently polygeneration systems do not receive any special treatment and are required to arrange for back-up energy supply in the same way as other energy providers. They state that:

> Generally, back-up supply is expected to be part of the negotiations for connecting to the traditional electricity network. Any contract for back-up electricity should conform to normal electricity retail market rules and include a payment for connection capability and capacity.[221]

5.46 NSW Trade and Investment told the Committee that a number of polygeneration operators have sought to avoid paying connection charges due to the reduced use of the network for the supply of remotely generated electricity. This does not, however, recognise that the connection itself and the occasional use of the network still incurs costs to the DNSPs:

> If a trigeneration operator requires back-up supply capacity from the traditional electricity network, this imposes substantial network costs, even if the connection is only used infrequently. There is often pressure from owners of trigeneration systems to avoid paying network costs, even where back-up supply is sought. Such proposals can create a risk that these costs are borne by the DNSP, which would flow on to higher charges for all of its customers. This would be a cross-subsidy from the traditional electricity network to the trigeneration network. The economic principles which underpin energy markets tend not to support this scenario.[222]

5.47 Other stakeholders also submitted to the Committee that the current situation is the fairest way to charge network customers as they may need to rely on the grid for back-up or at other times when a polygeneration plant is not operating. Macquarie Generation indicated that it agreed with the Productivity Commission that:

[219] Submission 35, Property Council of Australia, p14.
[220] Submission 44, NSW Trade and Investment, p13.
[221] Submission 44, NSW Trade and Investment, p14.
[222] Submission 44, NSW Trade and Investment, p13-14.

> It is equitable and efficient to charge all network customers for existing shared network assets, particularly as such customers may rely on the shared network during peak periods or when the embedded generation facility is not in service.[223]

5.48 Representatives from the Energy Efficiency Council told the Committee that their proposal was not that polygeneration operators pay nothing in network connection charges. Rather, the charges should more accurately and fairly reflect the amount the network is used by a polygeneration operator.

> 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.
>
> …
>
> Your using that limit will determine [the connection charge] 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.[224]

5.49 According to the DNSPs, the price signals provided to customers related to network usage decisions are not adequate. This leads to inefficient decision making by embedded generators about when to operate their units, especially when 'encouraging an inefficient level of energy conservation during periods when the network is not likely to be constrained'.[225]

5.50 In December 2011, the Australian Energy Market Commission (AEMC) made a final rule in relation to network payments to embedded generators which, the DNSPs observed, 'determined that the level of compensation for embedded generators should be reflective of the benefits they provide to the transmission network'.[226] This means that payments to polygeneration operators should reflect the extent to which they defer investment.

5.51 The Property Council of Australia noted that the AEMC draft decision did not accept the rule change proponents' complementary rule change proposal, which recommended that generators should only be charged connection costs and not network augmentation costs.[227] The Property Council reported that the AEMC stressed the 'existing obligation in the NER for a connection applicant to be reimbursed for the use of assets that are funded by that connection applicant and provide services to other connections'.[228] According to the Property Council, AEMC's position on shared network augmentation costs for embedded

[223] Submission 30, Macquarie Generation, p6.

[224] Mr Robert Murray-Leach, Chief Executive Officer, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p58.

[225] Submission 32, NSW Distribution Network Service Providers, p4.

[226] Submission 32, NSW Distribution Network Providers, p8.

[227] Submission 35, Property Council of Australia, p13.

[228] Submission 35, Property Council of Australia, p13.

generators such as polygenerators presents a significant barrier to the uptake of polygeneration in NSW.[229]

Choice of polygeneration sites

5.52 Prendergast Projects argued that a lack of information on the state of the distribution network leads polygeneration systems to be set up in 'in areas of low land value and access to fuel, rather than the most cost effective location'.[230] The Property Council of Australia noted that these polygeneration operators can also then be surprised by the amount they are charged for connection and associated shared network augmentation costs:

> … 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.[231]

5.53 Having more information available on the capacity of the network in specific areas would help polygeneration operators make more informed decisions.

5.54 A rule change proposed by the AEMC to improve this situation is the publication of zone substation data. The Energy Supply Association of Australia explained that this could aid prospective polygeneration operators as 'greater access to zone sub-station data would provide potential … investors better information on the relative value of investing … in different parts of the distribution network'.[232]

5.55 Some stakeholders told the Committee that even if a polygeneration system is installed in an area which has sufficient capacity, the operator may not see the benefit. This is because network costs are usually charged at the same rate across the state, regardless of the potential differences in the cost of supply in different areas. As such, the full benefit of a polygeneration system operating in an area where network augmentation is deferred or the fact that it avoids using sections of the network is not fully recognised and energy generated by polygeneration is not preferable to grid-supplied energy.[233]

5.56 On the whole, the Energy Efficiency Council noted the benefits of having more information available on network capacity for making an informed decision, stating that:

> 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.[234]

[229] Submission 35, Property Council of Australia, p14.

[230] Submission 31, Prendergast Projects, p8.

[231] Mr Mendo Kundevski, Neu Consulting , Property Council of Australia, Transcript of evidence, 21 October 2013, p46.

[232] Submission 41, Energy Supply Association of Australia, p2.

[233] Submission 39, Energy Efficiency Council, p9.

[234] Mr Robert Murray-Leach, Chief Executive Officer, Energy Efficiency Council, Transcript of evidence, 21 October 2013, p57.

5.57 Conversely, they told the Committee that in their experience the full benefits of operating a polygeneration system at an optimum site were not always realised:

> … the NEM rules require 'postage-stamp' pricing, so that energy prices are heavily smeared between regions … As a result, co/trigeneration supplied electricity can face unfair competition from cross-subsidised grid-supplied electricity, unless it can secure payments from NSPs for avoiding use of most of the network and/or deferring the need to build network services to meet peak demand.[235]

5.58 The DNSPs told the Committee, however, that location based incentives have been used in some situations where there is a benefit in having generators in specific areas. In these situations, these incentives can be a more effective method of recognising the relevant benefits:

> Effective location based incentives are currently achieved when a demand management program enrols generators in network support programs. To date, these specific contractual arrangements and incentives with proponents at particular sites have proven more effective, more flexible and more achievable that tariff based systems.[236]

Network investment and connection charges

5.59 In discussing network and connection charges, evidence was presented to the Committee that the current situation encourages DNSPs to invest in their network through the acquisition of new infrastructure or the upgrading of existing infrastructure. Sydney Airport argued that, 'the current regulations allow for the … (DNSP) to generate revenue based on asset value not on asset utilisation'.[237] For this reason, some stakeholders claim that the DNSPs prefer to retain the status quo, rather than exploring options to defer network augmentation and save on connection costs. The Energy Efficiency Council told the Committee that:

> The AEMC's Power of Choice report confirms that in many situations, while reducing network augmentation may be in the interest of consumers, it may not be in the interests of NSPs. Numerous sources have confirmed that network businesses face substantial incentives to over-invest in network augmentation, and therefore a negative incentive to support distributed generation that reduces the need to augment the network.[238]

5.60 Sydney Airport also told the Committee that they had encountered difficulties in setting up a polygeneration system because their energy savings would not necessarily lead to savings in connection and network fees:

> The current regulations allow for the … (DNSP) to generate revenue based on asset value not on asset utilisation. That is, if there is a reduction in use of the asset for example from the introduction of precinct cogeneration / trigeneration facilities, the

[235] Submission 39, Energy Efficiency Council, p9.

[236] Ms Pamela Henderson, Chief Engineer, Ausgrid, NSW Distribution Network Service Providers, Answers to questions taken on notice, 11 November 2013, p2.

[237] Submission 19, Sydney Airport, p1.

[238] Submission 39, Energy Efficiency Council, p9.

> distribution network fee charged by the DNSP has to be recalibrated in the next pricing period for the DNSP to achieve the same gross income.[239]

5.61 It should be noted, however, that in October 2013 the NSW Government announced that from 1 July 2014 amended reliability licence conditions will be introduced.[240] These licence conditions for network businesses will remove the design planning criteria but retain the existing targets relating to the frequency and duration of power outages. This will remove some of the incentives for over-investment that have been highlighted.

5.62 The Minister announced that it is the intention of the new conditions that 'investment will now be delivered only when necessary and only when appropriate'.[241]

5.63 A representative from NSW Trade and Investment also pointed out that these changes could have specific relevance to polygeneration operators in their dialogues with DNSPs. The two parties may be able to negotiate savings which are mutually beneficial and lead to lower costs or payments to the polygeneration operator:

> The changes to those reliability licence conditions … means there are greater incentives for the network operators to look at alternatives to simply building poles and wires and transformers, … 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.[242]

Committee Comment

5.64 The Committee notes that the process for connecting a generator to the grid was established prior to the proliferation of smaller, embedded generators such as polygeneration systems. As such, the Committee recognises that there now exists a number of barriers for these smaller operators to connect to the grid which should be reduced.

5.65 The Committee understands that there is information available to polygeneration operators who are planning a connection to the grid. However, the Committee also notes the comments of a number of polygeneration proponents who found the information to be inconsistent and of varying quality.

5.66 The Committee notes that the Government's Service and Installation Rules do not currently include specific reference to polygeneration connections. These Rules can offer guidance to connection applicants and the Committee supports their extension to cover these connections.

[239] Submission 19, Sydney Airport, p1.

[240] The Hon Chris Hartcher MP, Minister for Resources and Energy, Media release, 17 October 2013.

[241] The Hon Chris Hartcher MP, Minister for Resources and Energy, Media release, 17 October 2013.

[242] Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of Evidence, 21 October 2013, p34.

5.67 To ensure that a connection process runs smoothly, it is important for polygeneration operators to enter into dialogue with the DNSPs as early as possible to avoid a lack of proper information and unnecessary delays.

5.68 While the Committee recognises that the connection process can be complex for DNSPs, there also appears to be a lack of clear information for connection applicants. The development of a uniform set of requirements to be met by both polygeneration connection applicants and DNSPs early in the connection application process would facilitate matters. This may also lead to a standardised connection process in specific circumstances.

5.69 The Committee notes that the rule changes proposed by the AEMC aim to improve the connection process for polygeneration operators. It appears that they have recognised the comments of both sides of the process – the connection applicants and the DNSPs. The Committee is pleased to see that the rule changes have been largely supported by polygeneration proponents and DNSPs.

5.70 The Committee supports the rule changes proposed by the AEMC and notes that further changes could be counterproductive if introduced too soon after these alterations. The Committee notes that certain issues may need to be revisited after the rule changes have been in place long enough to take effect.

5.71 The Committee recognises the importance of providing back-up supply for polygeneration systems and, where this supply is provided for by the electricity grid, it is reasonable that this supply is paid for. The Committee notes the concerns expressed by polygeneration operators who currently pay what they see as excessive network connection fees for limited network use. The Committee also notes, however, concerns that any shortfall in network payments would lead to higher payments for other customers.

5.72 The Committee acknowledges the calls for a discount to be offered to polygeneration operators who use only a limited portion of the network but does not support such proposals. The Committee recognises that current network charging arrangements are seen as unfair by the polygeneration operators but also notes that some other network users may also experience such discrepancies, due to standard network charges across the state. The Committee is therefore concerned that any preferential arrangements for polygeneration operators may create further inequities.

5.73 The Committee acknowledges the AEMC's draft decision not to accept the rule change proponents' complementary rule change proposal, which recommended that generators should only be charged connection costs and not network augmentation costs.

5.74 The Committee notes that the choice of location for a polygeneration system is important. The Committee sees this as an area which prospective polygeneration operators could further consider if they hope to pay less in connection and network charges. The Committee notes that the proposed publication of substation data would assist these investigations and it is an area which will require further monitoring.

5.75 The Committee notes that the overall market conditions concerning infrastructure investment lie outside this inquiry's terms of reference and have been considered in other forums including the Committee's previous Inquiry into the Economics of Energy Generation.

