



Dr Alan Finkel AO
Chair
Independent Review into the Future Security of the NEM
By email: NEMSecurityReview@environment.gov.au

3 March 2017

Dear Dr Alan Finkel AO,

AGL submission on Independent Review into the Future Security of the National Electricity Market Preliminary Report

AGL Energy (**AGL**) welcomes the opportunity to make a submission in relation to the *Independent Review into the Future Security of the National Electricity Market Preliminary Report*.

AGL is one of Australia's largest integrated energy companies and the largest ASX listed owner, operator and developer of renewable generation. Our diverse power generation portfolio includes base, peaking and intermediate generation plants, spread across traditional thermal generation and renewable sources. AGL is also a significant retailer of energy, providing energy solutions to over 3.7 million customer accounts throughout eastern Australia. In 2015, AGL established a New Energy Services division, with a dedicated focus on distributed energy services and solutions.

Electricity generation accounts for approximately one third of Australia's Greenhouse Gas (**GHG**) emissions inventory and represents the single largest source of domestic emissions. The electricity sector has an important role to play in meeting Australia's emission reduction targets (and its longer term commitments under the Paris agreement) because technological substitutes to electricity generation from fossil fuels are currently available and relatively cost effective. Furthermore, the electricity generation sector can also be viewed as an enabler of emission reduction in other sectors, notably transport where electrification, powered by renewable energy, facilitates emission reduction beyond the initial sector.

However, the piecemeal introduction of carbon reduction and renewables policies has produced unintended consequences for wholesale energy markets, most apparent in South Australia which has been disproportionately impacted due to its superior wind resource attracting a large share of renewables investment. It is critical that policy makers discuss how better to integrate wholesale market design with climate change policy to ensure ageing 'firm' power plants are replaced with new, low-emissions generation and complementary infrastructure. The decarbonisation and modernisation of the electricity sector will span several decades, and a long-term vision and trajectory for this transition is essential.

End-users are also playing an important role in the energy market transformation, driving a shift away from the traditional linear electricity supply chain, to a more decentralised and bi-directional market. Since 2008, the cost of installing household solar PV has declined by around 80% and around one in four residential properties is now operating its own generation in many Australian jurisdictions. In addition to solar PV, a proliferation of more advanced 'distributed energy resources' or '**DER**' (digital metering, smart inverters, energy storage, energy management systems, household appliance with smart controls etc.) are now entering the consumer market. These distributed technologies offer new opportunities for customers more actively manage their energy use and to share in value beyond the home – whether by 'sharing' energy with peers or participating in programs which support the operation of the network or the wholesale market.

These developments are fundamentally changing the way in which consumers interact with the electricity grid, and affecting grid utilisation. Thus attention must also be paid to reforms that will ensure: consumer investment in DER is efficient; ongoing network tariffs are sustainable; and that regulatory and market frameworks facilitate (rather than inhibit) the emergence of new products and service markets that build on new distributed technology capabilities in ways that respond to customer preferences.

In order for the energy market transition to effectively respond to the competing policy objectives, which it must deliver concurrently (reliable and secure electricity supply, delivered at an affordable price, with increased integration of renewable energy capacity), AGL believes actions in three key areas are critical:

1. Supporting investment certainty in a carbon constrained future

Orderly closure - An expanded renewable energy future must be complemented with regulation which drives the progressive (and well telegraphed ahead of time) closure of older, emissions-intensive power stations or retrofitting with carbon capture and storage (**CCS**) technology (as has been implemented in Canada). For example, an age-based closure rule requiring that within 50 years of commencing operation, coal plants must either close, or invest in becoming carbon-neutral, would allow a transparent and orderly exit of the legacy coal generation fleet.

Emissions intensity trading scheme – The inclusion of carbon intensity into the wholesale price is a cost-effective way to support low-cost abatement at all operating fossil fuel plants. It will shift operational (short term) decisions to capture the most cost-effective abatement opportunities across the National Electricity Market (**NEM**). However, it is also clear that until a carbon price becomes very high it is unlikely to influence capital investment decisions. Hence the need to complement it with a closure rule and a third policy piece, stapling firm dispatchable capacity to new renewable generation (discussed below).

National Carbon Budget- A long term, national carbon budget for Australia that extends to 2050 is required to underpin climate policy. This would allow businesses some insight into the suitability of investments with long lifespans. A budget of emissions between today and 2050 would need to be derived from a global carbon budget.

2. Supporting the integration of increasing levels of variable renewable generation

Making renewable energy beyond the RET dispatchable – To ensure additional renewable generation beyond the current Renewable Energy Target (**RET**) does not impact system security, policy makers may consider adding a requirement for dispatchability to new intermittent generation. Given an energy-only market, the total cost of renewables subsidies will be greater if they are constructed with no reference to their impact on system security. A system whereby renewable generators partner, through direct or indirect means, with complementary 'firm' capacity (such as open-cycle gas turbines, pumped hydro or advanced batteries) has the potential to address such concerns.

Gas fired generation mix – AGL considers that gas-fired generation has a key role to play as the sector transitions away from a supply mix dominated by baseload coal fired capacity. It is critical therefore to lift the gas moratoria, address gas market settings and reform access to gas pipeline capacity.

Ancillary services – Ancillary services markets must be redesigned and expanded to underpin reliability where appropriate.

3. Protecting customers through the transition

Sustainable and efficient network tariffs – Care in the design of network cost-recovery and pricing frameworks is key to driving efficient network utilisation, efficient adoption of distributed energy technologies and mitigating potential equity issues that arise where those without the ability to adopt distributed generation technologies are left to bear a disproportionate share of remaining network costs. Distribution businesses are currently introducing more cost reflective network tariffs to support the achievement of these outcomes. However, with overall declining grid utilisation and spare capacity in many networks, there is a question as to whether the policy intent behind the introduction of cost-reflective pricing can be achieved without a clear policy on the treatment of the existing regulated asset base.

