Australian Gas Networks Limited
L6, 400 King William Street
Adelaide, SA 5000 Australia
PO Box 6468, Halifax Street,
SA 5000 Australia
+61 8 8227 1500
info@australiangasnetworks.com.au
australiangasnetworks.com.au

19 January 2017

Australian Energy Market Commission
PO Box A2449
SYDNEY SOUTH NSW 1235

Via online submission: www.aemc.gov.au

Re: Distribution Market Model Approach Paper (Reference SEA0004)

To Whom It May Concern:

Australian Gas Networks Limited (AGN) is one of Australia's largest natural gas distribution companies. AGN owns approximately 23,000 kilometres of natural gas distribution networks and 1,100 kilometres of transmission pipelines, serving over 1.2 million consumers in Victoria, South Australia, Queensland, New South Wales and the Northern Territory.

AGN welcomes the opportunity to make a submission to the Australian Energy Market Commission (the Commission) regarding its Approach Paper on the Distribution Market Model (the Paper).

In the Paper, the Commission comments that, *"... distributed energy resources have the potential to alter the structure and dynamics of the traditional electricity supply chain*."[1] As such, the Commission has used the Paper in order to set out the scope, context and its proposed approach to investigating how the evolution to a decentralised market for electricity services (at the distribution level), may occur.

We understand that the Commission is seeking feedback on the questions posed throughout the Paper in order to inform the development of its final report (due to be released mid-2017), which will set out a range of possible distribution market design options.

We are encouraged by the Commission's consideration of alternative market designs and in particular, the potential for distributed energy sources in the evolving energy landscape. Continuing to ensure that Australia's energy market is designed in a manner that is sufficiently flexible not to hinder the potential and uptake of new technologies will ensure the ongoing achievement of the National Electricity and Gas Objectives, as will the adoption of a technology neutral policy principle, which will ensure that market forces can determine Australia's future energy mix at least cost to customers.

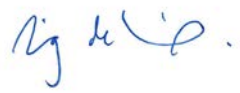
Our submission focuses on the value of adopting technology-neutrality as a policy principle to ensuring efficient market design, and detailing the benefits of this approach to energy customers. More specifically, Appendix A of this submission details our response to Question

[1] Australian Energy Market Commission, '*Distribution Market Model Approach Paper*', December 2016, page i.

6, "*Do stakeholders agree with the Commission's framework and the Commission's principles of good market design? Is there anything that the Commission has missed, or is unnecessary?*"[2]

Please contact either Ashley Muldrew (08 8418 1115) or myself (08 8418 1129) if you would like to discuss the matters raised in this submission further.

Yours sincerely,



Craig de Laine
General Manager – Strategy and Regulation

[2] Australian Energy Market Commission, '*Distribution Market Model Approach Paper*', December 2016, page 20.

Appendix A – Response to Question 6

Question 6: Do stakeholders agree with the Commission's framework and the Commission's principles of good market design? Is there anything that the Commission has missed, or is unnecessary?

Principles of Good Market Design

In the Paper, the Commission lists the following principles of good market design:

1 facilitate effective consumer choice;

2 promote competition where feasible;

3 regulate to safeguard the safe, secure and reliable supply of energy;

4 promote price signals that encourage efficient investment and operational decisions;

5 ensure technological neutrality; and

6 prefer simplicity and transparency.

We support all the principles outlined by the Commission on the basis that these principles are in the long-term interests of customers. We are particularly encouraged by the Commission's consideration of technology neutrality, a principle that we believe should be employed in all market and policy design.

The importance of technology-neutrality is outlined in further detail below. We also note that this principle also ensures consumers continue to have effective choice in energy products and services, as well as promoting ongoing competition and diversity thereby improving the security and reliability of the energy supply in Australia.

The Importance of Technology Neutral Policy

AGN is a strong supporter of technology neutral policy in market design (Principle 5 as listed above) and as such, is encouraged by the Commission's consideration of this principle. The Commission describes this principle as follows:

> *"In a time of rapid technological change, it is particularly important to ensure technology neutrality in market design. Specifying arrangements for a particular technology in the regulatory framework may lock it in, whilst locking out evolving new technologies that might not even have been anticipated when market design was considered. This means that market design should consider what is supplied rather than how it is supplied."*[3]

Further to this, we consider that technology-neutrality as a policy principle in market design is important because:

- it ensures market forces are able to determine the future energy mix, rather than government policy supporting the development of particular technologies; and

[3] Australian Energy Market Commission, '*Distribution Market Model Approach Paper*', December 2016, page 20.

- it enables least cost carbon abatement for energy users as we move toward a low carbon future.

As the Queensland Productivity Commission (QPC) states in its "*Solar Feed-In Tariff Pricing in Queensland*" Issues Paper:

> *"Policy frameworks typically include a principle that policies should be technologically neutral. The idea is that what is important is the quality and price of the service, not the specific platform, technology or approach to delivering the service. The focus is on the long-term interests of consumers and not the industry or the development of a specific technology."*[4]

The Benefits of Gas-Powered Distributed Generation

We also consider that technology neutral policy in market design ensures that the benefits of natural gas powered distributed generation facilities are able to be achieved.