5.76 The Committee recognises that these concerns have been raised within the context of polygeneration systems and applicable connection and network costs. However, these price structures and frameworks are determined by independent bodies, such as the AEMC, though the NSW Government also has a role in developing energy policy. As both owner of, and policy-influencer for, the State's 'poles and wires', the NSW Government has a potential conflict of interest in relation to the development of policy that may affect revenue received by distribution network service providers.

5.77 The Committee acknowledges that this has led some stakeholders to question decisions made regarding investment in the current network and the deferral of network augmentation.

5.78 The Committee is pleased to see that the Minister for Resources and Energy has acted in this area by introducing new licence conditions which will remove some of the incentives for over-investment in the network.

RECOMMENDATION 8

The Committee recommends that the Minister for Resources and Energy update the Service and Installation Rules to provide improved guidance for prospective polygeneration connection applicants.

RECOMMENDATION 9

The Committee recommends that the Department of Trade and Investment, Regional Infrastructure and Services work with the Distribution Network Service Providers in NSW to develop a transparent approval process for polygeneration connection applicants.

RECOMMENDATION 10

The Committee recommends that the Minister for Resources and Energy, through his position on the Standing Council on Energy and Resources, support the rule changes proposed by the Australian Energy Market Commission to amend the National Electricity Rules with respect to embedded generators.

Chapter Six – Exporting energy from polygeneration systems in NSW

6.1 In order to participate in the National Electricity Market (NEM) by exporting and retailing electricity, generator operators need to have authorisation to do so and adhere to certain rules under the National Electricity Rules.[243] The chapter will explore matters associated with a polygeneration operator seeking to export excess electricity in the NEM. The chapter will also examine matters related to polygeneration operators wishing to supply several buildings or retail energy directly to customers.

6.2 This chapter concerns the inquiry's terms of reference relating to the economic viability of polygeneration, its operation overseas, and the current regulatory arrangements.

EXPORTING ENERGY

6.3 Polygeneration systems operate most efficiently when they are running at a high generating capacity. If the demand at a location is variable or if a polygeneration system is installed with a capacity greater than the level of demand, this can lead to excess electricity being generated, which many operators will seek to return to the grid.[244]

6.4 The Committee received evidence that the current situation in NSW makes it difficult for polygeneration operators to return energy to the grid, making their polygeneration projects less viable. This has led to a number of potential polygeneration operators postponing or abandoning their plans as their systems are not viable if excess energy cannot be returned to the network.

Technical issues

6.5 According to the NSW Distribution Network Service Providers (DNSPs), one of the main barriers to connecting a polygeneration system which intends to export excess electricity back to the grid is that networks have traditionally been designed assuming that 'electricity flows in one direction, from a large generation source to the end consumers via transmission and distribution networks'.[245] If generators wish to export electricity, it must flow in the opposite direction from the generator back to the grid. This can cause various issues which must be examined before the connection can be accepted. The NSW DNSPs have concerns that they may not be able to fulfil their obligations if polygenerators connect and export to the grid:

> As networks are not traditionally built to handle two way flows of electricity, the connection of embedded generation can cause potential system protection, fault

[243] Submission 8, City of Sydney, p11.

[244] Submission 41, Energy Supply Association of Australia, p2.

[245] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy and Essential Energy, p1.

> level, and voltage regulation issues, which in turn may adversely affect a DNSP's ability to safely deliver power supply and affect the reliability and quality of other customers supplied to the network.[246]

6.6 Furthermore, if polygeneration operators do connect to the grid and are able to feed excess electricity into it, this must be monitored to ensure that the amount of energy being exported does not become too great. The more energy that a polygeneration system seeks to put back into the grid, the more potential there is for the network to encounter difficulties. This is particularly the case if the amount of energy which is being fed back into the network is greater than the capacity which the polygeneration system can draw on if it relies on grid power, for example, for back-up. Mr Neil Gordon, Manager, Asset and Network Planning, Ausgrid, told the Committee that:

> If [export quantity] 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.[247]

6.7 Prendergast Projects told the Committee that not all polygeneration proponents recognise these complexities involved in feeding electricity back to the grid. This means they can be surprised by the costs and reluctance of the DNSPs to act without full investigation. They explained that there are various factors to consider:

> In-building embedded generation seeks to direct electricity back up the building's existing grid connection. While this may seems a simple solution, the resulting redesign works of fault protection, transformers, wiring and other equipment often sees costs blow out to over $1 million, making such a connection unfeasible.[248]

6.8 If, however, the polygeneration operator tries to avoid connecting to the grid to avoid associated costs and difficulties, it faces other problems. Deniliquin Council explained the difficulties of exporting excess energy to the grid and the resulting inefficiencies which arise when trying to avoid this situation:

> The current regulatory framework makes licenses for power generation over 10 kW extremely expensive for trigeneration systems that return power to the grid. The system at Berry Street North Sydney is independent of the grid and the engines must instantly adjust power up and down to match building demand. This is a much more complex system and also reduces engine life.[249]

6.9 On the other hand, the Energy Efficiency Council argued that when some polygeneration operators seek to export energy, they are in fact losing some of the benefits gained by producing energy through polygeneration as the operator

[246] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy and Essential Energy, p1.
[247] Mr Neil Gordon, Manager, Asset and Network Planning, Ausgrid, NSW DNSPs, Transcript of evidence, 21 October 2013, p14.
[248] Submission 31, Prendergast Projects, p6.
[249] Submission 24, Deniliquin Council, p1.

will be required to pay additional network costs. At the Committee's public hearing, representatives told the Committee that:

> **Mr MURRAY-LEACH:** 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.[250]

Commercial issues

6.10 In addition to technical challenges, there are also commercial barriers to exporting surplus energy.

6.11 Polygeneration would be seen as a much more attractive investment if those systems which are able to export excess energy, received a competitive payment for this returned energy. The generated revenue would offset some of the costs involved in setting up and running the polygeneration system. Most stakeholders indicated that this was not currently the case and the lack of a competitive payment for excess energy was seen as a barrier to creating a feasible business plan.[251]

6.12 For instance, Kinesis Pty Ltd stated that even if the export of electricity from a polygeneration system is technically feasible, commercial barriers still exist. They outlined the issue for polygeneration providers:

> … there is no guarantee they will receive any payment for this exported electricity (payment is determined by the network utility). In most cases, even if the building operator can receive payment for this electricity, it is likely to be far less than the retail cost of electricity. Further the payment is often lower than the cost of producing the electricity.[252]

6.13 While some proponents outlined the difficulties of exporting any excess energy, the Committee also heard that prospective polygeneration operators should be aware that the market conditions may not be right for the export of energy. When discussing the difficulties experienced by some polygeneration proponents in receiving adequate payment for selling surplus electricity through off-take agreements, the Energy Supply Association of Australia noted that:

> To the extent that proponents of cogeneration and trigeneration are currently finding it difficult to obtain an off-take agreement, this may simply reflect the excess capacity in the wholesale market, which is currently depressing wholesale prices. While the market remains oversupplied it will reduce the relative attractiveness of taking DG [distributed generation] output.[253]

[250] Mr Robert Murray Leach, Chief Executive Officer & Mr Simon Helps, Vice President, Energy Efficiency Council, Transcript of evidence, 21 October, p65.

[251] Submission 6, Cowra Shire Council, p1.

[252] Submission 17, Kinesis Pty Ltd, p5.

[253] Submission 41, Energy Supply Association of Australia, p2.

6.14 TransGrid provided a specific example of a prospective polygeneration operator not going ahead as the price they were offered for returning excess electricity back to the grid was not sufficient to create a viable business plan:

> … IAI (Botany) advised of its interest in providing a relatively large capacity … cogeneration plant using steam etc. They did not proceed, and TransGrid understands the primary reason was that the price offered to them for injecting into the grid its extra capacity was too low.[254]

6.15 When a polygeneration system is set up to export energy to the network and receive payment, there are occasions when the operators may not receive the payment they expected. Due to safety requirements across the whole grid, systems which push voltage levels too high are automatically shut off. This has been recognised as a problem by NSW DNSPs who are working on a solution. Ms Pamela Henderson, Chief Engineer, Ausgrid, advised the Committee that:

> … 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.[255]

Feed-in tariffs

6.16 The low value of excess electricity fed back into the network and the relatively expensive nature of polygeneration led a number of stakeholders to call for a premium feed-in tariff to be introduced. This would improve the financial model and encourage polygeneration.[256]

6.17 Flow Systems brought to the attention of the Committee the previous existence of a 'Cogeneration Tariff', which was introduced in the early 1990s. A significant number of polygeneration projects were developed as a direct result of the tariff. Under that system, electricity companies were obliged to purchase any exported electricity to the grid at the rate of $110/MWh. According to Flow Systems, this provided a long-term benefit to polygeneration operators and a similar tariff should be reintroduced:

> In the past years cogeneration and trigeneration projects have been installed with the help of Federal and State government grants. While helpful to one-off projects, these funding grants have offered no long term security or support to the industry. As a matter of priority, Government needs to introduce a feed-in tariff for cogeneration and trigeneration precincts that will ensure the economic viability of decentralised energy schemes.[257]

6.18 Cowra Council also related their experience in developing a polygeneration plant. They found that the current situation is providing insufficient incentive to developers who may wish to explore alternative energy solutions, particularly on a larger scale. In their submission, they told the Committee that:

[254] Submission 29, TransGrid, p3.

[255] Ms Pamela Henderson, Chief Engineer, Ausgrid, NSW DNSPs, Transcript of evidence, 21 October 2013, p14.

[256] Submission 17, Flow Systems Pty Ltd, p8.

[257] Submission 17, Flow Systems Pty Ltd, p8.

> It is Council's experience that new cogeneration and trigeneration initiatives are being hampered by the low value of feed-in tariffs available to developers of renewable energy facilities. As a result there are few incentives to build facilities on a large scale that serve a wider energy market. Council would encourage greater incentives for new energy providers to sell surplus energy produced from their new plants on the wider centralised power market.[258]

6.19 Origin Energy highlighted a number of reviews which have considered the commercial barriers to exporting energy to the grid have recognised the need for flexible and cost reflective tariffs. Reviews have been conducted by the Standing Council on Energy and Resources (SCER), the Australian Productivity Commission, and the Australian Energy Market Commission (AEMC).[259] The AEMC concluded that in time, economic incentives to export electricity to the grid will improve:

> The Commission considers that in time, when more innovative and flexible tariff arrangements are developed and deployed in the NEM, that the economic incentives to export electricity to the grid will improve. This will lead to more embedded generators choosing to size their equipment to take advantage of the opportunities in providing electricity to the distribution network at times of peak demand where it is flexible to do so.[260]

6.20 Other stakeholders told the Committee that there are larger issues in the energy market which needed to be resolved but that until changes are introduced and begin to take effect, a feed-in tariff would encourage the take-up of polygeneration. Mr Allan Jones, Chief Development Officer, Energy and Climate Change, City of Sydney suggested the introduction of a temporary feed-in tariff that would decrease or 'regress' over time:

> … 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.[261]

6.21 In the meantime, the City of Sydney suggested that a feed-in tariff should be introduced for 'precinct trigeneration electricity during network peak and shoulder periods (working week days, 7 am to 10 pm)'.[262] The City of Sydney recommended a tariff composed of two elements. Firstly a 'market-aligned payment for the value of the energy being sent out by precinct generators … which would be comparable to the value of the feed-in tariff for solar PV that is determined by the Independent Pricing and Regulatory Tribunal as part of its annual regulated customer determination'.[263] The second element would be 'a

[258] Submission 6, Cowra Council, p1.

[259] Submission 13, Origin Energy Limited, p4 and further details of the reviews are found in the Australian Energy Market Commission, Draft Rule Determination, National Electricity Amendment (Connecting Embedded Generators) Rule 2013, 27 June 2013, p66.