Removing barriers to participation – The price, product and service benefits that flow to customers from competitive markets are predicated on the ability of customers to participate effectively in those markets. Thus attention should be paid to policy reforms that remove

barriers to participation, including reviewing the impact of home tenure on access to products and services, tenancy law reform and improving community outreach to vulnerable parts of the community.

Technology standards – Where possible, technology standards applied in Australia should be based on international standards to avoid unnecessary overheads, promote customer choice and competition, and encourage economies of scale. There is an immediate need to place high priority on battery safety, specifically to adopt international safety standards and ban the import of products that do not comply with these standards (IEC62619) – establishing a clear liability regime on importers, vendors and installers for faulty or dangerous product.

Appropriate energy market governance is critical in delivering on these objectives and actions. AGL is keen to ensure that governance and regulatory frameworks continue to be positioned to deliver benefits to energy users into the future, within the context of evolving technology and community expectations. AGL believes that the COAG Energy Council has a primary role in driving energy policy in Australia. There are opportunities to improve the Council's strategic focus and prioritisation of issues, and to build a common purpose amongst the different jurisdictions. Further, empowering different jurisdictions to take the lead on driving national reform through the Council on different issues may help to improve the implementation of agreed national reforms across all jurisdictions, and would reduce the duplication of work between States and ensure national consistency.

Closing remarks

Please refer to the attachment for further details. Should you have any questions or comments, please contact Stephanie Bashir on (03) 8633 6836.

Yours sincerely,



Dr Tim Nelson

Chief Economist, AGL Energy

ATTACHMENT

1. TECHNOLOGY IS TRANSFORMING OUR ENERGY INDUSTRY

AGL agrees with the Review Panel that new technologies present both opportunities and challenges for the management of the electricity system. The trajectory of technology innovations, cost movements and deployment cannot be predicted with certainty, and will be influenced by changing customer preferences and other external factors such as government policy in specific areas (e.g. carbon reduction, tariff reform). Although technical characteristics are known, it is often only when deployment reaches scale, that the full extent of system impacts become apparent.

In AGL's view, effectively managing uncertain system impacts of new technologies (and maximising their efficient deployment) requires commitment to several principles including:

- where feasible, using **competitive markets** to deliver and value energy services;
- establishing policy, regulatory and market frameworks that are **technology neutral**;
- establishing **appropriate technology standards** that do not contradict broader policy objectives and are based, where possible, on international standards to avoid unnecessary overheads, promote customer choice, support competition and encourage economies of scale;
- utilising **price signals** to encourage efficient investment and operational decisions;
- **allocating risks** to parties that are best able to manage them;
- introducing **regulation only where necessary to address a market failure**, including to ensure system safety, security and reliability.

Keeping these principles as a guidepost improves the predictability of modifications to existing regulatory and market frameworks when it becomes evident they are required. Open competitive markets and technology neutrality provide firms the impetus and latitude to pursue technology and service delivery innovations that meet system needs at efficient cost. We are already seeing evidence that holding to these principles promotes opportunities for addressing system impacts emerging from one set of technology innovations with technology innovations occurring elsewhere.

For example:

Establishing and opening-up wholesale ancillary service markets:

The NEM is now experiencing increased volatility, as well as supply disruptions – particularly in South Australia. This is largely driven by changes in the generation supply mix – a substantial increase in the proportion of intermittent renewable generation ('VRE') and the exit of more traditional 'baseload' plant. However, technological advancement offers new opportunities to face the emerging challenges associated with increasing penetrations of VRE.

Opening-up ancillary services markets to a broader range of participants and extending to new ancillary services not previously explicitly valued is something currently being acted on (in the case of frequency services) and examined (in the case of inertia), and AGL supports these developments. Where mechanisms to open-up ancillary services markets are competitively and technology neutral, the market will lead efficient entry – whether this be in the form of large scale transmission connected batteries, aggregation of midscale thermal loads or a multitude of other possibilities – and will naturally be directly correlated with the costs of potential solutions versus the value to be captured by market participation.

Making renewables 'dispatchable'

Investment in significant additional renewable energy generation is very likely to be required to facilitate Australia meeting its international emission reduction obligations. To ensure additional renewable generation beyond the current RET optimises system security, policy makers may consider adding a requirement for 'dispatchability' to new intermittent generation. Given an energy-only market, the total cost of renewables subsidies will be greater if they are constructed with no reference to their impact on system security.

A mechanism whereby renewable generators partner, through direct or indirect means, with complementary 'firm' capacity (such as open-cycle gas turbines, pumped hydro or advanced batteries) has the potential to address such concerns. By allocating risk to the party best able to manage it, and leaving the means for doing so at the discretion of that party, we can expect more efficient and innovative outcomes leveraging new technologies.

Distributed Energy Resources supporting the network

The increasing availability, declining costs and advancing capabilities of DER are presenting a range of new opportunities for customers to manage their energy needs. Although primarily adopted to meet a customer's own needs, new DER entering the market today also has the potential to provide system-wide benefits. The major factor distinguishing these technologies from 'first wave' distributed generation is their capacity to be intelligently controlled and dispatched according to algorithms that balance multiple needs (e.g. in home comfort, tariff optimisation and potentially participation in the provision of network and wholesale market services).

The increasing uptake of DER will also present challenges to distribution networks, which were originally established to enable one way flows of electricity from centralised generators to customer connection points, and must now increasingly manage reverse power flows, voltage instability and other technical challenges associated with higher penetrations of distributed energy resources. However, DER can also provide many services (such as peak shaving, voltage regulation and frequency response) that address some of these emerging issues. Therefore, to minimise such challenges and harness the potential of DER to efficiently support the stable operation of the grid, requires:

- Network pricing that reflects the variable cost placed on the network by different patterns of demand so that investment in and use of DER is efficient and promotes better network utilisation and lower network costs for all users;
- Grid-services markets that allow competitive providers to involve customers in innovative programs which support grid operation and reward them for that participation.