For example, cogeneration systems are a form of gas-powered distributed generation that use natural gas to produce electricity. These systems can provide strong customer benefits by lowering the cost and carbon intensity of electricity. For example, the Oasis Regional Aquatic Centre in Wagga Wagga installed a 229kW cogeneration system, which has reduced its electricity bill by over $20,000 a month whilst also reducing greenhouse gas emissions by 945 tonnes.[5]

In December 2015, Energy Networks Australia (ENA) released a paper called 'Australia's Bright Gas Future' (provided as Attachment A to this submission), in which it commented:

> *"Using gas-fired embedded generation (or micro-turbines), gas can be converted into electricity to run buildings and supply power for electric vehicles at a fraction of the emissions levels of grid sourced electricity."*[6]

Additionally, the generation provided from gas can support the increased installation of renewable energies embedded in electricity networks. In particular, gas-powered generation can provide reliable baseload generation, when generation from renewables (such as wind or solar installations) is low. To this end, the ENA notes that:

> *"The reliability, cost, physical footprint and availability of small scale gas generation systems suggest that these systems can support the integration of other alternative technologies into the electricity grid. Power systems that use cogen, trigen or microgen systems as backup have a number of benefits such as:*
>
> - *Increased reliability of power supply no matter what the weather conditions;*
> - *Efficient heating and cooling options due to capturing or otherwise wasted resources;*
> - *Continuous fuel supply through reticulated infrastructure."*[7]

We also note that using gas to produce electricity in this way can support electricity distribution systems in times of peak demand. This would therefore avoid costly investment in distribution networks required to meet peak electricity demand on only a few days of the

---

4 Queensland Productivity Commission, '*Issues Paper – Solar Feed-In Tariff Pricing in Queensland*', page 12.
5 Energy Networks Australia, '*Australia's Bright Gas Future*', December 2015, page 5.
6 Ibid, page 8.
7 Ibid.

year. As an example, one electricity network operator has indicated that augmentation of their network to cater for peak demand costs approximately $11 billion.[8]

Increased penetration of distributed energy facilities (such as cogeneration systems), facilitated by technology-neutral policy and market design therefore has the potential to reduce gas *and* electricity prices while lowering carbon emissions.

The Cost to Customers of Emissions Reduction

As further evidence of the benefits of technology-neutral policy, AGN (through the ENA) has worked with Jacobs to develop a further understanding of least cost carbon abatement policy options Australia-wide. Although not directly relevant to market design, it is still relevant to understand the potential benefits of technology-neutral policy more broadly, and in particular in relation to the achievement of emissions reduction in a manner that is consistent with the long term interests of customers.

Jacobs' findings indicate that a technology-neutral policy would achieve lower cost carbon abatement than the current policy mix. As such, AGN considers that the most effective and efficient path to lower carbon emissions in Australia is to ensure a technology-neutral approach to policy-setting.

Jacobs conducted analysis to understand the least cost abatement path for Australia under three policy scenarios:

- '*Business as usual'* - a continuation of the diverse range of various State and Federal abatement initiatives (which frequently prescribe specific technologies or scale, such as solar feed-in-tariffs);
- '*Level playing field'* - replacing current initiatives with technology-neutral programs focused on the outcome of lower emissions; and
- '*Alternative level playing field'* - current policies are replaced with a carbon equivalent mechanism.

Importantly, Jacobs found that more cost-effective abatement outcomes can be achieved through technology-neutral policy (i.e. the 'level playing field' option), rather than technology-specific abatement programs that seek to encourage the up-take of renewable energies (i.e. 'business as usual'), for example.

Additionally, Jacobs developed forecasts of the typical residential bill under each of these three scenarios and found the following:

> *"Jacobs' analysis shows a typical residential electricity bill in 2030 would be lower under a 45% target scenario with a Level Playing Field, than under the smaller 26-28% abatement target with our current, inefficient policy mix".*[9]

Summary

We are pleased that the Commission is intending to ensure technology-neutrality is a key policy principle that will be considered in the investigation and development of alternative distribution market designs.

---

8 Energy Networks Australia, '*Australia's Bright Gas Future'*, December 2015, page 8.
9 Energy Networks Australia, '*Media Release: Technology neutral policies will deliver lower bills'*, 10 March 2016, page 1.

As the Commission acknowledges, there are significant benefits of adopting this approach to market design, such as ensuring that market forces are able to determine the future energy mix as well as enabling the uptake of new technologies which may not have been anticipated at the time market design was being considered.

We also consider that technology-neutrality as a principle in market design will ensure that the potential benefits of gas powered distributed generation will be optimised, whereas a technology-neutral approach to carbon abatement policies will ensure that emissions reduction occurs at least cost to customers.

In all instances, a technology-neutral approach will ensure consistency with the long-term interests of customers, as well as both the National Electricity and Gas Objectives.