[260] Australian Energy Market Commission, Draft Rule Determination, National Electricity Amendment (Connecting Embedded Generators) Rule 2013, 27 June 2013, p66.

[261] Mr Allan Jones, Chief Development Officer, Energy and Climate Change, City of Sydney, Transcript of evidence, 21 October, pp27-28.

[262] Submission 8, City of Sydney, p36.

[263] Submission 8, City of Sydney, pp36-37.

provisional network-benefit, which would be a 'fixed proportion of the applicable network use of system charge at the relevant time of day'. The submission used the example of the UK where similar benefits are offered and on that evidence advised that 'the benefit would be at least 50 per cent of the applicable network charge'.[264]

6.22 An argument against premium feed-in tariffs is that they are often funded by other energy users who may not necessarily see the benefit. In this case, these energy users are subsidising the tariff recipients. Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment made this point to the Committee at its public hearing:

> … 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.[265]

6.23 This view was supported by the Energy Efficiency Council, who noted that it is reasonable to have a feed-in tariff for those polygeneration operators who are not aiming to retail significant amounts of excess energy but that premium feed-in tariffs can distort the market and send the wrong message. This point was also made by representatives of the Energy Efficiency Council at the Committee's public hearing:

> **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 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.[266]

6.24 As was noted in the previous chapter, the Government has recently announced changes to the reliability licence conditions which will remove some of the incentives for over-investment in the existing transmission network.[267] Mr Andrew Lewis, noted that these changes could offer an alternative to consumer funded feed-in tariffs. The changes include incentives to network operators to investigate alternative methods of energy generation and these incentives could be passed on to polygeneration operators. Mr Lewis told the Committee that:

[264] Submission 8, City of Sydney, p37.

[265] Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of evidence, 21 October, p33.

[266] Mr Robert Murray Leach, Chief Executive Officer & Mr Simon Helps, Vice President, Energy Efficiency Council, Transcript of evidence, 21 October, p68.

[267] The Hon Chris Hartcher MP, Minister for Resources and Energy, Media release, 17 October 2013.

> … 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.[268]

6.25 During its previous *Inquiry into the Economics of Energy Generation*, this Committee noted that feed-in tariffs could be beneficial but that they should reflect the actual economic benefit or costs for particular regions within the network. The Committee recommended that the Independent Pricing and Regulatory Tribunal (IPART) provide determinations for a fair feed-in tariff for other types of distributed generation, based on the actual market value of each type of distributed generation.[269] In its response to the Committee's recommendation, the NSW Government outlined that it 'supports amendment of the National Principles for Feed-in Tariff Scheme to include all forms of micro generation technologies'.[270]

6.26 Furthermore, as part of its previous *Inquiry into the Economics of Energy Generation*, the Committee recommended that 'NSW distribution service providers work with electricity retailers to determine a fair value for distributed generation feed-in tariffs, based on the location within the network and the actual market value of the distributed generation'.[271] In its response to the Committee's recommendation, the NSW Government outlined that it 'supports further cooperation between distribution network service providers and customers to develop fair rates of financial support where distributed generation provides a benefit to the network'.[272] Furthermore, the Government emphasised that 'with the adoption of the National Energy Customer Framework, a direct relationship between the customer and the distribution network service provider will be enabled to make direct negotiation possible'.[273]

Australian Energy Market Commission (AEMC) decision on greater rights to export electricity

6.27 Greater rights to export electricity for embedded generators such as polygeneration operators was included in the rule change proposal, which the

[268] Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of evidence, 21 October, p34.
[269] Public Accounts Committee, *Economics of Energy Generation*, report 6/55, Parliament of New South Wales, November 2012, p189.
[270] NSW Government, Legislative Assembly Public Accounts Committee Inquiry into the Economics of Energy Generation Public Report 6/55 NSW Government Response June 2013, p9.
[271] Public Accounts Committee, Economics of Energy Generation, report 6/55, Parliament of New South Wales, November 2012, p190.
[272] NSW Government, Legislative Assembly Public Accounts Committee Inquiry into the Economics of Energy Generation Public Report 6/55 NSW Government Response June 2013, p9.
[273] NSW Government, Legislative Assembly Public Accounts Committee Inquiry into the Economics of Energy Generation Public Report 6/55 NSW Government Response June 2013, p9.

Property Council, ClimateWorks Australia and Seed Advisory submitted to the AEMC in April 2012.[274]

6.28 In June 2013, the AEMC released its draft determination, accepting many of the solutions put forward in the rule change proposal, thereby encouraging greater uptake of polygeneration technology in NSW.[275] Yet, the Property Council of Australia reported that, 'the AEMC did not accept the rule change proponents' proposal of a right for embedded generators to export excess electricity to the distribution network'.[276] According to the Property Council, the AEMC rationale for its view is that 'network augmentation may be necessary to support the safe and reliable export of electricity from an embedded generator to the grid'.[277]

6.29 As a result, the Property Council observed that the decision 'as to whether an embedded generator can export electricity to the grid is left to the individual DNSPs'.[278] However, currently there is no system in place to guide and/or oversee DNSPs in this decision process. Consequently, the rule change proponents have requested that 'the AEMC ensure there is greater oversight of DNSPs when making this decision' by:

- allowing independent technical appraisal of the DNSPs export offer to connection applicants;
- providing more detailed guidance to DNSPs about the nature of their obligation to use reasonable endeavours to provide an applicant with the access sought; and
- providing more detailed guidance on the DNSPs' obligations governing their assessment of connection applications, such as those in relation to queuing.[279]

SUPPLYING ENERGY WITHIN A PRECINCT

6.30 In addition to matters that need to be considered when exporting energy in general, there are a number of issues that polygeneration systems face when seeking to supply energy to more than one building. These issues are discussed below.

Network charges

6.31 A key aspect of precinct based polygeneration is the supply of energy, both electrical and heating and/or cooling, to a number of buildings located nearby from one source. In order to provide this energy to the buildings, polygeneration systems will often rely on the existing distribution network to transport the energy.

[274] Submission 35, Property Council of Australia, p2.
[275] Submission 35, Property Council of Australia, p2.
[276] Submission 35, Property Council of Australia, p11.
[277] Submission 35, Property Council of Australia, p11.
[278] Submission 35, Property Council of Australia, p11.
[279] Submission 35, Property Council l of Australia, pp11-12.

6.32 The use of the existing distribution network by polygeneration systems was discussed in the previous chapter, particularly with regard to connection charges and network augmentation issues. The problems encountered by polygeneration operators when supplying energy within a precinct involve the amount charged for using the distribution network to supply local buildings. A number of stakeholders saw the level of transmission and network charges as a key barrier to precinct based polygeneration.

6.33 Regardless of the distance between the buildings, the network and transmission charges remain the same. Origin Energy told the Committee that a key benefit of polygeneration is avoiding distribution use-of-network (DUoS) charges by supplying energy locally and downstream from where the market electricity meter is read. This benefit is negated, however, when a polygeneration system supplies a number of buildings in a precinct. According to Origin:

> … when electricity is exported to buildings in precinct-scale projects, all of the distributed electricity is subject to full DUoS charges, irrespective of the distance involved. In some instances, the buildings could be adjacent to each other with only metres of the grid utilised. This situation manifests itself in its extreme when full DUoS charges are levied for in-building plants distributing electricity to multiple switchboards within the same building.[280]

6.34 Lismore City Council recounted a similar problem that emerged when they were investigating a potential polygeneration system. They highlighted the fact that the barriers for transferring energy are present even when both sites are owned by the same account holder and the sites are adjoining. They stated that:

> Lismore City Council recently investigated the feasibility of generating energy at one of our sites in order to power that site and the neighbouring high use site. … However, this option was not possible due to the Australian Standards for Wiring Rules ... and the NSW Service and Installation Rules that state that Electrical Installations may have only one point of supply, and that one installation cannot be 'mixed' with another.[281]

6.35 Other polygeneration operators planned to use any excess electricity generated to supply other buildings in an area to help counteract the large demand of these buildings but found that they were unable to do so. For example, North Sydney Council told the Committee that:

> The electricity provider did not allow any export of surplus electricity to the grid to offset Council's consumption at other big sites eg Council Chambers and Stanton Library.[282]

6.36 In other situations, it was seen as economically unviable to install a polygeneration system due to the network charges. For example, the University of Technology Sydney found that should they set up a '4MW trigeneration system operating 15 hours per day, 5 days per week, the annual network charge payable would be approximately $1.2 million per annum. This charge is the same cost as

[280] Submission 13, Origin Energy, p3.
[281] Submission 27, Lismore City Council, p2.
[282] Submission 26, North Sydney Council, p1.

transport of electricity from remote generation, despite generation occurring within 100m and using significantly less local grid infrastructure'.[283]

6.37 It was suggested that if these charges were amended to reflect the reduced use of the network due to the smaller distances the energy has to travel, polygeneration systems would become more financially viable. The City of Lake Macquarie told the Committee that:

> … without more proportionate levying of transmission/network charges, cogeneration and trigeneration are severely constrained … However, were transmission/network charges to be levied based on the amount of the network used, either by distance or by a stepped charge based on components of the network utilised, the financial viability of precinct-level projects would be greatly improved.[284]

6.38 Origin were also of the view that a more flexible network tariff would benefit polygeneration operators, telling the Committee that:

> In relation to cogeneration, we support the development of flexible tariffs that can recognise the limited use of the network when exporting generation from a building or precinct.[285]

6.39 These issues were recognised by the DNSPs who told the Committee that the attribution of network charges to polygeneration customers is a metering issue. If a polygeneration plant is installed in a commercial building that is owner occupied and has a single metered entity, 'it can locate [the] cogeneration unit behind the meter, and avoid both retail and network charges fully'. Where a polygeneration system is installed in a building with numerous tenants, however, 'the cogeneration unit could be located behind the base services meter and fully offset costs for that account. However, energy to the tenant accounts would at best avoid the retail portion of the bill and full network charges would be paid by all tenants'.[286]

6.40 The National Electricity Rules state that DNSPs cannot charge generators for Distribution Use of System (DUoS) charges, only for connection services.[287] This means that it is difficult to recognise the cost of transporting energy away from generators to deliver it to other customers. The DNSPs pointed out that: 'As a result, all costs must be recovered up-front, and this may place a higher first cost burden on generators, or result in inefficient charging regimes'.[288]

6.41 The DNSPs noted that, 'the ability to implement fair and reasonable DUoS charges could resolve some of the commercial distortions'[289] and also stressed

[283] Submission 22, University of Technology Sydney, pp2-3.

[284] Submission 36, City of Lake Macquarie, p1.

[285] Submission 13, Origin Energy Limited, p5.

[286] Submission 32, NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy and Essential Energy, p3.

[287] Australian Energy Market Commission, National Electricity Rules, 1 January 2014, 6.1.4.

[288] Pamela Henderson, Chief Engineer, Ausgrid, NSW DNSPs, Answers to questions taken on notice, 11 November 2013, p2.

[289] Pamela Henderson, Chief Engineer, Ausgrid, NSW DNSPs, Answers to questions taken on notice, 11 November 2013, p2.

the importance of cost reflective network pricing to improve the situation for precinct polygeneration systems. They reflected that this is not always possible, however, as 'cost reflective pricing can only be achieved where interval metering has been installed'.[290]

6.42 The Property Council of Australia noted that the Australian Energy Market Commission (AEMC) draft decision did not accept the rule change proponents' complementary rule change proposal, which recommended that generators should only be charged connection costs and not network augmentation costs.[291] The AEMC stressed the 'existing obligation in the NER for a connection applicant to be reimbursed for the use of assets that are funded by that connection applicant and provide services to other connections'.[292] According to the Property Council of Australia, AEMC's position on shared network augmentation costs for embedded generators such as polygenerators presents 'a significant barrier to the uptake of cogeneration in NSW'.[293]

Virtual private wire networks

6.43 One method used to avoid the problems involving the use of the distribution network to supply numerous buildings in a precinct is to set up a 'virtual private wire network'. A virtual private network allows an embedded generator to supply electricity to local sites and pay network charges that reflect the use of local distribution assets rather than use of the full network and transmission system. The Department of Climate Change and Energy Efficiency noted observations that such a flexible licensing option could 'allow distributed energy schemes to achieve more economic scales through operating larger energy centres to serve several developments and buildings in an area without building a parallel "private" network, which could represent a cost detrimental to the economic viability of the distributed energy project'.[294]

6.44 The City of Sydney told the Committee that they intend to use a virtual private wire network to assist in their polygeneration precinct projects. Mr Allan Jones, Chief Development Officer, Energy and Climate Change, City of Sydney said that:

> … 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.[295]

6.45 Energetics stated that virtual private wire networks offer a polygeneration operator the opportunity to pay more attractive network charges. They told the Committee that:

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[290] Submission 32, NSW DNSPs, p4.