Innovative business models creating value for customers and the system

As customers increasingly look to 'stack' multiple value streams (personal, network and wholesale), a successful framework will seek to maximise both customer choice and economic benefit across multiple realms. New entrants are seeking to develop products and services that make it easy for customers to decide how and when they produce, use, store and trade energy with each other, or offer energy or support services into wholesale or network markets. AGL considers it critical that in an environment with rapidly evolving technology and new business model innovations, there is sufficient opportunity to 'test and learn' without prematurely imposing rigid frameworks that might inadvertently stifle innovation.

Case study: AGL South Australian Virtual Power Plant

A recent example of AGL's effort in DER orchestration is the launch of the Virtual Power Plant Trial in South Australia. Over the next 3 years, AGL plans to have one thousand smart, connected energy storage devices installed behind the meter at homes and small businesses across Metropolitan Adelaide. When aggregated, the batteries will act like a 5 MW solar peaking plant that can be called upon at times of grid instability to provide support services to the grid. The project will demonstrate at a commercial scale the value that DER (solar and batteries in particular) can provide three groups:

- Consumers can use the batteries to self-consume more of their solar power by storing energy produced during the day that might otherwise be exported to the grid;
- Networks can benefit from peak load shaving and voltage management services that potentially avoids further infrastructure expenditure; and
- Retailers can benefit from their reduced wholesale exposure during peak demand periods, and through the use of the battery to provide synthetic inertia and frequency balancing services.

Importantly, all grid users stand to benefit from such an arrangement through the reduced spending on network infrastructure and improved grid stability.

2. SUPPORTING INVESTMENT CERTAINTY IN A CARBON CONSTRAINED FUTURE

2.1 Electricity Role in reducing Greenhouse Gas emissions

AGL recognises climate change is an important issue facing the global community and supports the global agreement to limit global warming to less than 2°C above pre-industrial levels (2° goal) with efforts to be made to limit warming to 1.5 degrees. The role of the electricity sector must give consideration to both the transitional nature of the challenge and the essential service nature of a reliable and affordable supply for electricity users.

The generation mix in the NEM is old and emissions intensive by international standards, with around 75% of the installed thermal capacity already operating beyond its original design life. The decarbonisation and modernisation of the electricity sector will span several decades, and a long-term vision and trajectory for this transition is essential to ensuring continued investment in low/zero-emissions energy sources and the orderly phase out of existing emissions-intensive power stations.

AGL is simultaneously Australia's largest corporate emitter with an emissions footprint of approximately 44 mt carbon dioxide equivalent (CO_{2e}) and Australia's largest private owner, operator and developer of renewable generation. AGL's 2015 Greenhouse Gas Policy outlines a renewed commitment for AGL to contribute to Australia's climate change objectives. It contains commitments to:

- not build or acquire new conventional coal-fired generation in Australia;
- not extend the operating life of any of its existing coal-fired power stations;
- close all existing coal-fired power stations in its portfolio by 2050; and
- continue to invest in new renewable and near-zero emission technologies, and make available innovative and cost-effective solutions for our customers such as distributed renewable generation, battery storage, and demand management solutions.

AGL is a strong supporter of renewable energy, having invested over \$3 billion in renewables since 2005. Australia's RET has been legislated to increase the proportion of renewable electricity supply to 2020, however policy volatility and underlying market conditions have created challenges for renewable energy investments. To meet the revised RET of 33, 000 GWh an estimated 5,000 MW of new renewable projects will be required nation-wide, representing over \$10 billion of investment.

In February 2016, AGL announced the creation of the 'Powering Australian Renewables Fund' (**PARF**), an innovative financing vehicle for renewable energy. The PARF was established to develop and own around 1,000 MW of large-scale renewable generation, which would require around \$2 to \$3 billion of total investment, and represent around 20 percent of the estimated 5,000 MW of new renewable generation capacity required by 2020 to meet the Federal Government's RET.

In July 2016, the PARF was formally launched, with AGL agreeing to commit \$200 million in equity funding and QIC (via its clients the Future Fund and the QIC Global Infrastructure Fund) providing \$800 million of equity funding. The PARF has achieved two major milestones since inception. In November 2016, AGL reached financial close on selling its existing 102 MW Nyngan and 53 MW Broken Hill solar plants into the fund, and in January 2017, AGL and the PARF reached financial close on the sale and subsequent construction of the 200 MW Silverton wind farm project in western New South Wales. This wind farm is targeted to be fully operational by the middle of 2018.

2.2 Transition to a low emissions system

More than 80% of electricity generated in Australia is sourced from the combustion of fossil fuels, the majority of which is provided by coal-fired generation. The transition to a decarbonised and modernised generation sector requires large scale investment, much of which will be less than half way through its asset life at the end of the current RET scheme and Government current 26-28% Paris target.

Investment will be best supported by emissions reduction policy that provides macro level certainty as to the timeframe and operating life of incumbent plant and reduced levels of uncertainty as to the market environment within which current investments will operate in post 2030. Greater certainty in these areas will support a more efficient transition, guiding decisions on new investments, management of existing capital stock, policy development, community transition and energy market development.