APGA
Australian Pipelines & Gas Association

appea
the voice of australia's oil and gas industry

ena
energy networks association

AUSTRALIA'S BRIGHT GAS FUTURE

COMPETITIVE, CLEAN AND RELIABLE

DECEMBER 2015

AUSTRALIA'S BRIGHT GAS FUTURE

Australia's energy consumers have a bright future with gas.

Australia's gas industry continues to deliver low-emissions energy to Australians providing energy security and convenience at a competitive price.

Gas is a low cost, low carbon and convenient fuel of choice for Australian consumers when it comes to cooking, hot water and winter heating. Gas fired appliances are proven contributors to reducing greenhouse gas emissions and are efficient and responsive.

More than 100,000 km of gas pipelines around Australia meet the needs of 4.5 million customers with exceptional reliability. The domestic gas sector was estimated to contribute almost $3 billion to GDP in 2013.

The price of delivered gas is lower than electricity on an equivalent energy basis in every Australian state. This price includes exploration and production costs, transmission costs, network charges and retailer fees. In many States and Territories, gas network charges are stable or falling.

Natural gas from a distribution network delivers energy which is one-quarter to one-sixth of the carbon intensity of mains electricity. Gas is today's low carbon option for cooking and heating. For households who take up solar to reduce emissions, gas also provides a low carbon solution when the sun is not shining and allows solar panel output to export to the grid when it is. Combining solar PV and gas appliances is the most practical and cost-effective way to achieve lowest carbon emissions.

For Australian businesses and industry, innovative uses of gas are lowering input costs and emissions intensity, with uses ranging from gas powered air conditioning, onsite power generation and space heating, to steam production and feedstock for manufacturing. In many cases, gas is an essential input to a manufacturing industry that employs almost one million Australians.

Australia has an abundance of natural gas, and this domestic fuel position plus the independence of the gas network from the electricity network makes a key contribution to our energy security. For electricity generation, gas is the only flexible fuel that can support renewable generation sources to deliver a stable, reliable, low emissions generation mix. Solar PV and gas is the lowest carbon combination.

GAS FOR HOUSEHOLDS

Gas continues to be a competitive, efficient and low emission energy source for Australian customers. Gas is a smart choice, providing instant warmth, chef-standard cooking appliances and a better lifestyle inside and outdoors.

WARM HOMES, LOW BILLS

Consumers consider a range of factors in their energy choices, including cost-effectiveness, their home and appliances, environmental performance and the lifestyle they enjoy. For example, gas heaters perform effectively at low temperatures to provide whole of house comfort, unlike electric reverse cycle air conditioners.

Gas remains price competitive and is delivered to Australian homes at a cost which can be up to 80% lower than mains electricity on an equivalent energy basis. The cost of gas to a customer reflects wholesale, network and retail costs. There have been increases to the wholesale cost of gas on the East Coast which reflects a combination of regulatory restrictions on gas production, increases in production costs and linkages to international markets. Many of the new sources of gas would have been uneconomic to develop without access to these international markets. Nevertheless, the wholesale cost only represents about 20 to 25 % of the total costs to typical residential customers.

A customer's gas bill will be more heavily influenced by network costs, which contribute around half of the average residential bill. Australian network operators are working hard to reduce network charges.

In New South Wales over the next five years, Jemena's network customers will see an average saving of $118 per year due to a 34% reduction in network charges.

In South Australia, Australian Gas Networks recently proposed an 11% reduction in residential network charges in 2016 equivalent to a $46 saving on the annual bill.

Customers of Ausnet Services in Victoria experienced a fall in network costs of 17% in 2013 and a further 6% in 2014 whilst customers served by Multinet Gas benefited from a 13% saving in network costs in 2013.

Gas customers can also save money by shopping around for the best retail offer and many retailers offer incentives for 'bundling' services. For example changing from a Standing Offer to a Market Offer could save a gas customer in NSW $212 per year, depending on the zone. Victorian customers could save between $162 and $285 per year and South Australian customers could save between $86 and $196 per year[1].

As a result of stable or falling distribution network costs and increased retail competition, the outlook for residential gas prices remains competitive, even with rising wholesale prices.