[291] Submission 35, Property Council of Australia, p13.

[292] Submission 35, Property Council of Australia, p13.

[293] Submission 35, Property Council of Australia, p14.

[294] Department of Climate Change and Energy Efficiency, Inclusion of Energy Generation in Building Energy Efficiency Standards, 2012, p5.

[295] Mr Allan Jones, Chief Development Officer, Energy and Climate Change, City of Sydney, Transcript of evidence, 21 October, p24.

> Virtual private wire networks allow an embedded generator to supply electricity to local sites and pay network charges that reflect the use of local distribution assets rather than the use of the full network and transmission system.[296]

6.46 There are some concerns, however, that this is a relatively new and uncommon solution and as such there is a lack of clarity around how it would operate and how it fits into the current regulatory framework. Lismore City Council told the Committee that they had investigated associated virtual net metering but found that there was insufficient information available:

> Shifting electricity from site to site or 'Virtual Net Metering' is not restricted under current retail regulations but the lack of precedent, ambiguity over how it would be implemented, and lack of appropriate price structures has led to barriers that currently result in no advancement of this issue.[297]

6.47 Similarly, the Sustain Northern Rivers Energy Working Group wrote that, in their experience, there was confusion around the issue, telling the Committee that:

> Virtual Net Metering is neither allowed nor restricted under current retail regulations but the ambiguity over how it would be implemented leads to a culture of inaction from the relevant stakeholders.[298]

6.48 The UK's Office of Gas and Electricity Markets (Ofgem) implemented the concept of virtual private wires under the Electricity Supply Licence Modification Statutory Notice on 19 March 2009.[299]

Committee Comment

6.49 The Committee acknowledges that NSW DNSPs have an obligation to ensure the safety, reliability and quality of energy supplied and that allowing polygeneration operators to export excess energy entails additional complexities for them.

6.50 The Committee notes that exporting excess electricity is not necessarily beneficial for polygeneration operators.

6.51 The Committee recognises the potential benefits of polygeneration as an alternative form of energy generation. Polygeneration should not be incentivised above other forms of energy generation. However, neither should it be penalised. As such, it is appropriate that a fair value for a feed-in tariff be calculated. This is not intended to be a 'premium' tariff but should be based on the actual market value of polygeneration. The Committee happily notes the NSW Government response that it 'supports amendment of the National Principles for Feed-in Tariff Scheme to include all forms of micro generation technologies'.[300]

[296] Submission 11, Energetics Pty Ltd, p2.

[297] Submission 27, Lismore City Council, p2.

[298] Submission 28, Sustain Northern Rivers Energy Working Group, p1.

[299] Department of Climate Change and Energy Efficiency, Inclusion of Energy Generation in Building Energy Efficiency Standards, 2012, p53.

[300] NSW Government, Legislative Assembly Public Accounts Committee Inquiry into the Economics of Energy Generation Public Report 6/55 NSW Government Response June 2013, p9.

6.52 The Committee likewise notes the NSW Government's support for further cooperation between Distribution Network Service Providers and customers to develop fair rates of financial support where distributed generation provides a benefit to the network. The Committee acknowledges that the establishment of the National Energy Customer Framework will facilitate a direct relationship between the customer and the Distribution Network Service Provider and thereby enable direct negotiation.

6.53 The Committee also notes the recent changes implemented by the Government with respect to the reliability licences for network businesses. The Committee hopes that these will lead to greater levels of cooperation between polygeneration operators and DNSPs.

6.54 The Committee reiterates its previous support for a feed-in tariff based on the actual market value of electricity generated by polygeneration. The Committee maintains its view that polygeneration systems should not be built with the aim of exporting excess energy simply to make a profit.

6.55 The Committee recognises the AEMC's view that network augmentation may be necessary to support the safe and reliable export of electricity from an embedded generator to the grid and may involve additional costs.

6.56 The Committee supports the rule change proponents' proposal for the AEMC to ensure there is greater oversight of DNSPs' decision making process related to right of a generator to export excess electricity to the grid.

6.57 The Committee recognises that network charges are seen as restrictive by a number of stakeholders, but they are necessary to maintain the safety and reliability of the network. Although polygeneration operators may seek to only use a small portion of the network, the DNSPs are required to maintain the whole network.

6.58 The Committee considers cost reflective pricing to be an important factor in efficient precinct polygeneration. It also notes the comments from the DNSPs that cost reflective pricing is difficult without adequate metering.

6.59 The Committee notes the calls for a discount to be offered to polygeneration operators who use only a limited portion of the network if they distribute energy locally. However, the Committee is cognisant of the fact that distance-based charges for use of the network are not applied in NSW. Further, as was discussed in the previous chapter in relation to network access and connection fees, this is also an issue for other forms of distributed generation. The Committee does not therefore consider it appropriate to incentivise polygeneration over other forms of energy generation. The Committee also notes that polygeneration systems can be configured to be less reliant on the network, for example, in situations where the network is used infrequently or a connection is maintained solely for back-up purposes.

6.60 The Committee also recognises the potential difficulties that may arise if polygeneration operators were exempt from paying all charges as this could lead

to a shortfall in funding. This shortfall may then be funded by increased charges from other customers and the subsidisation of polygeneration operators.

6.61 The Committee notes that the City of Sydney postponed plans to install a polygeneration precinct at Green Square Town Hall due to a number of problems with supplying energy to a precinct in an economically viable manner. The City of Sydney indicated that these problems included the clarification of the NABERS ruling, discussed earlier in this report, the uncertainty of electricity pricing due to changing gas prices and doubt over a carbon price, and the slow pace of the reform process for the National Electricity Market.[301] The City of Sydney has also recommended the introduction of a 'benefit-reflective network tariff' for polygenerators, to reflect the benefits of polygeneration to the network.[302]

6.62 The Committee recognises the problems encountered by the City of Sydney in its attempts to establish a large-scale polygeneration precinct at Green Square. However, the Committee questions the amount of work undertaken in this plan by the City of Sydney, and the inherent financial risk, when the modelling was based on incorrect or uncertain factors. For example, reform of the National Electricity Market is a slow process due to the stakeholders involved and there was never a guarantee that a benefit-reflective network tariff would be introduced. The Committee also reiterates its concerns regarding other energy consumers subsidising polygeneration operators should such a tariff be introduced. The Committee considers that, in the current regulatory framework, the City of Sydney has set overly ambitious targets for its precincts.

6.63 The Committee notes the Australian Energy Market Commission (AEMC) draft decision not to accept the rule change proponents' complementary rule change proposal, which recommended that generators should only be charged connection costs and not network augmentation costs.

6.64 The Committee notes recent changes to the reliability licence conditions and a new national regulatory framework that will be applied to the New South Wales networks. These changes offer better incentives for the network operators to look at alternative energy production methods to reduce infrastructure spending. The Committee sees this as a useful driver for polygeneration operators and DNSPs to enter into negotiations to explore different tariffs, perhaps based on Location and Generation of Use charges.

6.65 The Committee notes that virtual private wire networks and virtual net metering appear to have some merit in the field of polygeneration. The specific arrangements of such a system would have to be determined between polygeneration operators and network operators. However, it is apparent that at present there is a lack of clear information available to potential operators. Government could remove this barrier to innovation by providing information about the regulatory framework surrounding virtual private wire networks and virtual net metering.

[301] Submission 8, City of Sydney, pp26-27.

[302] Submission 8, City of Sydney, pp32-34.

RECOMMENDATION 11

The Committee recommends that the Minister for Resources and Energy advocate for the rule change proponents' proposal to introduce a mechanism to provide oversight of Distribution Network Service Providers' decision-making process relating to the right of a generator to export excess electricity to the grid.

RECOMMENDATION 12

The Committee recommends that the Minister for Resources and Energy publicly report on the progress of the amendment of the National Principles for Feed-in Tariff Schemes to include all forms of micro generation technologies.

RECOMMENDATION 13

The Committee recommends the Minister for Resources and Energy publicly report on the extent to which the adoption of the National Energy Customer Framework has facilitated direct negotiation between Distribution Network Service Providers and customers, and led to any financial support for polygeneration to date.

RECOMMENDATION 14

The Committee recommends that the NSW Government reject calls for polygeneration to be incentivised over other forms of distributed energy generation by making available discounted network fees based on occasional use of the network.

RECOMMENDATION 15

The Committee recommends that the Department of Trade and Investment, Regional Infrastructure and Services provide an information package outlining the options available for, and the regulatory framework surrounding, virtual private wire networks and virtual net metering for those generators who wish to explore this method of distribution.

Chapter Seven – Retailing energy and consumer protection

7.1 If a polygeneration operator wishes to sell electricity to retail customers, they must hold a licence in accordance with current energy retailing arrangements. Alternatively they can sell the energy they produce to a licenced retailer who would then supply the customers, or they can retail energy as an exempt electricity seller.[303] A number of prospective polygeneration operators in NSW, who have investigated the options available to them to enter the electricity market, found those options to be unsatisfactory.

7.2 This chapter will discuss issues regarding the retailing of energy to customers within a polygeneration network, including electricity and thermal energy. It will also examine questions relating to the protection of customers who source their energy from polygeneration. The inquiry terms of reference covered in this chapter include the viability of polygeneration, some risks as they relate to polygeneration customers and the suitability of current regulatory arrangements in NSW and nationally.

RETAILING ENERGY

7.3 The Property Council of Australia provided some details on the options available to potential polygeneration operators to retail energy and how arrangements may operate. They told the Committee that a project owner who wanted to service multiple buildings would need to either:

- Obtain an exemption to the requirement to hold a retail licence and then participate in the wholesale electricity market as an exempt participant for the transmission and distribution of electricity between the buildings; or
- Enter into an agreement with a retailer, who would manage the wholesale market, the transmission and distribution business requirements and hold the retail licence.

7.4 According to the Property Council, 'neither of these options is ideal, as they significantly increase costs and reduce project feasibility'.[304]

7.5 Similarly, Kinesis emphasised that these conditions make it particularly difficult for smaller polygeneration operators to retail electricity:

> … this regulatory requirement … may prevent smaller scale schemes from being implemented where none of the parties are likely to be able (due to time, cost or qualifying constraints) to receive energy retailing authorisation.[305]

[303] Submission 44, NSW Trade and Investment, p19.
[304] Submission 35, Property Council of Australia, p6.
[305] Submission 17, Kinesis Pty Ltd, p5.