Integrated policies are required to ensure that these objectives can be jointly pursued over time. As the decarbonisation and modernisation of the electricity sector will span several decades, a long-term vision and trajectory for this transition is essential to provide investors confidence to develop the long-lived and often capital intensive projects that will enable Australia to reduce its emissions efficiently over time, and at least cost. Complementary mechanisms to deliver the certainty required and facilitate a gradual but meaningful reduction in greenhouse gas emissions from the electricity sector would include:

- A long term, national carbon budget for Australia that extends to 2050 to underpin climate policy. This would allow businesses some insight into the suitability of investments with long lifespans. A budget of emissions between today and 2050 would need to be derived from a global carbon budget;
- Climate change programs developed by State Governments that give due consideration to Australia's commitments under international climate change agreements and policies implemented at the Commonwealth level to achieve these targets;
- Emissions standards for all new power stations (as has been implemented in the USA);
- Continued incentives for renewable energy, with increased scope to include all zero and near-zero emission energy sources;
- Regulation which drives the progressive closure of older, emissions-intensive power stations or retrofitting with CCS technology (as has been implemented in Canada). AGL considers it critical to complement an expanded renewable energy future with the orderly closure of legacy coal plant under an age-based closure rule. For example, a rule that within 50 years of commencing operation, coal plants must either close or invest in becoming carbon-neutral, would allow a transparent and orderly exit of the legacy coal generation fleet. A closure rule supports energy security and system reliability by enabling the market to plan for the new investment required to modernise and update the conventional generation fleet to complement an expanding renewables presence;
- the inclusion of carbon intensity into the wholesale price as a cost-effective way to support low-cost abatement at all operating fossil fuel plants. This would encourage operational (short term) decisions that capture the most cost-effective abatement opportunities across the NEM. However, it is also clear that until a carbon price becomes very high, it is unlikely to influence capital investment decisions. Hence the need to complement such a scheme with a closure rule and policies to require the stapling of firm dispatchable capacity to new renewable generation.

Importantly, the modernisation and decarbonisation of the electricity sector will require a particular focus on transitioning jobs and communities in regional areas that are currently dependent on fossil fuel generation and coal mining, such as the Latrobe Valley in Victoria. AGL is working with key stakeholders, including the business, not-for-profit and education sectors to identify opportunities for sustainable job creation in these regions. In AGL's view the development of industrial ecosystems are critical to economic transition. Such ecosystems should be grounded in university research infrastructure and industry collaboration, which focus on niche high value product/services.

3. SUPPORTING THE INTEGRATION OF INCREASING LEVELS OF VARIABLE RENEWABLE GENERATION

3.1 Market Design to support system security and reliability

The NEM was framed on the basis of thermal capacity investments and in most cases, assumes that demand is relatively inelastic and that dispatchable thermal generation is able to meet demand. The optimal generation mix therefore becomes the balance between the load duration curve and price duration curves. The shift to renewable energy is showing the limitations of the NEM's thermal-centric design in that both the load duration and price duration curves are shifting, diminishing the economic viability of incumbent large scale synchronous generation capacity.

As the generation mix changes to incorporate a growing amount of renewable energy, demand for energy services such as Frequency Control Ancillary Services, reactive power and inertia will increase as the traditional suppliers of these services exit the market. Wind and large scale solar generation cannot typically be used for Automatic Generation Control. Accordingly, system security functions that were previously regarded as an innate characteristic of generators will increasingly be both:

- less available, due to the exit of thermal generators from the market, and
- more valuable, as the intermittent nature of renewable generation increases the need for such services.

Consequently ensuring system security will require additional, complementary measures that accommodate a NEM in transition. Accommodating greater levels of variable renewable generation in the NEM requires correcting for the 'unintended consequences' of climate change policy on the operation of energy markets. In AGL's view, key mechanisms for doing so include:

- the introduction of incentives to ensure that intermittent generation sources become 'firm' and dispatchable; and

To ensure additional renewable generation beyond the current RET does not impact system security, policy makers may consider adding a requirement for dispatchability to new intermittent generation. Given an energy-only market, the total cost of renewables subsidies will be greater if they are constructed with no reference to their impact on system security. A system whereby renewable generators partner, through direct or indirect means, with complementary 'firm' capacity (such as open-cycle gas turbines, pumped hydro or advanced batteries) has the potential to address such concerns.

- the use of existing and new supplementary markets to improve security, reliability and system resilience.

For example the introduction of new ancillary services markets will ensure that users appropriately value services, such as inertia, that had previously been available for free and in surplus. The ability to procure system security services, like inertia, will support system security and reliability. South Australia in particular is moving away from thermal fuel sources of generation capacity and has experienced significant increase in the proportion of its energy being supplied by renewable, intermittent, generation sources. Contracting services, such as inertia, in such an environment would significantly help to address concerns with regards to security and reliability of electricity supply as the sectoral transformation continues.

3.2 Role of Natural Gas in reducing greenhouse emissions

In the 1990s and 2000s, it was anticipated that gas-fired generation capacity would provide the means by which to both meet growing emissions intensity constraints and support the integration of increasing levels of renewable energy capacity. This flexible, comparatively lower emissions, dispatchable plant was anticipated to be a natural partner to complement the intermittency of variable renewable generation.

However, a number of factors have impacted the realisation of this outcome. Substantial volumes of gas are moving to the Queensland LNG facilities for export, while policies such as gas moratoria and gas reservation are impeding opportunities for the exploration and commercialisation of new gas reserves. As a consequence, new domestic gas supplies are not able to mitigate rising domestic gas prices, and increased levels of renewable generation with zero short-run costs are

impacting wholesale energy prices, making the operation of and investment in gas-fired plant increasingly uneconomic.

AGL considers that gas fired generation still has a key role to play as the sector transitions away from a supply mix dominated by baseload coal-fired capacity. However, this requires that attention be paid both to:

- current NEM market design – whether its energy-only foundations remains sustainable, or whether amendments to market settings are now required to take account of the increased integration of renewable energy. In addition to considering the market valuation of new services that support reliability (such as inertia), system security and reliability could be enhanced by mechanisms which encourage new renewable energy generation capacity to underpin their output with dispatchable plant, such as gas-fired generation or energy storage – as a ‘capacity right’; and
- gas market settings, including mechanism to shore up new supply, increase access to gas pipeline capacity and improve gas market transparency. The Australian Competition and Consumer Commission recently found that domestic gas extraction (CSG) moratoria needed to be lifted (to increase the flow of gas), gas transmission pipeline access arrangements needed to change (in order to facilitate gas pipeline access), and further investigation of domestic gas joint marketing arrangements was also warranted.

