

Ms Audrey Zibelman
Chief Executive Officer
Australian Energy Market Operator Ltd

2 February 2018

www.coal21.com

**Integrated System Plan Consultation – For the National Electricity Market
ACALET Response to the December 17 Consultation Document**

Dear Ms Zibelman

The ACA Low Emissions Technologies Ltd (ACALET) welcomes the opportunity to respond to the Integrated System Plan Consultation document for the National Electricity Market.

ACALET has world leading experience in the development of low emissions electricity generation technologies and manages the COAL21 Fund established in 2006 by the Australian black coal industry. The COAL21 Fund is funded by a voluntary levy on black coal production and through partnerships with government and wider industry it complements and extends Australia's black coal producers' individual contributions to the research, development and demonstration (RD&D) of low emissions technologies.

Context

AEMO has invited a response on a series of questions outlined in the “Integrated System Plan Consultation – For the National Electricity Market” document released in late December 2017.

AEMO has advised in the consultation document that “stakeholder input to modelling (questions 1.1 and 1.2) must be received by AEMO by 2 February 2018 to be incorporated”, therefore this response by ACALET will provide input to address these questions only. ACALET will provide a written response to the remaining questions by 28 February 2018 as requested by AEMO.

Key Considerations

In order to meet the Australia’s energy objectives, the grid and electricity supply requires the following fundamental characteristics:

- Secure, reliable and affordable electricity able to meet the National Electricity Market (NEM) reliability standards
- Electricity available on demand, 24/7
- Large volume, uninterrupted electricity able to support Australian industry
- A system that takes advantage of Australia's natural resources
- A system that enables the transition to a lower emissions future
- Simple and effective regulation that enables an efficient, innovative and competitive market that encourages new products that compete on value, service and quality, while improving customer outcomes.

Policy that provides an incentive or subsidy to a particular technology in preference to other options cannot meet the Government's energy objectives. Non-distorting policy is a better approach to support a transition to a lower emissions future. Technology targets or other similar policy instruments can disrupt the market's ability to implement the most effective solution to emissions reductions and hence compromise the achievement of desired energy objectives.

Renewable energy is playing some role in supporting the future low emissions requirements of Australia however as shown by recent events, large volume weather-dependent intermittent renewable electricity generation technologies are not able to provide a secure and 24/7 reliable electricity supply and achieve market required service and quality outcomes.

Technology Neutrality – Inclusion of CCS and HELE

The Australian electricity sector has to date taken advantage of the abundant high quality coal available close to existing fossil fuel power plants. Looking ahead we need to ensure there are no policy impediments for the uptake high efficiency low emissions (HELE) coal fired plants and subsequently carbon capture and storage (CCS). HELE plants augmented with CCS technologies are able to provide large volumes of on-demand, flexible, responsive, highly secure, grid-strengthening, low emissions electricity. HELE coal fired plants are able to provide the lowest cost dispatchable electricity for Australia, the recent independent report from Solstice Development Services and GHD indicated in the low cost scenario for 2030 delivered a wholesale price of \$36/MWh. In addition HELE coupled with CCS technology indicated the low cost wholesale price for 2030 was \$62/MWh.

Australia is well placed to take advantage and be an early mover of CCS with high efficiency coal power plants currently operating as well as carbon storage locations under development. The CTSCo project in Queensland is proving storage in the Surat Basin and this work will be supported by a University of Queensland initiative to further advance the knowledge of the Surat Basin through their Surat Deep Aquifer Appraisal Project. Additionally, Australia continues to be a leader in the development of CCS with projects such as the Callide OxyFuel Project in Queensland, the Otway and CarbonNet projects in Victoria and the Gorgon CO₂ Storage Project in WA as examples.

An Australian CCS Roadmap: "Energy Security and Prosperity in Australia: A Roadmap for Carbon Capture & Storage" has been finalised with its development supported by the Commonwealth Government and industry through the Low Emissions Technologies for Fossil Fuel Leadership Roundtable. CCS projects are also well underway globally with prime examples including the Canadian Boundary Dam CCS Project, Petra Nova CCS Project Texas USA, Sleipner CCS North Sea Norway and the Sinopec Shengli Power Plant CCS Project in Shandong Province, China.

In relation to HELE, this technology is well established and ready for adoption locally with the benefit of immediate and reliable access to the highest quality coal in the world.