CHEAP, CLIMATE-FRIENDLY HOT WATER

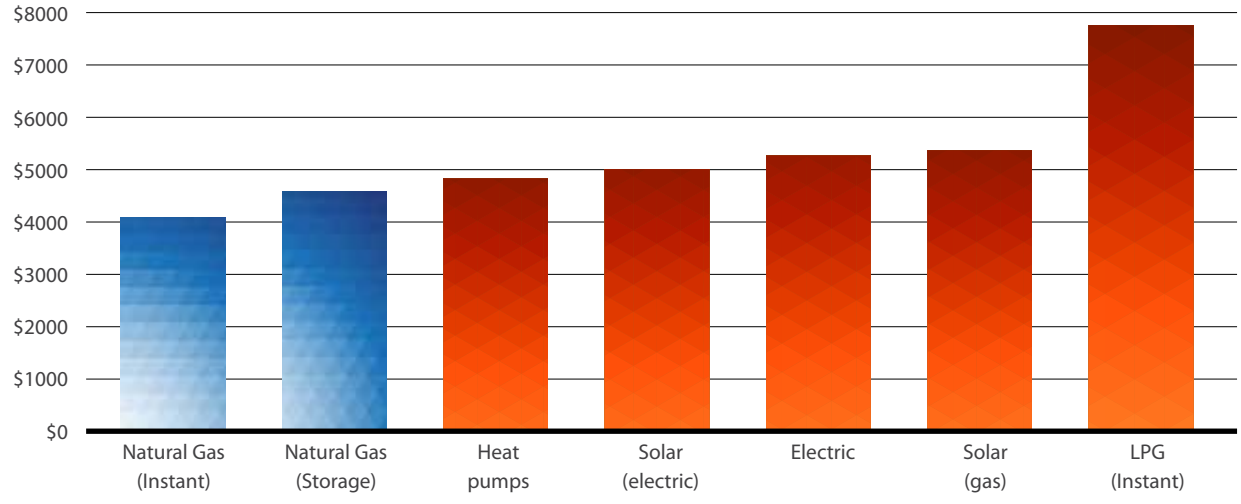
Natural gas can deliver a hot water system that never goes cold, is one of the lowest cost options on the market and which has greenhouse gas emissions equivalent to a solar hot water system.

Gas hot water heaters deliver instantaneous supply with up to 83% less emissions than an electric resistance water heater – an abatement outcome which is on par with electric-boosted solar hot water systems.[2] Approximately half of Australian households are still using emission intensive electric resistance systems which can produce up to six times the greenhouse gas of low emission alternatives.

As highlighted in Figure 1 below, gas hot water systems can achieve the lowest lifecycle costs of any water heating system.[3]

Oh… and an instantaneous gas hot water system never runs out.

FIGURE 1. Comparison of water heating lifecycle costs



1 Pages 49 (NSW), 52 (Vic) and 56 (SA), Annual report on the performance of the retail energy market, Australian Energy Regulator, 2014.
2 ENA Response to RET Review, May 2014, Table 1, page 2.
3 CORE Energy Group (2014) ENA: Gas Network Study, p.6

CONTROL FOR THE CHEF AT HOME

Cooking with natural gas remains the choice of professional chefs because it is easy, clean, quick and economical. Cooking on natural gas is preferred because its heat is instant and visible, providing complete control from entrée to dessert.

Gas appliances offer varying burner combinations to suit your cooking style; simmer burners for extra control; multi-functional wok burners for complete control and versatility; and fish burners that can double as an indoor BBQ.

Cooking on electricity in Australia is cooking on coal. Even with the use of PV, you are likely to be using grid electricity at night to cook and this is mainly supplied from coal. Why do that when you can cook on gas?

WHAT'S NEXT ?

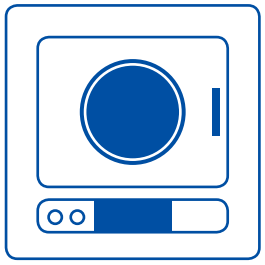
Australians are enjoying innovative new uses for household gas appliances

GAS REVERSE CYCLE AIR CONDITIONING

For the larger homes, ducted gas reverse cycle air conditioning is now an option. This is even lower emissions and running cost than electric air conditioning and performs better at low temperatures. If you need to manage your peak electricity demand, gas fired air conditioning is a great option.

GAS DRYERS[4]

Comparisons show that that the 54% of Victorians who have clothes dryers will add $123 a year to their electricity bill to run a large electric dryer 1.5 times a week. For the same load, gas dryers are more efficient and will save a customer $87 annually whilst reducing drying times and greenhouse gas emissions.



GAS BARBEQUES AND PATIO HEATERS[5]

Natural gas barbeques and patio heaters allow warm outdoor entertaining all year round. A networked natural gas patio heater provides substantial warmth, requires no lifting of heavy cylinders and can save you money. Networked natural gas costs about one quarter to one-third of the cost of LPG cylinders, without the inconvenience or transport emissions of refueling.

GAS MICRO GENERATION

Gas microgenerators are being developed in Europe, North America and Asia to assist balancing residential electricity demand. These can provide hot water and cooling as useful by-products, and being onsite, gas-fired micro generation can help to avoid electricity losses and lower carbon emissions.

4 *Washer and Dryers*, Sustainability Victoria, April 2014
5 natural-gas.com.au - Natural Gas your questions answered, p.2