3.3 Role of Distributed Energy Resources in the transition

DER has the potential to play an important role supporting the integration of higher levels of renewable energy into the NEM whilst maintaining security and reliability. For example, the addition of energy storage can improve the dispatchability of otherwise intermittent renewable generation. Elsewhere in this submission we have put forward a ‘capacity right’ as one means of encouraging this development.

DER also has the potential to participate in new and expanded ancillary service markets providing synthetic inertia, frequency services and other forms of grid support. This could either be in the form of large-scale grid connected DER, or through an aggregation and orchestration of small-scale DER installed ‘behind-the-meter’ in customer homes. Rather than policy makers attempting to predict the most efficient and commercially viable model, markets should be constructed as far as possible on open and technology neutral grounds, allowing competing providers to lead the form of entry and participation.

AGL does not support curtailing or capping the levels of DER in each region, not least because this could have unintended consequences and actually worsen system reliability issues. Digital metering and orchestrated DER including solar, storage and home/business energy management has an active role to play in security and reliability. Rather than curtailing demand by using the blunt instrument of a rolling blackout, precise tailored dispatch and load control can actively manage the grid with a far superior customer experience, providing reliability for both the customer and the grid, and allowing the value of grid stabilisation services to be shared with participating consumers.

The rapid uptake of digital meters is providing a step change in grid edge intelligence. There may be potential for network operators to purchase high quality data about system conditions and power quality from metering businesses.

4 PROTECTING CUSTOMERS THROUGH THE TRANSITION

4.1 Meeting the changing needs of energy consumers through competitive markets

Customer preferences continuously evolve. The availability of distributed renewable generation and other digital technologies is enabling customers to exert greater control over their energy usage and demand improved services and a wider range of products from energy service providers. Although energy remains an essential service, customers now have far greater choice as to how that service is delivered.

A decade ago, the choice for customers was simply 'who' sold them energy. Now the choice is who and 'how' (and increasingly 'when') – how they will be supported by online services and flexible payment options, how they will combine grid supplied and distributed energy sources, how they expect to be able to monitor and control usage, and increasingly how they will share energy and share in value streams available beyond the home (e.g. network and wholesale values). As such, we support the approach taken by the Review Panel that places customers at the centre of the energy trilemma. Policy and regulatory reform should reflect the shift to a system where customers are best placed to choose the products and services that meet their unique needs.

AGL notes that the Council of Australian Government's Energy Council (**COAG EC**) and the Australian Energy Market Commission (**AEMC**) have recently implemented several market reforms in response to changing customer sentiment and interactions in the NEM. These changes, largely through the AEMC's Power of Choice reforms, place greater emphasis on increasing competition, customer choice, innovation and demand-side participation. We support these principles and their embodiment in the national energy rules.

4.2 How we are evolving to meet customers' changing needs

In 2016, AGL announced a \$300m program to transform the customer's experience when interacting with AGL through a program of digitally enabled touchpoints. This program, to be delivered over a 3 year period, complements a range of other service innovations already implemented – such as 24/7 customer service and webchat both introduced in 2014.

In 2015, AGL established a New Energy division, with a dedicated focus on distributed energy services and solutions. We offer customers 'beyond the meter' energy solutions, new and emerging technologies including energy storage, electric vehicles, solar PV systems, digital meters through our ring-fenced subsidiary business Active Stream. We are actively working with customers and in partnership with network businesses to develop a network services capability involving load management and demand response solutions.

AGL is offering and trialling a number of products and services to our customers. Some of these products include:

Electric Vehicles: In November 2016, AGL launched an Electric Vehicle (**EV**) concierge service and a \$1/day "all-you-can-eat" capped charging plan. The capped charging plan is made possible by digital metering infrastructure which can measure the EV charging load within the household, and reconcile it against the various network and retail tariff structures that apply.

Solar analytics: Our 'Solar Command' product provides customers with a personalised online dashboard with near real time information on the performance of their rooftop solar system and inverter unit to maximise the value of their solar system. We are rolling out our new 'dual element' net meter which allows us to provide customers with insights through Solar Command online and via the AGL mobile App. These customer benefits and insights include:

- Expected daily solar production versus actual production;
- Information on whether the system is performing to its potential based on system size, arrangement, configuration and shading profile.
- recommendations on when to use more solar-produced electricity e.g. pool pump or air conditioning while solar production curve is higher than consumption.

AGL Mobile App: The AGL Energy mobile app enables customers to gain greater control over their energy usage. Customers can see usage and usage charges on a daily, weekly, monthly and yearly basis (depending on their metering) enabling them to identify usage trends and see a projection of their next bill. There is also the ability to set an alert when overall spend for the billing period reaches a specified amount, plus customers can pay bills from the app using their credit card.

AGL Future Forests: this program enables residential customers to offset carbon emissions based on their electricity consumption for \$1 per week. This funds the purchase of native

Australian forestry carbon credits to offset those emissions and also supports biodiversity conservation and the planting of Australian native trees.

AGL's Virtual Power Plant (VPP) Trial: AGL is currently in the process of selling and installing 1,000 batteries in residential homes and businesses across metropolitan Adelaide. These batteries will be remotely connected and managed, to provide 5 MW of peaking capacity and offering customers the opportunity to save on their energy bills. Customers signing up to the trial will also receive a digital meter. This is to allow the monitoring and verification of data on the network. However, the Network support services and the orchestration of the VPP will be delivered through sophisticated cloud based solutions and VPP infrastructure platform.

4.3 Fit-for-purpose consumer protection framework

The market in distributed solar PV and energy storage resources is growing. We are seeing the development of interconnected bi-directional home energy management systems which assist customers to make choices about how and when they produce, use, store and potentially even trade energy with peers or participate in programs offering value beyond the home (such as wholesale or grid services markets). Local 'micro grids' are growing in popularity as a form of establishment, particularly in greenfield developments. Within such micro grids, community solar and storage resources may be shared or traded using peer-to-peer platforms.