7.6 Flow Systems recommended that polygeneration systems should be granted a connection exemption or a special licensing provision to allow them to retail to multiple customers. This would improve the financial viability of polygeneration systems and encourage their use.[306]

7.7 According to the Australian Energy Market Operator, there have been improvements in the arrangements for small polygeneration operators (usually under 5MW) to facilitate their participation in the NEM spot market. From January 2013, the AEMC established a new category of registration called the Small Generation Aggregator (SGA) which permits a stream-lined registration in specific circumstances. While beneficial for factory and building level polygeneration systems, this may not offer sufficient incentives for residential or smaller scale systems:

> The SGA category is likely to provide benefit to factory and building level cogeneration/trigeneration, allowing improved commercial opportunities for electrical generation surplus to local requirements. However the SGA category may not be suitable for cogeneration at a residential level, as there is a requirement for remotely-read interval metering which could be uneconomic for small scale installations.[307]

7.8 NSW Trade and Investment told the Committee that the Department had looked into the issue of changing licencing conditions for polygeneration operators. One available option would be to consolidate some of the regulations, which cover network access and consumer protection. This would simplify the process for polygeneration operators. Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment made this point to the Committee:

> [The Department is] 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.[308]

Ring fencing

7.9 Should polygeneration become more prevalent there are emerging issues which could require further consideration, particularly if more systems seek to enter the energy market. One of these issues is whether polygeneration operators will be required to ring-fence, i.e. financially separate, portions of their business.

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[306] Submission 15, Flow Systems, p6.

[307] Submission 20, Australian Energy Market Operator, p3.

[308] Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of evidence, 21 October, p33.

7.10 Energy reforms in NSW have led to the retail and distribution functions of the relevant energy businesses being separately owned. This has removed the need for ring fencing of retail operations from distribution operations. It is unclear whether polygeneration operators would need to take this step which would increase the cost and complexity of any business proposal, as highlighted by NSW Trade and Investments:

> Requiring a trigeneration system operator to ring fence its retail business from its network arm would add cost and complexity to the business. Whether such arrangements are required for retail customers buying electricity from a trigeneration system is unclear.[309]

7.11 Should a polygeneration operator establish a generator with a large capacity which is primarily intended to sell electricity to customers who are not already connected to the system, the Department told the Committee that, it would be reasonable for polygeneration operators to be subject to the same rules as any other generator, network operator or retailer. This does not, however, fit the model of a traditional polygeneration precinct which is 'a distinct geographic area to be supplied with combined heat and power'.[310] In such cases, the Department noted the argument that ring fencing would represent an unnecessary barrier to polygeneration:

> … if the trigeneration operator only wants to sell a small amount of residual electricity left over after its own customers' needs are met; application of costly ring fencing measures is an inappropriate regulatory barrier for trigeneration.[311]

CONSUMER PROTECTION

7.12 An additional challenge for polygeneration operators who intend to supply a number of customers within a precinct is ensuring that they are able to accurately estimate demand and match supply while also understanding that all customers will have a choice of energy supplier.

7.13 Kinesis noted that a key risk for a polygeneration operator is whether or not buildings in a precinct will choose to sign up to their system:

> The biggest risk for any developer of a district cogeneration or trigeneration scale project is ensuring that adjacent properties connect to [the] district scheme so the scheme operator achieves a return on their capital investment.[312]

7.14 The freedom of choice for consumers to choose their electricity supplier in a competitive retail market is provided for in the *Electricity Supply (General) Regulation 2001*. According to NSW Trade and Investment though, the structure of polygeneration systems, which aim to supply separate consumers, may restrict these choices:

> The bundled nature of the trigeneration operations may eliminate the ability of customers to choose their energy supplier. Trigeneration system operators also

[309] Submission 44, NSW Trade and Investment, p19.
[310] Submission 44, NSW Trade and Investment, p20.
[311] Submission 44, NSW Trade and Investment, p20.
[312] Submission 17, Kinesis Pty Ltd, p5.

> often contractually bind their customers to dedicated supply arrangements to ensure demand and financial certainty, which may result in little choice for trigeneration customers in how much they are charged for standard energy services.[313]

7.15 Alternatively, where customers do retain the freedom to choose, there may be little incentive to choose the polygeneration supply and this can hamper the financial viability of a project.

> Due to contestability regulation, customers are able to choose their electricity supplier. This creates uncertainty for cogeneration projects, as building[s] typically include several customers (base building owner, several commercial tenants, many retail tenants) and such customers are not incentivised to use the cogeneration electricity.[314]

7.16 Mr Andrew Lewis, NSW Trade and Investment, noted that a monopoly supply could be acceptable in certain situations, but if that occurred it was essential that protections remained for the customers involved:

> … 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.[315]

7.17 Conversely, the Committee heard arguments that the current regulations surrounding the protection of consumer choice do not offer sufficient choice to energy customers, particularly when polygeneration is involved. This is because a significant part of electricity bills are made up of network costs and there is therefore less opportunity for energy retailers to compete with one another. For polygeneration operators, this becomes a further issue as they may be paying what they consider to be unreasonable network charges given the local aspect of the energy generation. The Energy Efficiency Council told the Committee that:

> Given that over 50 per cent of electricity bills are currently network costs, a much higher proportion than the proportion of the bill that is driven by retailers, this requirement actually increases the proportion of consumers' bills that is directed by a monopoly [DNSP].[316]

Exclusive dealing

7.18 Exclusive dealing can include full line forcing or third line forcing. Full line forcing involves a supplier refusing to supply goods or services unless a purchaser agrees not to buy particular goods or services from a competitor, or to resupply goods or services to a competitor. This is only illegal if it can be demonstrated that the

[313] Submission 44, NSW Trade and Investment, p9.

[314] Submission 31, Prendergast Projects Pty Ltd, p4.

[315] Mr Andrew Lewis Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of evidence, 21 October, p35.

[316] Submission 39, Energy Efficiency Council, p12.

conduct substantially reduces competition in the relevant market. Third line forcing involves the supply of services on the condition that a purchaser buys services from a specific third party. Third line forcing is prohibited.

7.19 Where polygeneration systems operate independently of the electricity grid, consumer choice is significantly reduced, as the only energy available is provided through the polygeneration system. This presents issues in terms of competition and the potential for exclusive dealing on the part of polygeneration operators.

7.20 As discussed, the *Competition and Consumer Act 2010* contains provisions to prevent anti-competitive behaviour and various types of exclusive dealing. However, the Australian Consumer and Competition Commission may allow third line forcing where it can be demonstrated that the public benefit outweighs the negative impact of any anti-competitive behaviour. The Consumer, Trade and Tenancy Tribunal may provide an exemption from anti-competitive provisions.

7.21 However, an Owners Corporation must be formed in order for an exemption to be applied in a residential building. For many developers attempting to estimate the potential demand for polygeneration supplied energy, this requirement represents too great a risk. For example, UrbanGrowth NSW told the Committee that waiting for an Owners Corporation to be formed represents too much of a delay:

> At this time the necessary infrastructure and development will already be complete and the risk around an uncertain services contract is too high. The CTTT [Consumer, Trade and Tenancy Tribunal] is not ruled by any timeframes regarding its resolution which adds to the settlement risk for projects.[317]

7.22 The Committee did receive evidence that the provision of energy from a polygeneration system would be of sufficient public benefit that third line forcing would be allowed by the Australian Competition and Consumer Commission. According to Mirvac: 'The public benefit of utilising a low carbon source of energy would be recognised from the environmental, economic and practical gains'.[318]

7.23 Alternatively, where similar situations have arisen in other countries, solutions were devised. For example, in the UK there is a system in place which allows polygeneration operators to retail directly to consumers, without the need for alternative suppliers, provided that the prices charged are equivalent to prices charged by nearby energy companies.[319]

7.24 This system is being considered by the Government and it may be appropriate in some circumstances. Mr Andrew Lewis, NSW Trade and Investment, agreed that there may be some merit in this solution and noted that similar arrangements are in place in other areas in NSW:

> We already have a number of [these arrangements] …, 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-

[317] Submission 42, UrbanGrowth NSW, p2.
[318] Submission 43, Mirvac Limited, p1.
[319] Submission 39, Energy Efficiency Council, p12.

> 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.[320]

7.25 In their recent project to set up polygeneration system in the Green Square development, the City of Sydney have avoided any monopoly situations. Customers are free to choose whether to receive their energy from the locally generated source or from any other source. When asked about the situation in Green Square, Mr Allan Jones, Chief Development Officer, Energy and Climate Change, City of Sydney told the Committee that:

> In terms of electricity … 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.[321]

7.26 While these issues primarily concern the supply of electricity to multiple customers, the City of Sydney highlighted similar difficulties they had encountered when trying to establish a precinct thermal energy network. At one development, they had intended for all occupants to source their thermal energy for hot water, space cooling and other uses from the polygeneration source. There were concerns, however, that this may have involved third-line forcing under subsection 93 of the *Competition and Consumer Act 2010* and require input from the Australian Competition and Consumer Commission. This was seen as adding unnecessary burden and risk on polygeneration operators.[322]

7.27 Similarly, the City of Sydney argued that there would be benefits for polygeneration operators if they were able to negotiate thermal energy supply arrangements in new developments earlier in order to better estimate demand. They stated that Section 113 of the *Strata Scheme Management Act 1996* (NSW) inhibits efficient long term contracting of precinct-based thermal energy infrastructure.[323]

Thermal energy and customer protection

7.28 Chapter 2 of this report considers the various risks posed by polygeneration and protections which are available to polygeneration customers in some detail. There are, however, specific issues relating to thermal energy customers.

7.29 Protection for energy consumers is well established and regulated by the National Energy Retail Law and the National Energy Retail Rules, known collectively as the National Energy Customer Framework and commenced in NSW

[320] Mr Andrew Lewis, Executive Director, Energy, Department of Resources and Energy, NSW Trade and Investment, Transcript of evidence, 21 October, p36.

[321] Mr Allan Jones, Chief Development Officer, Energy and Climate Change, City of Sydney, Transcript of evidence, 21 October, p26.

[322] Submission 8, City of Sydney, pp14-15.

[323] Submission 8, City of Sydney, pp42-43.

on 1 July 2013. These protections, however, are primarily aimed at protecting gas network and grid based electricity customers.

7.30 The Department of Trade and Investment explained that while 'traditional energy retailers are licensed and small retail customers are provided with a number of safeguards including hardship arrangements and a dedicated Ombudsman to deal with small retail customer disputes', there are no specific regulatory arrangements or consumer protection laws governing the sale of thermal energy in the form of hot or chilled water.[324] Moreover, the Energy and Water Ombudsman NSW does not have any authority to deal with issues such as billing, disconnection and reconnection.[325]

7.31 In fact, at present, polygeneration customers receive protection only under the Australian Consumer Law (ACL) set out in Schedule 2 of the Competition and Consumer Act 2010 (Cth).[326]

7.32 The new Exempt Selling Guideline from the Australian Energy Regulator also offers additional protections to small retail customers, particularly of unlicensed suppliers. The Department told the Committee that, 'these protections may extend to trigeneration customers who purchase electricity from a trigeneration system operator'.[327]

7.33 There appears to be less certainty, however, concerning the protections available for customers of hot or cold water, as the Department noted:

> There are currently no specific regulatory arrangements or consumer protection laws governing the sale of thermal energy in the form of hot or chilled water and the Energy and Water Ombudsman NSW (EWON) does not have the authority to assist with issues such as billing, disconnection and reconnection.[328]

Thermal energy and customer rights

7.34 The production of both electricity and thermal energy (and cooling when operating a trigeneration system) is a key aspect of polygeneration. The Committee received evidence that the thermal energy network and corresponding regulatory framework are underdeveloped compared to the electricity network and that this may require further attention if polygeneration becomes more common.

7.35 The best method for polygeneration operators to provide hot and cold water to customers is a user-pays system, which requires metering to provide individual bills. At present there are no legal requirements to meter hot and chilled water, but introduction of such requirements could facilitate supply from polygeneration sources. Some concerns were put to the Committee, however, from UrbanGrowth NSW that the installation of thermal metering may not be a simple process:

[324] Submission 44, NSW Government Trade and Investment, p8.
[325] Submission 44, NSW Government Trade and Investment, p8.
[326] Submission 44, NSW Government Trade and Investment, p9.
[327] Submission 44, NSW Trade and Investment, p8.
[328] Submission 44, NSW Trade and Investment, pp8-9.