GAS FOR BUSINESS AND INDUSTRY

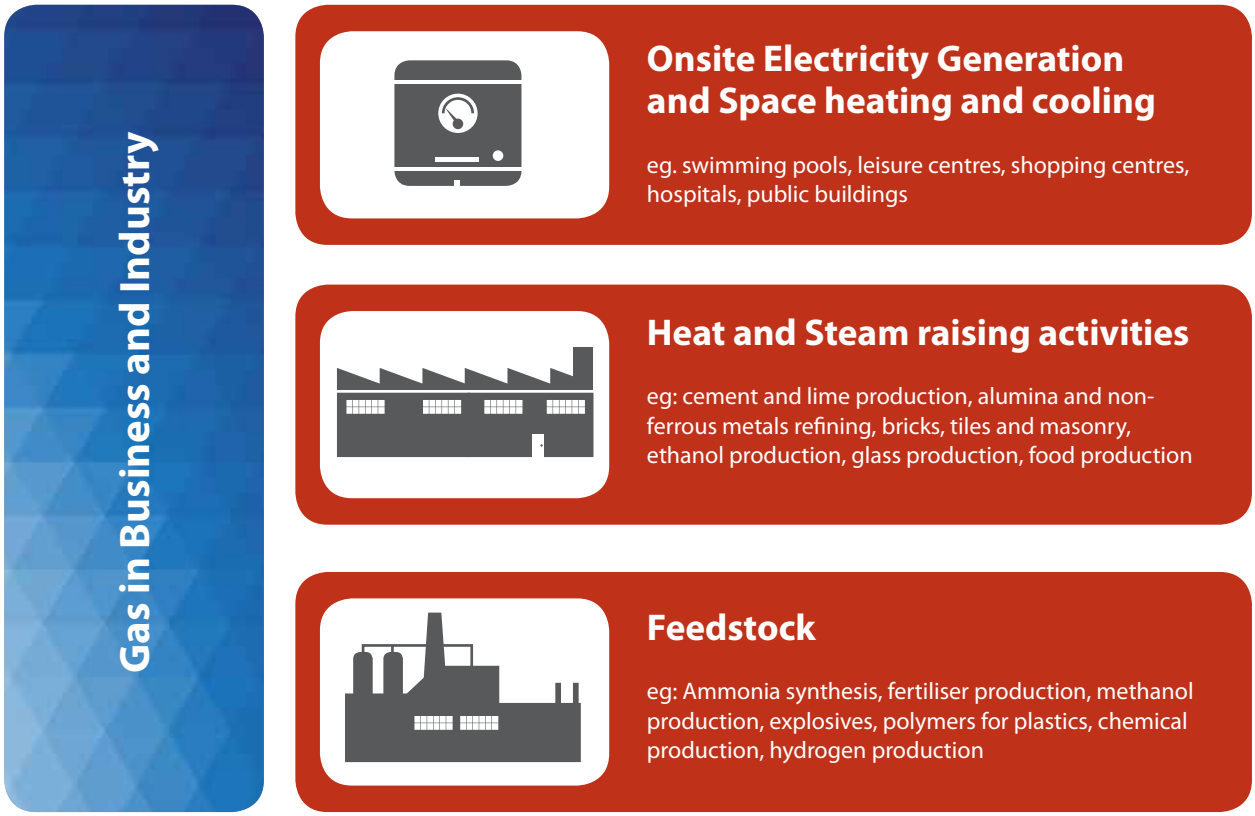
FUELLING ECONOMIC GROWTH

Australia's 12 distribution gas networks provide approximately 133,000 commercial and industrial customers with an essential input to growth, job creation and environmental performance. A quarter of Australia's energy used comes from gas. The domestic gas sector was estimated to contribute almost $3 billion to value added GDP in 2013[6].

Natural gas is widely used in commercial premises as an efficient source of heating and cooling. Gas is increasingly used in combined heat and power (CHP) applications - including cogeneration (heat and power) and trigeneration (heat, power and cooling) - which efficiently utilise the waste heat produced in generating energy in order to fuel other processes.

As summarised in the figure below[7], gas is also a critical input to industrial operations including the manufacturing sector which employs about one million Australians. It is commonly used to generate electricity, heat and steam for production including alumina refining, food manufacturing, beverage and grocery production. Gas is irreplaceable in the production of most fertilisers, cleaners, polymers and refrigerants, making it a crucial feedstock for industry.[8]

Significant innovation in gas uses and technology are driving efficiency, economic growth and lower greenhouse gas intensity in industrial production. For instance, natural gas desiccant systems used for dehumidification provide major benefits to plastics, pharmaceutical and recycling industries. Infrared heating units are using natural gas to improve heat processes in the metals industry and direct contact water heaters have achieved exceptional improvements in energy efficiency for industries relying on hot water. Case studies in gas-powered airconditioning, cogeneration and gas-vehicle fleets are also discussed on the next page.



6 CORE Energy Group, ibid, p. 69.
7 Based on Eastern Australian Domestic Gas Study 2020, section 3.
8 Deloitte Access Economics (2015) Gas market transformations– Economic consequences for the manufacturing sector

GAS POWERED AIR CONDITIONING

Gas Powered Air Conditioning (GPAC) systems have a number of advantages over electric alternatives including benefits such as significant savings in cooling costs.

GPAC is used in Australia by a number of commercial and industrial operations including offices and educational facilities. GPAC units are suitable for hospitals, warehouses and apartment complexes. Owners of very large houses or small businesses with a cooling load of over 14 kW may also benefit.

GPACs can also reduce pressure on electricity peak demand (which can reduce electricity network augmentation costs) and reduce greenhouse gas emissions by up to 50%. These benefits also provide opportunities to improve ratings under NABERS (National Australian Built Environment Rating System) and green star ratings improving property value and rental returns. Some networks provide incentives to commercial operators that install GPAC systems and customers may be able to apply for incentives under State or Australian Government emissions reductions schemes.