In addressing the material questions the Integrated System Plan seeks to address, in particular in regard to addressing the question of what is the best way to achieve the policy objectives of affordable, reliable, secure power and meeting emissions targets, the key contextual setting for this would be to ensure the broadest range of technology solutions were available for selection and application in an integrated system. This would include low emissions dispatchable power generation technologies such as HELE coal and ultimately with carbon capture and storage, and gas with carbon capture and storage. The current Integrated System Plan consultation document does not have power generation technology neutrality as a guiding principle or assumption.

Modelling Time Interval/Granularity

A key consideration in the modelling to be undertaken by AEMO should be modelling at a time interval/granularity that reflects the realities of grid balancing. Too large a time interval will not reveal supply/demand mis-match issues such as that experienced as recently as January 18-19 in South Australia and Victoria where wholesale power prices were high for extended periods of time.

ACALET welcomes the opportunity to provide a detailed response for input into modelling for the Integrated System Plan for the National Electricity Market. The detailed response to the specific questions raised by AEMO is attached for your reference.

ACALET would also welcome the opportunity to discuss in person with yourself, or with your staff any aspect of the ACALET submission.

Yours sincerely



GREG EVANS
CHIEF EXECUTIVE ACALET
2 February 2018

Integrated System Plan Consultation – ACALET Detailed Response

1.1 The material questions the ISP seeks to address are in Section 1.3.1. Are there any other questions the ISP should address?

From Section 1.3.1 :

In setting the key drivers for scenario analysis, it is important to understand the key questions the ISP is seeking to address. The following key questions have been collated through stakeholder engagement over the past year:

What is the best way to achieve the policy objectives of affordable, reliable, secure power and meeting emissions targets?

In pursuing this pathway:

- What are the least-regret generation and transmission developments which are most robust to different futures?*
- Could large-scale renewable generation in targeted zones provide an efficient solution for future power system development, and what storage and transmission investment would be needed to support such an outcome?*
- What is the optimal balance between a more interconnected NEM, which can reduce the need for local reserves and take advantage of regional diversity, thereby more efficiently sharing resources and services between regions, and a more regionally independent NEM with each region self-sufficient in system security and reliability?*
- To what extent could aggregated load shifting and price-responsive load management, made available through investment into distributed energy resources (DER), reduce the need for large-scale generation and transmission development to replace the existing generation fleet as it reaches end of life, while maintaining power system reliability and security?*
- What is the optimal balance between the lowest-cost pathway and having the optionality to ramp up new development if required by circumstances, such as earlier than expected generator retirements, lower than expected DER uptake/orchestration, or higher than expected development of renewable generators?*

ACALET Response

In regard to addressing the question of what is the best way to achieve the policy objectives of affordable, reliable, secure power and meeting emissions targets, the key contextual setting for this would be to ensure the broadest range of technology solutions were available for selection and application in an integrated system. This would include low emissions dispatchable power generation technologies such as coal with carbon capture and storage, and gas with carbon capture and storage. The current ISP consultation document does not have power generation technology neutrality as a guiding principle or assumption.

In terms of generation and transmission developments of least-regret which are most robust to different futures, this would include low emissions dispatchable power generation technologies such as coal with carbon capture and storage, and gas with carbon capture and storage. Deployment of these technologies would likely require much lower investment in transmission than those involving intermittent power generation technologies either combined with storage or relying on geographical diversity to provide effective dispatchability. The recent announcements by Snowy Hydro have highlighted that for every two dollars spent on the Snowy 2.0 pumped storage facility, approximately one dollar would need to be spent on transmission augmentation¹.

In regard to large-scale renewable generation in targeted zones being able to provide an efficient solution for future power system development, and what storage and transmission investment would be needed to support such an outcome, an alternative case of low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage in the period post 2030, and gas with carbon capture and storage should be considered. The large-scale renewable generation case should provide 72 hours of equivalent fuel assurance (to allow continuous power supply), a benchmark recently proposed by PJM², a major power system operator in the United States.

In regard to addressing what is the optimal balance between a more interconnected NEM, which can reduce the need for local reserves and take advantage of regional diversity, thereby more efficiently sharing resources and services between regions, and a more regionally independent NEM with each region self-sufficient in system security and reliability, a key consideration should be modelling at a time interval/granularity that reflects the realities of grid balancing. Too large a time interval will not reveal supply/demand mis-match issues such as that experienced as recently as January 18-19 in South Australia and Victoria where wholesale power prices were high for extended periods of time³.