> We are concerned that future changes around thermal metering standards would require the re-installation of meters which would be costly and obtaining legal access may also be difficult.[329]

7.36 The City of Sydney also recognised that regulatory requirements to replace thermal meters could pose a risk to developers. To avoid this, they recommended that regulatory standards be introduced for thermal meters, but that future regulatory changes give grandfather rights to installed meters so that they do not need to be replaced.[330]

7.37 Without a user pays system, building residents would pay a uniform rate regardless of the thermal energy they used. The Committee heard concerns that where a supplier has an exclusive right, customers will not be able to avoid price rises or switch suppliers to attain better rates. UrbanGrowth NSW recommended that 'thermal services, similar to other services are regulated by IPART'. They argued that that this 'will help ensure fair pricing which reflects the capital and operating costs of this system'.[331]

Committee Comment

7.38 The safety of customers and the reliability of supply remains of utmost importance and licensing conditions should reflect these priorities. However, the Committee considers that wherever possible, consideration should be given to simplifying licensing conditions to enable polygeneration operators to retail energy.

7.39 The Committee recognises the importance of ring fencing to avoid adverse effects on the market and consumers. At present, it agrees with the NSW Government that ring-fencing for smaller polygeneration operators would act as an unnecessary barrier. This may, however, be an area which must be monitored should polygeneration become far more prevalent.

7.40 The Committee understands that the capacity to accurately estimate demand and manage the supply of energy is critically important to polygeneration operators. Nevertheless, where a building is connected to the grid, the Committee considers that market forces should be allowed to operate and consumer choice retained.

7.41 The Committee notes the potential for polygeneration to lead to anti-competitive behaviour and involve full-line and third-line forcing. The use of polygeneration in multi-tenant buildings is a relatively new development and as such this is an emerging issue. Government should address the possibility of anti-competitive behaviour in such situations. The Committee notes the role of the Australian Energy Regulator in monitoring and enforcing compliance with energy retailers' obligations, including the right of consumers to choose their providers. The Committee considers that the Australian Competition and Consumer Commission could provide further clarity in relation to possible measures to prevent, and respond to, exclusive dealing where it adversely affects customers.

[329] Submission 42, UrbanGrowth NSW, p2.
[330] Submission 8, City of Sydney, p42.
[331] Submission 42, UrbanGrowth NSW, p3.

7.42 If a monopoly-type situation is permitted, efforts must be made to ensure that customers are not forced to pay unfair fees. The Committee is pleased to see that the Government has already considered this issue in relation to developments such as shopping centres, where customers are charged a regulated tariff. This is an area that may benefit from further investigation, particularly as it relates to polygeneration systems.

7.43 The Committee notes stakeholder concerns that consumer choice may be reduced if polygeneration operators attempt to lock consumers into contracts. This is an emerging area which will require further consideration, particularly if polygeneration systems become more common in new developments. If polygeneration does become more common and the supply of thermal energy through the existing thermal energy network expands, consumers of thermal energy will need to be appropriately protected.

7.44 The Committee is concerned that at present there are insufficient controls on the price of thermal energy in the form of hot and chilled water. The provision of these services will be a key function of polygeneration systems. The Committee therefore considers that it is appropriate for IPART to regulate the price of thermal services.

RECOMMENDATION 16

The Committee recommends that, to the extent that safety requirements and consumer protection provisions allow, the Department of Trade and Investment, Regional Infrastructure and Services simplify retail licensing arrangements for smaller polygeneration operators.

RECOMMENDATION 17

The Committee recommends that the Minister for Fair Trading, through his position on the Ministerial Council on Consumer Affairs, advocate for the Australian Competition and Consumer Commission to provide clarity on the impact of anti-competitive behaviour and exclusive dealing in specific situations for developments utilising polygeneration.

RECOMMENDATION 18

The Committee recommends that the Minister for Resources and Energy publish an information package for consumers of energy from polygeneration sources outlining their rights and the responsibilities of energy providers.

RECOMMENDATION 19

The Committee recommends that the Minister for Resources and Energy expand the powers of the Energy and Water Ombudsman to include customer complaints about the provision of thermal energy in the form of hot and chilled water.

RECOMMENDATION 20

The Committee recommends that the Premier introduce legislation to empower the Independent Pricing and Regulatory Tribunal to regulate the price of thermal services, in a manner similar to regulation of other energy services.

Appendix One – List of Submissions

1	Wagga Wagga City Council
2	Gosford City Council
3	Home Loan Experts
4	Wright Energy Consulting
5	Total Environment Centre
6	Cowra Council
7	Name Suppressed
8	City of Sydney
9	Clean Energy Council
10	AGL Energy
11	Energetics Pty Ltd
12	CETEC Pty Ltd
13	Origin Energy
14	Name Suppressed
15	Flow Systems
16	APA Group
17	Kinesis Pty Ltd
18	Confidential
19	Sydney Airport
20	Australian Energy Market Operator
21	Green Building Council of Australia
22	University Technology, Sydney
23	Dalkia Energy Solutions
24	Deniliquin Council
25	Sustainable Business Australia
26	North Sydney Council
27	Lismore City Council
28	Sustain Northern Rivers Energy Working Group
29	TransGrid
30	Macquarie Generation

31	Prendergast Projects Pty Ltd
32	NSW Distribution Network Service Providers, Ausgrid, Endeavour Energy and Essential Energy
33	Jemena Gas Networks (NSW) Ltd
34	Energy Networks Association
35	Property Council of Australia
36	City of Lake Macquarie
37	Confidential
38	Confidential
39	Energy Efficiency Council
40	Urban Energy Australasia
41	Energy Supply Association of Australia
42	UrbanGrowth NSW
43	Mirvac
44	NSW Government Trade and Investment

Appendix Two – List of Witnesses

21 October 2014, Jubilee Room

Witness	Organisation
Mr Tom Grosskopf *Director, Metropolitan Branch, Regional Operations*	NSW Office of Environment and Heritage
Ms Samantha McLean *Senior Team Leader, Commercial Buildings Regional Operations Group*	NSW Office of Environment and Heritage
Mr Neil Gordon *Manager Asset & Network Planning*	Ausgrid
Ms Pamela Henderson *Chief Engineer*	Ausgrid
Mr Peter Coombes *Senior Program Manager/Green Infrastructure*	City of Sydney
Mr Allan Jones *Chief Development Officer*	City of Sydney
Mr Andrew Lewis *Executive Director, Energy, Department of Resources & Energy*	NSW Trade & Investment
Mr Glenn Byres *NSW Executive Director*	Property Council of Australia
Mr Mendo Kundevski *Business Proprietor*	NEU Consulting
Mr Peter Gayen *Manager Networks Commercial Networks Commercial*	APA Group
Mr Scott Martin *Manager Commercial Operations*	Jemena Gas Networks (NSW) Limited
Mr David Musson *General Manager Gas Networks Commercial*	Jemena Gas Networks (NSW) Limited
Mr Adam Pegg *Head of Environmental Development*	APA Group
Mr Simon Helps *Vice President*	Energy Efficiency Council
Mr Rob Thomson *President*	Energy Efficiency Council
Rob Murray-Leach *CEO*	Energy Efficiency Council

Appendix Three – Extracts from Minutes

MINUTES OF PROCEEDINGS OF THE PUBLIC ACCOUNTS COMMITTEE (NO. 53)

Monday 15 July 2013
1:30 pm
Room 1153, Parliament House, or via teleconference

Members Present

Mr Bassett, Mr Daley, Dr Lee, Mr Piper

Apologies

Mr O'Dea (Chair), Mr Williams

Officers in Attendance

Ms Rachel Simpson, Mr John Miller, Mr Leon Last, Ms Sasha Shevtsova

1. Inquiry into cogeneration and trigeneration in NSW

1.1 Correspondence

Resolved on the motion of Mr Basset, seconded Mr Piper: that the Committee note the correspondence from the Minister for Resources and Energy, dated 3 June 2013, referring an inquiry into trigeneration to the Committee.

1.2 Terms of reference and advertising the inquiry

The Committee considered the terms of reference from the Minister.

Resolved on the motion of Mr Piper, seconded Mr Bassett: That the Committee amend the terms of reference referred to the Committee by the Minister for Resources and Energy by inserting the word cogeneration.

Resolved on the motion of Mr Bassett, seconded Mr Piper: That the Committee adopt the following terms of reference for an inquiry into cogeneration and trigeneration in NSW:

That the Committee inquire into and report on the installation and use of cogeneration/trigeneration technology in New South Wales and in particular:

i) whether the current regulatory framework can adequately support the utilisation of cogeneration/trigeneration precinct developments;
ii) the operation of cogeneration/trigeneration technology in other jurisdictions and the applicability of the technology to New South Wales;
iii) the economic viability of cogeneration/trigeneration technology in New South Wales including the impact of future gas prices on the running costs of cogeneration/trigeneration systems;
iv) any financial, public safety and/or other risks to prospective cogeneration/trigeneration customers;

v) any supply security and reliability issues associated with cogeneration/trigeneration, especially for residential customers of these systems;
vi) the ability of existing regulatory arrangements at the New South Wales and national level to address issues which may be identified;
vii) any other relevant matters.

Resolved on the motion of Mr Piper, seconded Mr Bassett: That the Committee advertise the inquiry in the *Sydney Morning Herald*, the *Sydney Central Courier* and on the Committee website, calling for submissions with a closing date six weeks from the date of the advertisement.

Resolved on the motion of Mr Bassett, seconded Mr Piper: That the Chair write to relevant stakeholders, including all local councils, calling for submissions to the inquiry, (with the secretariat to circulate a list of stakeholders to members by 19 July 2013, for their comment).

Resolved on the motion by Mr Piper, seconded Mr Bassett: That the secretariat prepare a briefing paper on cogeneration/ trigeneration.

2. Next meeting

The Committee adjourned at 1:55 pm until Tuesday 13 August 2013 at 12:30 pm in the Room 1043.

MINUTES OF PROCEEDINGS OF THE PUBLIC ACCOUNTS COMMITTEE (NO. 54)

Tuesday 13 August 2013
12:32 pm
Room 1043, Parliament House and via teleconference

Members Present

Mr O'Dea (Chair),Mr Bassett, Mr Daley, Dr Lee, Mr Piper, Mr Williams

Officers in Attendance

Rachel Simpson, John Miller, Leon Last, Jenny Gallagher

1. ***

2. Confirmation of minutes nos 52 and 53 held on 21 June and 15 July 2013

Resolved on the motion of Mr Piper, seconded Mr Daley: That draft minutes nos 52 and 53 be confirmed.

3. Next meeting

The Committee adjourned at 1:23pm until 9.45 am on Thursday, 15 August 2013 in Room 1043.

MINUTES OF MEETING 55

Thursday, 15 August 2013
9.56 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Dr Lee, Mr Piper, Mr Williams

Apologies

Apologies were received from Mr Daley

Officers in attendance

Rachel Simpson, John Miller, Leon Last, Sasha Shevtsova, Jenny Gallagher, Laura Sloane

1. Confirmation of minutes no. 54 held on 13 August 2013

Resolved on the motion of Mr Piper, seconded by Mr Bassett, that draft minutes no. 54 be confirmed.

2. ***

3. ***

4. ***

5. Inquiry into cogeneration and trigeneration in NSW

5.1 Briefing from DPS next week

Resolved on the motion of Mr Bassett, seconded by Mr Williams, that the Committee request a briefing from the Department of Parliamentary Services about NSW Parliament's cogeneration plant, as well as an inspection of the plant, to be conducted on 29 August 2013.

6. ***

7. ***

8. ***

9. ***

10. ***

11. ***

The Committee agreed to hold any late items of business over until the next meeting.

12. Next meeting

The Committee adjourned at 10:05 am until 9.45 am on Thursday, 22 August 2013 in Room 1043.