CASE STUDY: GPAC

The ATCO Gas site in Jandakot, WA utilises clean, reliable and safe natural gas for cooling through Gas Powered Air Conditioning. The building uses four, 85kW gas powered air conditioning units to cool a total of 3,127 m^2. Using GPAC has saved the business 40% on the running cost of an equivalent electricity system. It has improved environmental performance also, adding an extra star under the Green Star building rating scheme.

GAS FOR CO-GEN AND TRI-GEN

Cogeneration (Cogen) systems use natural gas to create electricity. The waste heat is used to heat air or water. Trigeneration (or Trigen) systems increase energy efficiency further by using waste heat for heating and cooling.

Cogen and trigen units can supply inexpensive electricity, heating and cooling to aquatic centers, clubs, hospitals, hotels, universities, supermarkets, shopping centers, nursing homes, commercial buildings and mixed-use commercial and residential apartments.

They can also be used in industrial sites such as plasterboard factories and brickworks, breweries and the manufacture of confectionery and cereal.

CASE STUDY: Co-Generation[9]

A year after the installation of a 229kW Cogeneration System at the Oasis Regional Aquatic Centre in Wagga Wagga NSW, the Centre has reduced its electricity bill by over $20, 000 a month and its greenhouse gas emissions by 945 tonnes.

The Cogeneration System is fuelled by Natural Gas but supplements the existing gas fired hot water boilers. With the total investment of the system including installation of $373,636 and factoring in maintenance costs, an estimated payback of just over 2 years has been achieved.

GAS-FUELLED VEHICLES

Globally, there are already over 16 million natural gas vehicles, a number which has grown tenfold since 2000. As per the Table (below), Australian commercial fleet operators can achieve short term payback periods by investing in gas vehicles. Natural gas as a transport fuel delivers a range of other benefits including: reduced CO_2 emissions, reduced air pollution, increased safety and increased energy security. Natural gas is already used in buses in many Australian capital cities and provides a good low-emission alternative for long range haulage.

TABLE1. Payback periods based on 40c/litre/equivalent price spread between CNG, NGV and petrol/diesel. Figures include fuel excise.[10]

	Km/yr	Fuel use l/yr	CNG premium	Annual saving	Payback period years
Car 2.5l	30000	3000	$4,500	$1,200	3.75
	60000	6000	$4,500	$2,400	2.5
Taxi	150000	20000	$4,500	$6,000	0.75
Light duty van	30000	3600	$7,000	$1,440	4.86
	75000	9000	$7,000	$3,600	1.94
Light duty truck	30000	7500	$13,000	$3,000	4.33
	75000	18750	$13,000	$7,500	1.73
Medium duty truck	30000	9000	$18,000	$3,600	5
	75000	22,500	$18,000	$9,000	2

9 http://simonsgreenenergy.com.au/news-events
10 Envirotrans Australia (2015): Report to the Energy Networks Association

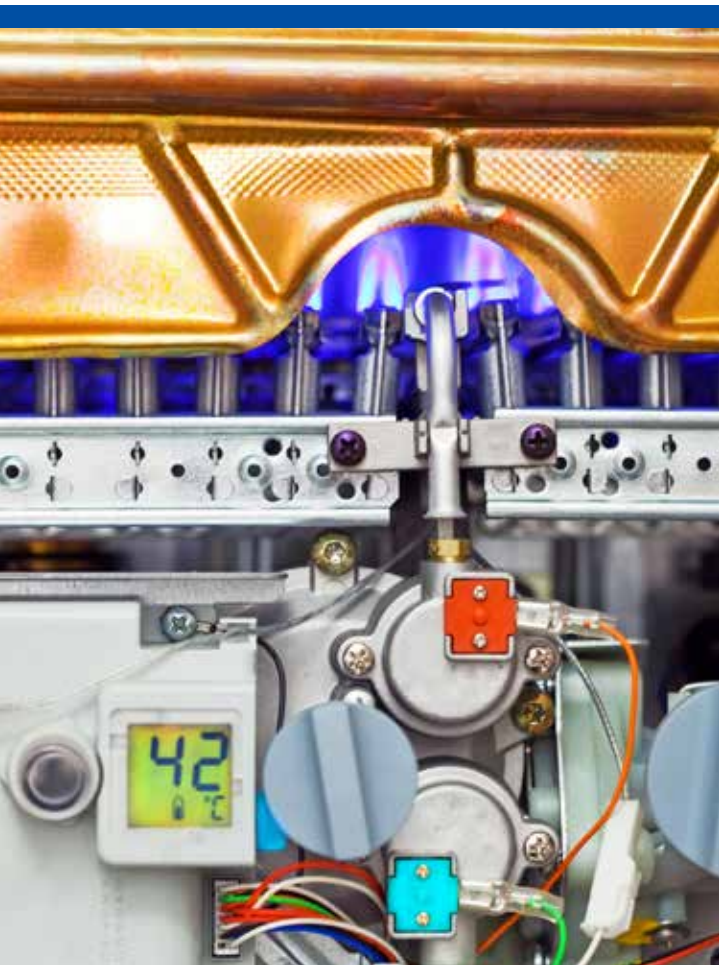
GAS FOR OUR ENERGY FUTURE

OUR CLEAN ENERGY TRANSITION

Australian gas is allowing many other countries achieve environmental improvements while providing energy to their communities.