These development illustrate that market competition has expanded beyond traditional energy plans. There is increasing presence and activity of alternative energy sellers in the market and this is expected to continue to exert competitive pressure on licenced energy retailers to respond in terms of price and innovation in product and service offerings.

AGL believes that these evolving tailored products and services enabled by smart digital technologies have the potential to address a number of factors in the trilemma. Not only can customers take control of their bills through more granular data and information and self-generation technologies, but these products can improve overall energy productivity (and therefore overall cost to customers) and assist with the integration of greater levels of renewable generation into the distribution system.

These changing market dynamics require that the existing consumer protection regulatory framework be reviewed to ensure it remains fit-for-purpose. The consumer protection framework should recognise that consumers are not homogenous but rather have their own distinct and unique preferences. The framework should be flexible enough to accommodate innovation in product and service provision (including the business or delivery model), and not constrain informed customer choice and participation. Importantly, it should promote competitive neutrality and allow existing and emerging business models to compete on their merits, enabling consumers to choose products and services that suit their circumstances.

The current regulatory framework was developed to support an engineering focussed energy sector set up whereby electricity is delivered via a linear and one-way flow (from generator to home/business premise) through a centralised market structure and a basic accumulation meter. Consumers, enabled with digital and social technology and subject to rising retail prices over the past decade, are changing the way electricity is delivered. Consumers are seeking more value add services (e.g., energy management, distributed generation), are looking to interact with their retailer through different channels and expect differing levels of information to make informed decisions.

The current regulatory framework does not facilitate digital engagement and inhibits service providers in their efforts to expeditiously bring to market new products and services and through channels that consumers' value. For example, the NECF 'safety net' for bill delivery and channel is one bill be sent every quarter via post. If a retailer wants to deliver electronic bills of a more frequent nature, they are required to seek the customer's consent through a highly prescriptive process that adds time, costs and leads to poor customer experience.

4.4 Pricing access to the grid

Mechanisms for pricing access to the grid and the revenue model applying to distribution businesses are closely related issues. In an environment where decentralised technologies are offering partial substitutes to grid supplied energy, networks must have both the incentive and flexibility to introduce alternative pricing arrangements that maintain the relevance of the grid. At a time of flat or declining network demand, the potency of any such incentives would seem to be materially impacted by the form of control underpinning the network's revenue model. Linking revenue to utilisation is more likely to encourage networks to competitively price access to their networks and to introduce tariff innovations (such as rewarding distributed generation exported during network peaks, or 'by-pass' pricing customers for whom it would be economically feasible to go fully off-grid).

In 2014, the Commission made a rule requiring distribution businesses to gradually introduce more cost reflective network tariffs to their customers. AGL supports greater cost-reflectivity in network tariffs, however there are some constraints on the true cost reflectivity of the tariffs that networks are likely to introduce. These relate in part to the revenue cap that networks currently operate under, together with the spare capacity that exists in many networks (particularly in New South Wales). There is a question as to whether the policy intent behind the introduction of cost-reflective pricing can be achieved without a clear policy on the treatment of the existing regulated asset base which may be partially stranded over time.

Care in the design of the cost-recovery and network pricing frameworks is key to driving efficient network utilisation, efficient adoption of distributed energy technologies and managing potential equity issues that arise where those without the ability to adopt distributed generation technologies are left to bear a disproportionate share of remaining network costs.

4.5 Data sharing and privacy are appropriately balanced

In a fast evolving competitive landscape there are incentives on businesses to not only make data available to customers, but to do so in ways that are useful and valued by them. Thus the advanced energy services on which the market is increasingly competing now commonly include products and services that are targeted at providing customers greater insight into, and the ability to better manage, their energy usage behaviour. This empowers customers to make informed choices and capture the value of those choices.

There is plenty of evidence of this right across the energy industry. As an example, AGL's online portal provides access to 'AGLIQ' which gives customers easy access to their detailed usage data, as well as presenting the data in a series of summary formats which give the customer an up-to-date and easy to understand snapshot of their energy use, associated costs, comparisons with similar households and achievements against any energy saving goals which the customer has set. AGL has also launched a mobile phone application giving customers easy access to this data 'on the go'.

Access to energy consumption data can also better enable customers to assess what products and services best suit their needs. In this regard, AGL acknowledges that the development of a vibrant third party energy services market requires a framework that allows customers to provide authorised representatives timely access to their energy consumption data in a common format. In 2014 the Australian Energy Market Commission made new Rules to achieve just this.¹

While there is a clear rationale for establishing minimum obligations for the provision for energy consumption data, AGL considers that otherwise governments and regulators should not seek to prescribe tools or solutions which crowd out or replicate solutions that the competitive market is already delivering. We are currently witnessing only the first wave of products and services that leverage energy consumption data to offer value to customers. As the digital and technological transformation of the energy industry continues apace we expect to see competing energy services businesses responding to unique customer preferences in new and innovative ways. We will see a range of tools and solutions coexisting to meet the expectations and demands of different customers.

AGL also recognises that there are sensitivities around access to energy consumption data, particularly as digital metering vastly increases the granularity of consumption data that is generated. Engendering consumer trust will be fundamental to ensuring that the most beneficial use of data can be made. For AGL, in addition to utilising data to offer products and services that customers value, building consumer trust involves strictly maintaining the security of such data and ensuring that customers determine who else is permitted access to their energy consumption data.