***

MINUTES OF MEETING 56

Thursday, 22 August 2013
9.49 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Dr Lee, Mr Williams

Officers in attendance

Rachel Simpson, John Miller, Leon Last, Sasha Shevtsova, Jenny Gallagher, Shane Armstrong, Laura Sloane

1. Confirmation of minutes no. 55 held on 15 August 2013

Resolved on the motion of Dr Lee, seconded by Mr Bassett, that draft minutes no. 55 be confirmed.

2. *

3. *

4. *

5. *

6. *

7. Inquiry into cogeneration and trigeneration in NSW

7.1 Briefing paper

The Committee noted the briefing paper on cogeneration and trigeneration in New South Wales.

7.2 New stakeholders for inquiry

Resolved on the motion of Mr Williams, seconded by Dr Lee, that the Committee write to Mr Alan Davis, associate director of WSP Built Ecology and Mr Bruce Taper, director of Kinesis to invite them to make a submission to the inquiry.

7.3 Correspondence

The Committee noted the following item of correspondence received:

- 19 August 2013 - from Australian Academy of Technological Sciences and Engineering (ATSE) declining to make submission.

8. *

9. *

10. Next meeting

The Committee adjourned at 10:04 am until 9.45 am on Thursday, 29 August 2013 in Room 1043.

MINUTES OF MEETING 57

Thursday, 29 August 2013
9.48 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Piper, Dr Lee, Mr Williams

Officers in attendance

Rachel Simpson, John Miller, Leon Last, Jenny Gallagher, Shane Armstrong, Laura Sloane

1. Confirmation of minutes no. 56 held on 22 August 2013

Resolved on the motion of Mr Williams, seconded by Mr Bassett, that draft minutes no. 56 be confirmed.

2. ***

3. ***

4. *******

5. ***

6. Inquiry into cogeneration and trigeneration in NSW

6.1 Correspondence

The Committee noted the correspondence received from Great Lakes and Ryde Councils declining to make submissions to the inquiry.

6.2 Briefing and tour from Department of Parliamentary Services

Mr Robert Nielsen, Director Facilities and Mr Brett Wright, Operations Manager gave a presentation on and tour of the cogeneration plant on level one. The Chair asked to be provided with a current analysis of the potential viability of reactivating the Parliament's cogeneration facilities, including any relevant power price points.

The Committee agreed to write a letter of appreciation for the presentation and tour to Mr Rob Stefanic, Executive Manager, Department of Parliamentary Services.

7. Next meeting

The Committee adjourned at 10:50 am until 9.45 am on Thursday, 12 September 2013 in Room 1043.

MINUTES OF MEETING No 58

Thursday 12 September 2013
9.46 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Dr Lee, Mr Piper, Mr Williams

Officers in attendance

Rachel Simpson, John Miller, Leon Last, Sasha Shevtsova, Jenny Gallagher, Laura Sloane

1. Confirmation of minutes no. 57 held on 29 August 2013.

Resolved on the motion of Mr Piper, seconded Dr Lee: That draft minutes no.57 held on 29 August 2013 be confirmed.

2. ***

3. ***

4. ***

5. Inquiry into cogeneration and trigeneration in NSW

5.1 Correspondence

The Committee noted the following items of correspondence received:

- 29 August 2013 – Letter from Mr Paul Healey, Chief Financial Officer, Places Victoria, declining to make submission.
- 4 September 2013 – Email from Ms Liz Moore, Director, Resources and Land Use, Department of Premier and Cabinet requesting and extension to make a submission.

Resolved on the motion of Mr Piper, seconded Mr Bassett: That the Committee grant an extension to the NSW Government and Leichardt Council until 18 September 2013 to lodge a submission.

5.2 Submissions received

The Committee noted the following 20 submissions:

- Submission 1 – Wagga Wagga City Council

- Submission 2 – Gosford City Council
- Submission 3 – Home Loan Experts
- Submission 4 – Wright Energy Consulting
- Submission 5 – Total Environment Centre
- Submission 6 – Cowra Council
- Submission 7 – Name suppressed
- Submission 8 – City of Sydney
- Submission 9 – Clean Energy Council
- Submission 10 – AGL Energy
- Submission 11 – Energetics Pty Ltd
- Submission 12 – Cetec Pty Ltd
- Submission 13 – Origin Energy
- Submission 14 – Name Suppressed
- Submission 15 – Flow Systems
- Submission 16 – APA Group
- Submission 17 – Kinesis Pty Ltd
- Submission 18 – Confidential
- Submission 19 – Sydney Airport
- Submission 20 – Australian Energy Market Operator

5.3 Proposed publication orders: public submissions

Resolved on the motion of Mr Bassett, seconded Mr Piper: That the Committee authorise publication of Submissions No 1 – 6, 8 – 13, 15 – 17, 19 – 20 and that the submissions be placed on the Committee's website.

5.4 Proposed publication orders: partially confidential submissions – names suppressed

Resolved on the motion of Mr Bassett, seconded Mr Piper: That the Committee authorise partial publication of Submission No 7 and 14 with the exception of the author's name and other identifying details, which are to remain confidential, and that the redacted submissions be placed on the Committee's website.

5.5 Proposed publication orders: confidential submissions

Resolve on the motion of Mr Bassett, seconded Mr Piper: That Submission No 18 remain confidential.

6. ***

7. ***

8. Next meeting

The Committee adjourned at 11:34am until 4.00pm Thursday 12 September 2013 in the Macquarie Room.

MINUTES OF MEETING 59

Thursday, 12 September 2013
4.04 pm
Macquarie Room, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Dr Lee, Mr Piper, Mr Williams

Officers in attendance

Rachel Simpson, John Miller, Leon Last, Sasha Shevtsova, Jenny Gallagher, Laura Sloane

1. ***

2. ***

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4. ***

5. ***

6. Next meeting

The Committee adjourned at 5.50pm until 9.45am on Thursday, 19 September 2013 in Room 1043.

MINUTES OF MEETING NO 60

Thursday 19 September 2013
9.48am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Dr Lee, Mr Piper

Officers in attendance

Rachel Simpson, John Miller, Leon Last, Sasha Shevtsova, Meike Bowyer, Laura Sloane

1. Apologies

An apology was received from Mr Williams.

2. Confirmation of minutes no. 58 and no. 59 held on 12 September 2013.

Resolved on the motion of Mr Piper, seconded Dr Lee: That draft minutes no.58 and no. 59 held on 12 September 2013 be confirmed.

3. ***

4. ***

5. ***

6. ***

7. Inquiry into cogeneration and trigeneration in NSW

7.1 Submissions received

The Committee noted the following submissions received:

- Submission 21 – Green Building Council of Australia
- Submission 22 – University of Technology, Sydney
- Submission 23 – Dalkia Energy Solutions
- Submission 24 – Denilquin Council
- Submission 25 – Sustainable Business Australia
- Submission 26 – North Sydney Council
- Submission 27 – Lismore City Council
- Submission 28 – Sustain Northern Rivers Energy Working Group
- Submission 29 – TransGrid
- Submission 30 – Macquarie Generation
- Submission 31 – Prendergast Projects Pty Ltd
- Submission 32 – NSW Distribution Network Service Providers – Ausgrid, Endeavour Energy and Essential Energy
- Submission 33 – Jemena Gas Networks (NSW) Ltd
- Submission 34 – Energy Networks Association
- Submission 35 – Property Council of Australia
- Submission 36 – Lake Macquarie City Council
- Submission 37 – Confidential
- Submission 38 – Confidential
- Submission 39 – Energy Efficiency Council
- Submission 40 – Urban Energy Australasia
- Submission 41 – Energy Supply Association of Australia
- Submission 42 – Urban Growth NSW
- Submission 43 – Mirvac

7.2 Proposed publication orders: public submissions

Resolved on the motion of Dr Lee, seconded Mr Piper: That the Committee authorise publication of Submissions Nos 21 – 36, 39 – 42, and that the submissions be placed on the Committee's website.

Resolved on the motion of Dr Lee, seconded Mr Piper: That the submission from the NSW Government is circulated when it is received and that the Committee authorise publication of the submission and its placing on the Committee's website, provided no objections are raised by Committee members.

7.3 Proposed publication orders: confidential submissions

Resolve on the motion of Dr Lee, seconded Mr Piper: That Submissions No 37 and 38 remain confidential.

7.4 Visit of inspection

The Committee agreed to conduct a visit of inspection on 18 October with the details to be finalised at a later date.

7.5 Public Hearing

The Committee agreed to conduct a public hearing on 21 October with the details to be finalised at a later date.

8. ***

9. ***

10. ***

11. Next meeting

The Committee adjourned at 10.21am until 9.45am Thursday, 17 October 2013 in Room 1043.

MINUTES OF MEETING No 61

Thursday 17 October 2013
9.50am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Mr Piper, Mr Williams

Officers in attendance

Bjarne Nordin, John Miller, Leon Last, Meike Bowyer, Laura Sloane, Sarah-Anne Fong

1. Confirmation of minutes no. 60 held on 19 September 2013.

Resolved on the motion of Mr Bassett, seconded Mr Daley: That draft minutes no. 60 held on 19 September 2013 be confirmed.

2. ***

3. ***

4. Inquiry into cogeneration and trigeneration in NSW

4.1 Site Visit

The Committee noted information regarding the Site Visit to 20 Bond Street and 161 Castlereagh Street on Friday 18 October 2013.

4.2 Public Hearing

Resolved on the motion of Mr Williams, seconded by Mr Daley, that the Committee hold a public hearing at Parliament House on Monday 21 October 2013, and that the representatives of the following organisations be invited to appear as witnesses:

- City of Sydney
- Kinesis Pty Ltd
- APA Group and Jemena Gas Networks (NSW) Ltd (appearing together)
- NSW Trade and Investment
- NSW Distribution Network Service Providers, including Ausgrid, Endeavour, and Essential
- NSW Office of Environment and Heritage
- Property Council of Australia
- Energy Efficiency Council

5. ***

6. ***

7. ***

8. Next meeting

The Committee adjourned at 10.18 until 12.30pm Friday, 18 October at 20 Bond Street and 161 Castlereagh Street.

MINUTES OF MEETING 62

Monday, 21 October 2013
9.50 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Piper, Mr Williams

Officers in attendance

Bjarne Nordin, John Miller, Leon Last, Meike Bowyer

1. Apologies

Apologies were received from Mr Daley and Dr Lee.

2. ***

3. Public hearing: Cogeneration and trigeneration in New South Wales

Witnesses, the public and media were admitted. The Chair opened the public hearing and made a brief statement regarding the broadcasting of proceedings and other matters.

The following witnesses from the Office of Environment and Heritage were affirmed and examined:

- Mr Thomas Andrew Grosskopf, Director, Metropolitan Branch, Regional Operations
- Ms Samantha McLean, Senior Team Leader, Commercial Buildings

Evidence concluded. The witnesses withdrew.

The following witness from NSW Distribution Network Service Providers were sworn and examined:

- Ms Pamela Ann Henderson, Chief Engineer, Ausgrid
- Mr Neil Raymond Gordon, Manager, Asset and Network Planning, Ausgrid

Evidence concluded. The witnesses withdrew.

The following witnesses from the City of Sydney were affirmed and examined:

- Mr Allan William Jones, Chief Development Officer, Energy and Climate Change
- Mr Peter Coombes, Senior Program Manager, Green Infrastructure

Evidence concluded. The witnesses withdrew.
The following witness from NSW Trade and Investment was affirmed and examined:

- Mr Andrew Joseph Bruce Lewis, Executive Director, Energy, Department of Resources and Energy

Evidence concluded. The witnesses withdrew.

The following witnesses from the Property Council of Australia were affirmed and examined:

- Mr Glenn Byres, New South Wales Executive Director
- Mr Mendo Kundevski, Neu Consulting

Evidence concluded. The witnesses withdrew.

