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Professor Mary O'Kane
NSW Energy Security Taskforce
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Via email: energy.taskforce@chiefscientist.nsw.gov.au

26 April 2017

Dear Professor O'Kane

AGL Energy (AGL) welcomes the opportunity to make a submission in relation to the NSW Energy Security Taskforce review which seeks to:

- assess the risks to and resilience of the NSW electricity system (including the transmission and distribution networks) from extreme weather events in the context of a changing climate;
- review the adequacy of the State's management of electricity system security events including prevention, preparedness, response and recovery; and
- make recommendations on actions to address any vulnerabilities identified and/or opportunities for improvements to current practices

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, battery storage 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. The diversity of this portfolio has allowed AGL to develop a detailed understanding of the risks and opportunities presented by energy and climate policy.

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 sector.

However, the piecemeal introduction (and removal) of carbon reduction and renewables policies has produced unintended consequences for wholesale energy markets, most apparent in South Australia which has been disproportionately impacted, including 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.

Our submission seeks to address the focus areas of the NSW Taskforce by looking at three critical actions needed from Federal, State and Local governments. These are:

- Investment certainty in a carbon constrained future;
- Integration of increasing levels of variable renewable generation; and
- Protecting customers through the transition.

Lastly, appropriate energy market governance is critical in delivering on these objectives and actions. AGL is keen to ensure that governance and regulatory frameworks evolve to deliver benefits to energy users into the future, within the context of rapidly advancing 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.

Should you have any questions or comments, please contact Stephanie Bashir on (03) 8633 6836 or sbashir@agl.com.au.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Tim Nelson', written in a cursive style.

Dr Tim Nelson
Chief Economist



1. Supporting investment certainty in a carbon constrained future

AGL recognises climate change is an important issue facing the global community and supports the global agreement to limit 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 (CO₂e) 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.

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.

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 the Australian Government's current 26-28% Paris target.

One of the key risks in the energy market transition is the lack of investments due to policy uncertainty. AGL believes this can be best mitigated 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:

- **Orderly closure** - An expanded renewable energy future must be complemented with regulation which drives the progressive (and date certain) 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 date-certain closure rule and a third policy piece: stapling firm dispatchable capacity to new renewable generation beyond the RET (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.

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 and Hunter Valley in NSW. 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.

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

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 some incumbent 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;
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.
- 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 'firm capacity certificate'; and
 - gas market settings, including mechanisms 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.

Importantly AGL believes that Distributed Energy Resources (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.

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.

3. Protecting customers through the transition

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). 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.

Further, 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 developments 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 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. This requires:

- 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.