¹ <http://www.news.com.au/finance/business/snowy-hydro-20-passes-feasibility-study/news-story/567baa5e07f98ac5c20cd182106063c4>

² Appendix to PJM's "Evolving Resource Mix and System Reliability", p23 accessed as <http://www.pjm.com/~media/library/reports-notice/special-reports/20170330-appendix-to-pjms-evolving-resource-mix-and-system-reliability.ashx>

³ <https://www.aer.gov.au/communication/wholesale-electricity-price-spikes-in-victoria-and-south-australia-trigger-regulator-report>

1.2 The scenarios the modelling will use to inform the ISP are outlined in Section 1.4. Recognising the time limitations to produce the first ISP in mid-2018, are these suitable scenarios to address at a high level? Should these be expanded in more detailed analysis following the first high level ISP?

From Section 1.4 :

Noting the final question listed in 1.3.1 above, AEMO proposes a scenario design for the ISP which provides:

- *A neutral outlook, and*
- *Two bookend scenarios which explore futures with faster and slower rates of change, affecting the need for and timing of large-scale generation and transmission augmentations.*

Table 1 Proposed scenarios for the Integrated System Plan

Key input	Neutral – business as usual	Slow change	Fast change
Demand settings			
Economic growth and population outlook	Neutral	Weak	Strong
Rooftop PV capacity	Neutral	Neutral	Neutral
Battery storage installed capacity	Neutral	Neutral	Neutral
Large-scale demand side participation and distributed storage aggregation	Neutral	Strong	Weak
Electric vehicles	Neutral	Weak	Strong
Policy settings			
Emissions reduction trajectory*	28% 2005 - 2030 70% 2016 - 2050	28% 2005 - 2030 70% 2016 - 2050	52% 2005 - 2030 90% 2005 - 2050
Government renewables targets	LRET+VRET (to 2025) QRET (to 2020)**	LRET VRET+QRET (to 2020)	LRET VRET+QRET (to 2020)
Energy efficiency	Neutral	Weak	Strong
Supply side settings			
Wind + utility PV	Neutral cost reductions	Slower cost reductions	Rapid cost reductions
Grid scale storage costs	Neutral cost reductions	Neutral cost reductions	Neutral cost reductions
Small scale PV + distributed battery costs	Neutral cost reductions	Neutral cost reductions	Neutral cost reductions
Gas market settings			
Gas demand: LNG export	Neutral	Weak	Strong
Gas demand: Residential/commercial/industry	Neutral	Weak	Strong***
Gas demand: Gas powered generation	Model outcome	Model outcome	Model outcome

* Emissions reduction trajectory assumptions are discussed further in Section 2.1.4 below.

** AEMO notes the recent Queensland election outcome and will determine the most appropriate assumption to apply for the QRET through stakeholder consultation.

*** Underlying growth strong, but increased shift to electricity for heating and industrial processes will moderate any increase.

Sensitivities are used to assess how specific drivers could impact the Neutral outlook for generation and transmission development.

Proposed sensitivities include, but are not limited to:

- *How could the proposed Snowy 2.0 project impact generation and transmission development across the NEM?*
- *How could a greater uptake and orchestration of DER (behind-the-meter generation and storage, demand response, energy efficiency, and load shifting) impact large-scale generation and transmission development?*
- *How could proposed additional Bass Strait interconnection, for instance driven by the Battery of the Nation project, impact generation and transmission development across the NEM if it was built sooner than currently projected?*

ACALET Response

In regard to scenarios to be modelled, and as previously stated the key contextual setting for this would be to ensure the broadest range of technology solutions were available for selection and application in an integrated system. This would include low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage in the period post 2030, and gas with carbon capture and storage.

The current ISP consultation document does not have power generation technology neutrality as a guiding principle or assumption. Scenarios to be modelled therefore would need to include the full range of technologies including coal and CCS.

As indicated in 1.1 a key consideration in the modelling should be modelling at a time interval/granularity that reflects the realities of grid balancing. Too large a time interval will not reveal supply/demand mis-match issues such as that experienced as recently as January 18-19 in South Australia and Victoria where wholesale power prices were high for extended periods of time⁴.

Another proposed sensitivity is “How could the deployment of dispatchable coal-fired power generation with carbon capture and storage in hubs such as the Surat Basin in Queensland, the Darling Basin in NSW and the Gippsland Basin in Victoria impact generation and transmission development across the NEM?”

⁴ <https://www.aer.gov.au/communication/wholesale-electricity-price-spikes-in-victoria-and-south-australia-trigger-regulator-report>