The following witnesses from the APA Group were affirmed and examined:

- Mr Peter Gayen, Manager Networks Commercial
- Mr Adam Pegg, Head of Environmental Development

The following witnesses from Jemena Gas Networks (NSW) Limited were affirmed and examined:

- Mr Scott Martin, Manager Commercial Operations
- Mr David Musson, General Manager Gas Networks Commercial

Evidence concluded. The witnesses withdrew.

The following witnesses from the Energy Efficiency Council were affirmed and examined:

- Mr Robert William Murray-Leach, Chief Executive Officer
- Mr Robert Douglas Thomson, President

and the following witness from the Energy Efficiency Council was sworn and examined:

- Mr Simon Richard Helps, Vice President

Evidence concluded. The witnesses withdrew.

The Chair closed the hearing. The public and media withdrew.

4. Questions for absent witness

Resolved on the motion of Mr Williams, seconded by Mr Bassett, that the Committee send questions on notice to Kinesis Pty Ltd who were scheduled to appear at the hearing but were unable to attend.

5. Publication orders - Transcript of evidence

Resolved on the motion of Mr Piper, seconded by Mr Bassett, that the Committee authorise the publication of the corrected transcript of evidence given today, and that the transcript be posted on the Committee's website.

6. Answers to questions on notice

Resolved on the motion of Mr Williams, seconded by Mr Bassett, that witnesses be requested to return answers to questions taken on notice during the hearing and supplementary questions within 2 weeks of the date on which the questions are sent to the witness.

7. Documents presented

Resolved on the motion of Mr Williams, seconded by Mr Bassett, that the Committee accept the document entitled *Tariffs for London Power Networks in 2013 - 2014*, which was presented by Mr Allan William Jones, Chief Development Officer, Energy and Climate Change from the City of Sydney during the hearing.

8. Next meeting

The Committee adjourned at 5.25pm until 9.45am on Thursday, 24 October 2013 in Room 1043.

MINUTES OF MEETING 63

Thursday, 24 October 2013
9.49 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Daley, Mr Piper, Mr Williams

Officers in attendance

Bjarne Nordin, John Miller, Clara Hawker, Leon Last, Meike Bowyer, Sarah-Anne Fong

1. Confirmation of minutes no. 61 and 62 held on 17 October and 21 October 2013.

Resolved on the motion of Mr Piper, seconded Mr Williams: That draft minutes nos. 61 and 62 held on 17 October and 21 October 2013 be confirmed.

2. Inquiry into cogeneration and trigeneration in NSW

Resolved on the motion of Mr Williams, seconded by Mr Piper: That the Committee write to the Federal Department of Resources, Energy and Tourism with questions arising from the public hearing regarding disclosures under the Building Energy Efficiencies Disclosures Act.

Resolved on the motion of Mr Williams, seconded by Mr Piper: That the Committee write to the Environment Protection Agency with questions arising from the public hearing regarding emission standards in NSW.

Resolved on the motion of Mr Williams, seconded by Mr Piper: That the Committee write to Treasury and the Department of Health to ascertain any proposed use of cogeneration or trigeneration for Government owned buildings and whether they have produced any economic modelling for such use.

Mr Williams agreed to circulate additional questions to be sent to the Energy Efficiency Council following their appearance at the public hearing.

3. ***

4. ***

5. ***

6. ***

7. Next meeting

The Committee adjourned at 10.20 am until 9.45 am on Thursday, 31 October 2013 in Room 1043.

MINUTES OF MEETING 65

Thursday, 14 November 2013
9.47 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Dr Lee, Mr Piper, Mr Williams.

Officers in attendance

Rachel Simpson, Bjarne Nordin, Clara Hawker, Leon Last, Meike Bowyer, Sarah-Anne Fong

1. Confirmation of minutes no 64 held on 31 October 2013

Resolved on the motion of Mr Williams seconded by Mr Bassett: That draft minutes no. 64 held on 31 October 2013 be confirmed.

2. ***

3. Inquiry into cogeneration and trigeneration in New South Wales

Resolved on the motion of Mr Daley, seconded by Mr Piper: That the Committee, having considered the Chair's previous statements on a potential conflict of interest in the inquiry, are satisfied that based on his declaration there is no requirement for him to stand aside as Chair for the purposes of the inquiry.

Mr Bassett advised the Committee that he holds a small number of shares in a company that may have commercial interest in cogeneration in New South Wales.

4. ***

5. ***

6. ***

7. ***

8. Next meeting

The Committee adjourned at 10.49 am until Thursday, 21 November 2013 at 9.45 in Room 1043.

MINUTES OF MEETING 66

Thursday, 21 November 2013
9.46 am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Dr Lee, Mr Piper, Mr Williams

Officers in attendance

Rachel Simpson, Bjarne Nordin, Clara Hawker, Leon Last, Meike Bowyer, Sarah-Anne Fong

1. Confirmation of minutes no 65 held on 14 November 2013

Resolved on the motion of Mr Williams seconded by Dr Lee: That draft minutes no. 65 held on 14 November 2013 be confirmed.

2. ***

3. Inquiry into cogeneration and trigeneration in New South Wales

3.1 Answers to questions on notice from public hearing on 21 October 2013

The Committee noted that answers to questions on notice had been received from:

- The City of Sydney
- APA Group
- NSW Distribution Network Providers (represented by Ausgrid)
- Office of Environment and Heritage
- NSW Environment Protection Authority

Resolved on the motion of Mr Williams, seconded by Mr Bassett: That the Committee authorise publication of the answers to questions on notice on its website.

4. ***

5. ***

6. ***

7. ***

8. ***

9. Next meeting

The Committee adjourned at 11.06 am until Thursday, 27 February 2014 at 9.45 in Room 1043.

MINUTES OF MEETING 70

Thursday 27 February 2014
9:15am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Dr Lee, Mr Bassett, Mr Daley, Mr Piper, Mr Williams

Officers in attendance

Elaine Schofield, Abigail Groves, Leon Last, Meike Bowyer

1. Confirmation of previous minutes

Confirmation of draft minutes no 67 held on 13 February 2014, no 68 held on 17 February 2014, and no 69 held on 18 February 2014.

Resolved, on the motion of Mr Piper, seconded by Dr Lee: That the minutes of meeting no. 67 held on 13 February be confirmed.

Resolved, on the motion of Mr Bassett: That the minutes of meetings nos. 68, held on 17 February, and 69, held on 18 February, be confirmed.

2. ***

3. ***

4. ***

5. Inquiry into co-generation and trigeneration in New South Wales

The Chair advised that his draft report on polygeneration in New South Wales will be considered at the Committee's meeting on 20 March.

5.1 Answers to further questions received from the Hon Jillian Skinner, Minister for Health and the Minister for Medical Research

Resolved, on the motion of Dr Lee, seconded by Mr Piper: That the correspondence from the Hon Jillian Skinner, Minister for Health, dated 20 February 2014, be published and uploaded onto the Committee's website.

5.2 Answers to further questions received from Lend Lease

Resolved, on the motion of Mr Piper, seconded by Dr Lee: That the answers to further questions received from Mr Andrew Wilson, Managing Director, Lend Lease, dated 29 November 2013, remain confidential as requested by the author.

6. ***

7. ***

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11. ***

12. Next meeting

The meeting adjourned at 10.30am until Thursday, 6 March 2014 at 9.45am in Room 1043.

MINUTES OF MEETING 71

Thursday 6 March 2014
9:45am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Dr Lee, Mr Bassett, Mr Daley, Mr Piper, Mr Williams

Officers in attendance

Abigail Groves, Leon Last, Meike Bowyer

1. Confirmation of previous minutes

Resolved, on the motion of Mr Piper, seconded by Mr Bassett: That the minutes of meeting no. 70 held on 27 February 2014 be confirmed.

2. ***

3. Inquiry into cogeneration and trigeneration in NSW

The Chair provided an update on the progress of his draft report, which will be tabled at the next meeting. The Committee discussed issues relating to network charges for polygeneration providers and provided feedback to the secretariat for inclusion in the report.

4. ***

5. Next meeting

The meeting adjourned at 10.37am until Thursday, 29 March 2014 at 9.45am in Room 1043.

MINUTES OF MEETING 72

Thursday 20 March 2014
9:45am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Dr Lee, Mr Daley, Mr Piper

Officers in attendance

Elaine Schofield, Abigail Groves, Leon Last, Meike Bowyer

1. Apologies

Apologies were received from Mr Bassett and Mr Williams.

2. Confirmation of previous minutes

Resolved, on the motion of Dr Lee, seconded by Mr Piper: That the minutes of meeting no. 71 held on 6 March 2014 be confirmed.

3. ***

4. Inquiry into cogeneration and trigeneration in NSW

4.1 Correspondence

Resolved, on the motion of Mr Daley, seconded by Mr Piper: That the answers to questions provided by Mr Murray-Leach, Chief Executive Officer, Energy Efficiency Council, be published and uploaded to the Committee's website.

4.2 Draft report on Polygeneration in NSW

Resolved, on the motion of Mr Daley, seconded by Dr Lee: That the Chair's draft report as tabled be adopted as the report of the Committee, to be signed by the Chair and presented to the House; that members circulate any proposed amendments to the Committee for their concurrence, and the secretariat be permitted to correct stylistic, typographical and grammatical errors; and that, once tabled, the report be published on the Committee's website.

5. ***

6. Next meeting

The meeting adjourned at 10.02am until Thursday, 29 March 2014 at 9.45am in Room 1043.

DRAFT MINUTES OF MEETING 73

Thursday 27 March 2014
9:45am
Room 1043, Parliament House

Members present

Mr O'Dea (Chair), Mr Bassett, Mr Daley, Mr Piper, Mr Williams

Officers in attendance

Elaine Schofield, Abigail Groves, Meike Bowyer

3. Apologies

An apology was received from Dr Lee.

4. Confirmation of previous minutes

Resolved, on the motion of Mr Piper, seconded by Mr Bassett: That the minutes of meeting no. 72 held on 6 March 2014 be confirmed.

5. Inquiry into cogeneration and trigeneration in NSW

Resolved, on the motion of Mr Bassett, seconded by Mr Piper: That the Committee re-consider its Report on Polygeneration in NSW as adopted at the meeting on 20 March 2014.

Resolved, on the motion of Mr Bassett, seconded by Mr Piper: That the following paragraphs, as previously circulated, be inserted in chapter 6 of the report after paragraph 6.60:

> The Committee notes that the City of Sydney postponed plans to install a polygeneration precinct at Green Square Town Hall due to a number of problems with supplying energy to a precinct in an economically viable manner. The City of Sydney indicated that these problems included the clarification of the NABERS ruling, discussed earlier in this report, the uncertainty of electricity pricing due to changing gas prices and doubt over a carbon price, and the slow pace of the reform process for the National Electricity Market.[332] The City of Sydney has also recommended the introduction of a 'benefit-reflective network tariff' for polygenerators, to reflect the benefits of polygeneration to the network.[333]
>
> The Committee recognises the problems encountered by the City of Sydney in its attempts to establish a large-scale polygeneration precinct at Green Square. However, the Committee questions the amount of work undertaken in this plan by the City of Sydney, and the inherent financial risk, when the modelling was based on incorrect or uncertain factors. For example, reform of the National Electricity Market is a slow process due to the stakeholders involved and there was never a guarantee that a benefit-reflective network tariff would be introduced. The Committee also reiterates its concerns regarding other energy consumers subsidising polygeneration operators should such a tariff be introduced. The Committee considers that, in the current regulatory framework, the City of Sydney has set overly ambitious targets for its precincts.

Resolved, on the motion of Mr Bassett, seconded by Mr Piper: That the Report, as amended, be the Report of the Committee and be tabled in the House.

6. ***

7. ***

8. ***

9. Next meeting

The meeting closed at 10.40am. Next meeting will be on Thursday, 8 May 2014 at 9.45am in Room 1043.

[332] Submission 8, City of Sydney, pp26-27.

[333] Submission 8, City of Sydney, pp32-34.