4.6 Affordability and impacts on Vulnerable customers

AGL agrees that a careful balancing exercise is required when addressing the three objectives of the trilemma and is pleased that there is equal focus on affordability. In order to address this issues of affordability, we firstly need to explore the definition of vulnerable and hardship customers. It is common in policy development for this to be interpreted as customers with an eligible concession card, or customers participating in a retailer hardship program. These two distinct customer groups may share some similarities, such as having a higher proportion of

¹ Australian Energy Market Commission, Final Rule Determination, *National Electricity Amendment (Customer access to information about their energy consumption) Rule 2014*, *National Energy Retail Amendment (Customer access to information about their energy consumption) Rule 2014*, 6 November 2014
<http://www.aemc.gov.au/getattachment/a816abd5-4903-4fb2-aa6e-55d23fdd7e39/Final-determination.aspx>

households with low income. However, as is outlined later in this section, they can have markedly different consumption or home tenure profiles and therefore markedly different household energy costs.

The difference in customer segments and the barriers facing different customer groups becomes an even more important issue when considering the redistribution of costs and benefits across the retail consumer base that are currently being driven by the uptake of new technologies such as solar, batteries and home energy management solutions. Customers that are able to take up new technologies and reduce reliance on grid-connected electricity are better able to buffer themselves from pricing changes associated with wholesale and network structural reform. Those customers unable to make investments to reduce reliance on grid-connected electricity face greater exposure to the costs of energy market transformation.

AGL's approach to program development recognises that vulnerability can occur in many forms – financial and non-financial. Non-financial indicators of vulnerability may be households experiencing family violence, relationship breakdown, mental health issues or those living in culturally and linguistically diverse communities. Fundamentally, vulnerability and financial or non-financial hardship can impact the way customers are able to engage with the energy market and policy and program development in response, should thus not trend towards a one-size-fits-all approach.

Evolution of regulations that govern consumer protections for vulnerable customers must also move in alignment with complementary government policy reform such as concessions, energy efficiency, solar and new technology incentives. Addressing energy affordability and hardship issues remains a shared-responsibility across industry, government and the community sector. Alignment in the delivery of partnerships and policy which recognises the strengths of the various sectors in developing an effective response is critical, without which gaps develop and the support net is weakened for the broader community.

Vulnerable customers and people experiencing hardship have consistently been found to consume higher than average electricity consumption each year. Customers participating on AGL's Staying Connected customer base consumed around 42% more electricity than AGL's average customer base in the 12 months to August 2016. Feedback from financial counsellors and community workers supporting these customers, often through home energy visits, cite poor quality building fabric, cheap appliances with high running costs, large families and more time spent in the home as some of the underlying challenges for these customers.

This is often compounded by low levels of home ownership, limiting the ability of tenants to make changes to the property. In the 12 months to August 2016, it is approximated that around 62% of customers participating on AGL's hardship program Staying Connected across QLD, NSW, VIC and SA were homeowners, compared to 79% across the average customer base.

It is important to contrast the consumption levels of customers participating in hardship programs with those of concession card holders. Concession cards are often used as an eligibility criteria for many low income energy efficiency programs, however they in fact tend to consume less electricity per year than the average customer base. This can be explained by the fact that a significant proportion of concession card holders are aged pensioners, who are not only known to consume more frugally but also to have higher levels of home ownership.

Market-based energy efficiency (white certificate) schemes have led to uptake of low-cost energy efficiency measures in households in some states. However, there is little evidence to suggest that they have effectively supported the installation of higher upfront cost energy efficient appliances to the homes of high consumption vulnerable customers, where the benefit is likely to be greatest. Co-investment programs provide the greatest opportunity to deliver higher-cost, high impact technology to materially reduce consumption, energy bills and ultimately debt accrual for customers with a significant gap between the cost of consumption and the capacity to pay.

The NSW Government is the first state government to partner with an energy retailer to target this customer group, in a \$1 million partnership with AGL Energy to upgrade social housing properties with solar energy, along with a home visit by community agency Kildonan UnitingCare. This partnership integrates the engagement of households by community sector experts connecting them with other social services where required, the identification of high consumption households and installation of the solar system by the energy retailer and partnership with social housing organisations. The program is being delivered throughout 2017 and outcomes will be measured and fed back into future program design.

Removal of barriers to participation

Home tenure is an increasingly important factor impacting the ability of customers to engage with the new energy market. As technologies and product offerings evolve, such as battery

storage, home energy management systems, electric vehicle charging infrastructure and solar technologies, growing dispersion in the market between customers who can install these technologies and those who cannot will have redistributive impacts as system costs are spread across a smaller number of fully-grid reliant households.

Customers living in rental properties experience a long-standing split incentive problem, where the property owner has the ability to change the building fabric, yet the reduction in energy bills will benefit the tenant. Ensuring customers living in public housing and private rental properties are not disproportionately impacted should be a focus for policy reform. The NSW Government has identified this issue and is currently consulting through the Draft Plan to Save Energy and Money on potential solutions. The introduction of minimum standards for rental properties is one option to lift the quality of poor housing stock, which can drive high energy bills for disadvantaged consumers.

Similarly, minimum disclosure of the energy rating of properties at the point of sale or lease allow transparent information to be provided to potential tenants and homebuyers around the future running costs of the property. AGL supports the NSW Government in introducing a voluntary scheme and transitioning to mandatory over time. A mandatory disclosure policy also has the added benefit of enabling homeowners that have made significant energy investments (such as batteries, EV charging or solar) to capture the additional value of these investments at the point of sale.

Ensuring social policy evolves to meet the needs of consumers in a changing market

An evolving social policy framework is also critical to move alongside a changing market. The primary support available from governments for customers struggling with bills is energy concessions. The concessions framework across Australia varies widely in eligibility, accessibility and application. In 2014 the Energy Retailers Association of Australia (now Australian Energy Council) formed a working group across energy retailers and consumer groups to review the framework and make recommendations for reform. AGL chaired this working group and the report has now been sent to the NSW, QLD, VIC and SA governments along with key recommendations to improve the framework.