Natural gas offers a number of environmental benefits over other energy sources. It is the least carbon intensive fossil fuel and creates less particulates and other air pollution.

Natural gas from a distribution network delivers energy which is one-quarter to one-sixth of the emission intensity delivered from mains electricity.[11] Despite significant investment in alternative technologies, the emissions intensity of the domestic electricity supply was 4.3% higher in the year to June 2015 than in the previous year[12]. This is due to a reduction in output from low emission, gas-fired power stations and an increased share of power coming from coal fired power stations.



For households that have adopted solar energy to reduce their emissions, gas also plays an important role when the sun is not shining. Without gas fired generation in the Australian electricity system and a gas connection for cooking, Australian solar homes will generally be "cooking on coal", because of the use of coal baseload power generation.

CASE STUDY: Integrating With Renewables

The intermittent nature of renewable sources needs to be balanced by power generation systems that are able to rapidly adapt to differing energy supply requirements. Gas power generation is the only technology to offer the rapid response required to work with intermittent renewable energy generation.

Gas can provide a cleaner more easily adjustable source of power than coal to support the growth of alternative power sources. For example, Florida Power and Light's Martin Next Generation Clean Energy Center has generated low emissions electricity since 2010 using solar energy during the day and natural gas at night. Distributed natural gas, along with rooftop solar is part of Australia's long-term, low emission future.

LOW EMISSION APPLIANCES

Gas appliances are proven contributors to reducing Australia's greenhouse emissions. In its 2014 report on progress of emissions reduction, the Climate Change Authority reported that:

> ***The most significant contributor to emissions reductions in the residential sector between 1990 and 2012 was gas heating. Gas replaced emissions-intensive electric heating as the gas network expanded.***[13]

Gas appliances provide a great opportunity for households to introduce highly efficient and cost competitive comfort for their homes.

11 Page 13 and 9, National Greenhouse Account Factors, Department of Environment, December 2014.
12 Carbon emissions index (Cedex®) Update by pitt&sherry, July 2015.
13 Chapter 6, Reducing Australia's Greenhouse Gas Emissions: Targets and Progress Review—Final Report, Australian Government Climate Change Authority, 2012

RENEWABLE GAS

Biogas is a naturally occurring gas that is produced from the decomposition of organic material. It is composed mostly of methane and has similar characteristics to natural gas. This gas is a renewable energy source as it is created from biomass and can be captured and burnt for power generation.

Using biogas to generate heat and power doubles the emissions abatement effect from biogas as the methane is converted to carbon dioxide and the energy delivered displaces other less clean energy sources.

CASE STUDY: Biogas

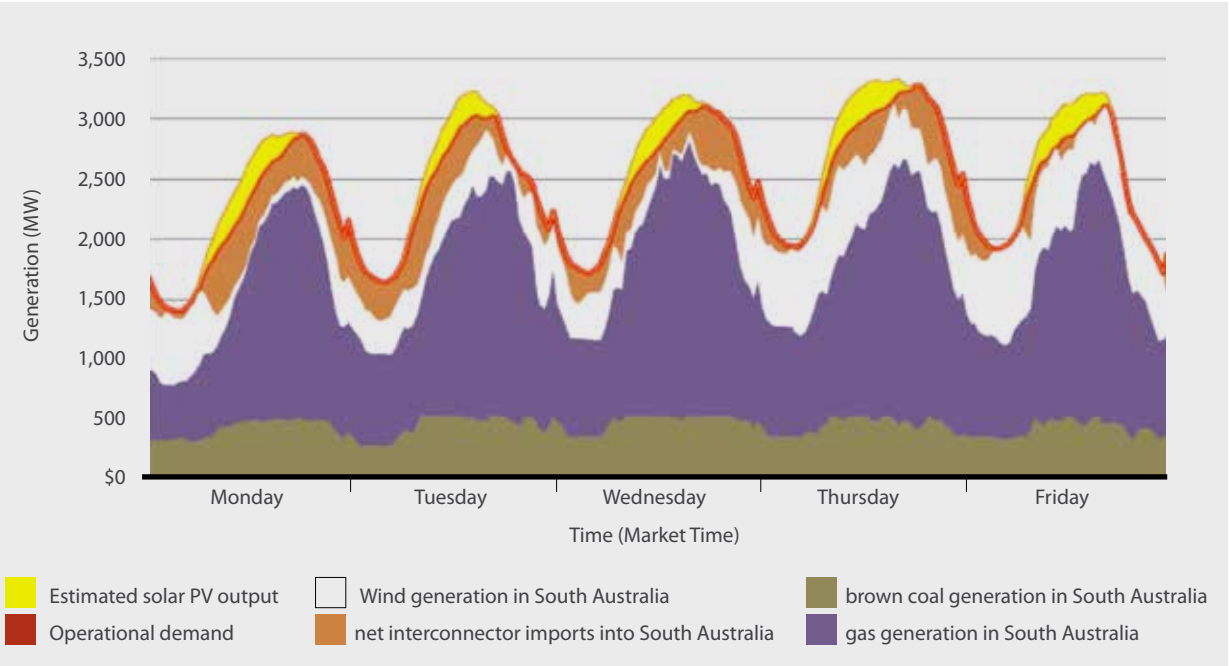
The use of biogas is a significant element to the City of Sydney's Decentralised Energy Master Plan 2012-2030. The plan includes the use of biogas with the aim of powering trigeneration units and providing gas to residential users. Significant efforts have been made to produce and collect biogas from organic waste through landfill gas recovery and the design of a special bioreactor near Goulburn, NSW to collect organic waste diverted from Sydney and convert that into biogas.