Key recommendations included:

- Shift to a percentage-based approach (% off the bill) rather than flat rates – consumer groups and retailers raised concern with the current inequity currently within flat rate schemes, as underlying network charges and ability to change consumption varies widely across households. As the energy market evolves, customers that are able to invest in energy saving technologies under a flat rate would receive the same government benefit, yet seeing a smaller bill. A percentage-based approach was universally accepted as a fairer system for customers now and into the future;
- Greater accessibility for crisis support / emergency relief grants (URGS, HEEAS, EAPA) – stakeholders recommended a simple entry point for customers to access these grants, regardless of if approaching a retailer or a community organisation.

Increasing engagement with known disengaged and vulnerable groups

Community and consumer groups have highlighted the need to develop particular engagement and outreach programs for customers of known vulnerability such as: those impacted by family violence, asylum seekers and culturally and linguistically diverse communities.

Over time best-practice approaches focus on businesses shifting their engagement model rather than directly with customers, but to the services where these customer groups are entering the support system. For example, in 2015 AGL consulted widely with family violence community workers and women's legal services to build a greater understanding of the risks and issues that were impacting energy customers when dealing with family violence. Reports from the Consumer Utilities Action Centre and Women's Legal Service of Victoria on these topics can be found online². In response, AGL developed a domestic violence policy which

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http://www.womenslegal.org.au/files/file/WLSV_Stepping%20Stones%20Report_UPDATE_digital.pdf
<https://cuac.org.au/research/cuac-research/345-helping-not-hindering-uncovering-domestic-violence-utility-debt/file>

ensured calls where this issue was raised being fast-tracked to customer service representatives trained in dealing with hardship issues.

Participation by energy retailers in community engagement activities is difficult to regulate, rather it is best facilitated (as it regularly is) as an industry-led initiative or by Ombudsmen, government programs and community organisations. A greater focus on complementary policy and resources being dedicated to community outreach to engage traditionally disengaged or difficult to reach groups should be a focus to build greater awareness of the products and services available in the energy market and the support available when things go wrong or when hardship is experienced. An example of such a program with this objective includes the Queensland Government Switched On Communities grant program, developed in partnership with Queensland Council of Social Service.

5 Energy Market Governance is critical

5.1 Strategic direction for energy policy

AGL is keen to ensure that governance and regulatory frameworks continue to be positioned to deliver benefits to energy users into the future, within the context of evolving technology and community expectations. The introduction of carbon reduction and renewables policies has produced unintended consequences for the wholesale energy markets, most apparent in South Australia which has been disproportionately impacted due to its superior wind resource attracting a large share of renewables investment. It is critical that policy makers discuss how better to integrate wholesale market design with climate change policy to ensure ageing 'firm' power plants are replaced with new infrastructure that complements renewables. The decarbonisation and modernisation of the electricity sector will span several decades, and a long-term vision and trajectory for this transition is essential.

While AGL supports the role of the COAG EC as the primary driver of energy policy in Australia, we believe there are opportunities to improve the Council's strategic focus and prioritisation of issues, and to build a common purpose amongst the different jurisdictions. AGL supports establishing formal and transparent processes for setting the strategic objectives, priorities and work program for energy market reform, in consultation with interested stakeholders (and reviewing and updating them periodically). AGL considers that the AEMC has the appropriate independence and market expertise to coordinate the process and to provide advice to the Council for consideration and approval on strategic direction, market development and emerging issues.

The States should have greater influence and buy-in to the COAG EC meeting agendas. Where State governments have an interest in a particular area of reform, AGL would support the relevant Minister taking carriage of the issue and championing the change, undertaking relevant work through their department, resolving key issues, and reporting back to the Council for endorsement and national implementation. Empowering different jurisdictions to take the lead on driving national reform through the Council on different issues may help to improve the implementation of agreed reforms across all jurisdictions, and would reduce the duplication of work between States.

5.2 National consistency

AGL considers that energy consumers are best served by nationally consistent market settings. Harmonisation not only allows savings from lower regulatory burdens to be passed on to consumers in the form of lower energy costs, it also facilitates greater competition, and the entry to market of new products and services. National consistency also ensures that all consumers can benefit from robust and best-practice regulations; inconsistency inevitably means that some jurisdictions have regulation that is more fit-for-purpose than others.

AGL supports measures that strengthen incentives for jurisdictions to complete national reform processes agreed through the COAG EC, as well as the ongoing monitoring and reporting on reform implementation. This could include a 'necessity criterion' be introduced so that any jurisdiction seeking derogations would be required to substantiate and justify the costs and benefits of deviating from otherwise nationally agreed market policies.

5.3 Improvement to the review process

AGL believes that there are significant improvements needed in the timeliness and strategic focus of the AEMC's rule change processes. These include:

- Making reviews and rule changes subject to a 'gateway' process, whereby proposals are expedited or rejected based on their alignment (or otherwise) with strategic objectives;
- Introducing a two-stage process for complex reviews so that the merits of high-level principles and policies are consulted upon in the first stage, with feedback on detailed design and implementation received in the second stage (if the decision is made to proceed);
- The use of a single-step process for simpler (or non-contentious) rule changes;
- The use of an expedited 8 week process where appropriate; and
- A formal process to cancel a rule change process that is no longer required.

AGL considers that this suite of options strikes the right balance between the need for extensive stakeholder consultation for significant changes, and the desire for faster implementation of straight-forward proposals. Rapid market changes increase the need for robust scenario analysis, stakeholder engagement and cost-benefit assessments, to understand how proposed reforms may play out in practice, including the potential for unforeseen consequences or for rule changes to become unnecessary.

5.4 Responsibilities of the Australian Energy Market Operator

AGL believes that the role of the Australian Energy Market Operator (**AEMO**) in market development work should be clarified, and the work undertaken by the AEMC and AEMO should be better coordinated. AEMO should be engaged on policy matters through consultation with the AEMC, and the COAG EC should not directly assign policy tasks to AEMO. However, AGL considers that AEMO has unique skills and experience that add significant value to the market development work plan, and that it is important for this input to be retained.