LARGE-SCALE LOW CARBON GENERATION

Gas-fired electricity generation provides essential support to the modern electricity grid. Australia's energy system is changing rapidly and incorporating significant amounts of renewable energy including large scale and distributed generation. Gas-fired generation and gas home appliances play a vital enabling role in the low carbon energy future –supporting intermittent sources of supply and supporting energy needs when solar output is low.

The ability of gas fired power stations to support fluctuating supply from renewables and demand from consumers has been demonstrated in events such as the January 2014 heat wave in southern Australia, where only gas-fired generation provided the essential, flexible response to keep the lights on. The purple band in Figure 3 indicates the contribution of gas fired power to peak electricity demand for South Australia in the January 2014 heat wave event. Analysis indicates that South Australian peak demand doubled from 2013 levels to meet these peaks with gas fired electricity generation providing 91% of the extra energy required[14].

FIGURE 3. Contribution to electricity demand January 2014 heat wave in South Australia[15]



14 Gas steps up to meet heat wave power demand, Energy Quest, 20 January 2014

DISTRIBUTED GENERATION

Gas-fired electricity generation has a role to play in reducing emissions at a small scale as distributed energy resources. Using gas-fired embedded generation (or micro-turbines), gas can be converted into electricity to run buildings and supply power for electric vehicles at a fraction of the emissions levels of grid sourced electricity.

In a study in 2014, UBS stated that:

> ***In a decentralised electricity system, power generated by small and flexible units will be a pre-requisite.*** [16]

The reliability, cost, physical footprint and availability of small scale gas generation systems suggest that these systems can support the integration of other alternative technologies into the electricity grid. Power systems that use cogen, trigen or microgen systems as backup have a number of benefits such as:

- Increased reliability of power supply no matter what the weather conditions;
- Efficient heating and cooling options due to capturing of otherwise wasted resources;
- Continuous fuel supply through reticulated infrastructure.

GAS AND ELECTRICITY WORKING TOGETHER

Australia's network of natural gas infrastructure complements the electricity network and also assists in mitigating peak electricity demand, the primary driver of long-term electricity network costs. It has been estimated that infrastructure required for peak electricity demand is used for the equivalent of four or five days a year[17] with one network operator alone indicating that augmentation for peak demand costs $11 billion.

Australia's significant gas resources, pipeline infrastructure and distribution networks operate together as a significant source of alternative energy to Australian homes and businesses, supporting electricity supplies particularly at peak times. Our gas supply industry operates in tandem with the electricity system and provides energy for water heating, cooking and space heating to 4.3 million homes and 133,000 commercial businesses. Natural gas is used to generate 20% of Australia's electricity.

Heating or cooling using gas provides a viable and cost effective alternative to augmenting the electricity grid. For example, although gas networks only cover part of the State, NSW residents get more than 20% of their winter energy needs from gas networks. Without gas networks, the electricity network in NSW would be required to provide this amount of extra energy and expensive infrastructure upgrades would be required.

The use of air conditioners for cooling contributes to peak electricity use in summer. Using a five kilowatt air conditioner at peak times can create around $1000 a year in additional electricity network costs. It has been estimated that adding one 2 kilowatt air conditioner costs the entire power supply system $7,000.[18] Gas powered air conditioning can reduce this impact.

Gas networks safely and reliably deliver an important source of energy to around half of Australian households. Gas is delivered straight from production centres via a pipeline network which is predominantly underground and rarely affected by natural disasters such as bushfires, floods or high winds.

15 AEMO Heat Wave 13 - 17 January 2014, p.7
16 Page 37, Will solar, batteries and electric cars re-shape the electricity system? UBS August 2014
17 Electricity prices and network costs, ENA, 2014
18 Page 184, Energy White Paper, Australian Government, 2012

AUSTRALIAN PETROLEUM PRODUCTION & EXPLORATION ASSOCIATION

WWW.APPEA.COM.AU

AUSTRALIAN PIPELINES AND GAS ASSOCIATION

WWW.APGA.ORG.AU

ENERGY NETWORKS ASSOCIATION

WWW.ENA.ASN.AU/GAS-NETWORKS