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Ms Audrey Zibelman,
Chief Executive Officer,
Australian Energy Market Operator

27 February 2018

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

Dear Ms Zibelman

The ACA Low Emissions Technologies Ltd (ACALET) welcomes the opportunity to respond in full 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.

ACALET has previously provided to AEMO a response to "stakeholder input to modelling (questions 1.1 and 1.2) by the required date of 2 February 2018. In this letter ACALET is providing 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.

ACALET has a number of significant concerns regarding the consultation process being undertaken by AEMO as part of their preparation of their Integrated System Plan.

AEMO is not adhering to the specific Finkel recommendations

AEMO is moving beyond the recommendations of the Finkel Review in preparing an Integrated System Plan in place of what it was recommended it do in preparing an Integrated Grid Plan.

An Integrated System Plan would need to include total system requirements across the NEM which is not what the Finkel review recommended and is far from what the AEMO plan is attempting to achieve. The AEMO plan appears to be a plan of integrating more renewables into the grid and is not considering total system requirements. It is not enabling the highest grid stability at the lowest cost while still achieving long term emissions targets.

AEMO is choosing to exclude technologies

AEMO's questions are purely focused on renewable energy electricity generation technologies, in the form of renewable energy zones (REZ). There are no questions seeking response to other technology options or combinations of technology options.

At the outset, it is unclear why AEMO would be more concerned about trying to increase REZ's as opposed to ensuring a low cost and reliable grid. As noted in section 4.3.8 of the ISP "The displacement of synchronous generation by non-synchronous generation is projected to greatly reduce system strength". System strength and the ability to ensure a reliable, lowest cost grid should be AEMO's primary concern.

It would seem prudent that 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 subsequently 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.

AEMO have not taken into account advice from previous reviews in undertaking this task

In taking on a role of developing an Integrated System Plan, and going beyond Finkel review recommendations that have been accepted by the Council of Australian Governments, AEMO have chosen to ignore the advice provided to the Council of Australian Governments as part of the Vertigan review.

ACALET welcomes the opportunity to provide a response for the Integrated System Plan for the National Electricity Market. The 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
27 February 2018

Integrated System Plan Consultation – ACALET Detailed Response

General Comments From ACALET

ACALET has a number of significant concerns regarding the consultation process being undertaken by AEMO as part of their preparation of their Integrated System Plan.

1. AEMO is not adhering to the specific Finkel recommendations

AEMO is not following the recommendations made by the Finkel Review.

As AEMO states itself in their Integrated System Plan Consultation document, The Independent Review into the Future Security of the National Electricity Market (Finkel Review) recommended:

> *"By mid-2018, the Australian Energy Market Operator, supported by transmission network service providers and relevant stakeholders, should develop an integrated grid plan to facilitate the efficient development and connection of renewable energy zones across the National Electricity Market."*

AEMO has advised in their Integrated System Plan Consultation document that:

> *"AEMO is calling this an Integrated System Plan (ISP), rather than an integrated grid plan…"*

AEMO is moving beyond the recommendations of the Finkel Review in preparing an Integrated System Plan in place of what it was recommended it do in preparing an Integrated Grid Plan.

An Integrated System Plan would need to include total system requirements across the NEM which is not what the Finkel review recommended and is far from what the AEMO plan is attempting to achieve. The AEMO plan appears to be a plan of integrating more renewables into the grid and is not considering total system requirements. It is not enabling the highest grid stability at the lowest cost while still achieving long term emissions targets.

2. AEMO is choosing to exclude technologies

AEMO's questions are purely focused on renewable energy electricity generation technologies, in the form of renewable energy zones (REZ). There are no questions seeking response to other technology options or combinations of technology options. AEMO appears to have decided that it is only renewable energy electricity generation technologies, in the form of renewable energy zones (REZ), supported by transmission augmentation and storage, that are to be included as part of the technologies to be considered as part of the Integrated System Plan.

At the outset, it is unclear why AEMO would be more concerned about trying to increase REZ's as opposed to ensuring a low cost and reliable grid. As noted in section 4.3.8 of the ISP "The displacement of synchronous generation by non-synchronous generation is projected to greatly reduce system strength". System strength and the ability to ensure a reliable, lowest cost grid should be AEMO's primary concern. It would seem prudent that 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 subsequently 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.

It would also seem prudent that 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 HELE coal and subsequently 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 augmentation[1]. AEMO appears to have ignored such facts in focusing on a narrow set of technology options.

3. AEMO have not taken into account advice from previous reviews in undertaking this task

The following extract is from the Vertigan panel review of NEM governance for the CoAG Energy Council delivered in October 2015:

"The Panel considers that AEMO should not be specifically tasked with policy or market development roles, and that it should be more clearly focused on developing procedures for the purposes of market operation within the energy market. AEMO's contribution to more general market development should be through the AEMC's recommended strategic process. In relation to roles other than market operations, the Panel's view is that AEMO should only undertake tasks outside of its core responsibilities where they do not conflict with those responsibilities and are undertaken on a contractual basis."

In taking on a role of developing an Integrated System Plan, and going beyond Finkel review recommendations that have been accepted by the Council of Australian Governments, AEMO have chosen to ignore the advice provided to the Council of Australian Governments as part of the Vertigan review.

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

4. Other concerns

ACALET also has concerns with the assumption that renewables are the cheapest energy sources on a LCOE basis. This does not take into account the significant cost impacts of providing firm backup supply for times when intermittent renewable power plants are unable to generate, nor the expensive upgrades to transmission networks, nor the provision of technologies to ensure essential ancillary services, and system strength is available at all times to ensure a secure grid.

In regard to transmission networks, ACALET contends that, in order to ensure lowest cost outcomes for electricity consumers, the existing regulatory process for new transmission (RIT-T) should be maintained. The cost of providing transmission infrastructure is substantial when intermittent renewable generation technology is firmed with energy storage such as pumped storage hydro. As highlighted earlier, 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 augmentation[2].

[2] http://www.news.com.au/finance/business/snowy-hydro-20-passes-feasibility-study/news-story/567baa5e07f98ac5c20cd182106063c4

Specific ACALET Response

2.1 What are the key factors which can enable generation and transmission development to be more coordinated in future?

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:

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 HELE coal and subsequently 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 HELE coal and subsequently 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 augmentation[3].

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, and gas with carbon capture and storage should be considered. The large-scale renewable generation case should provide a minimum of 72 hours of equivalent fuel assurance (to allow a level of continuous power supply), a benchmark recently proposed by PJM[4], a major power system operator in the United States which has a much larger and more widely integrated grid system than the NEM.

[3] http://www.news.com.au/finance/business/snowy-hydro-20-passes-feasibility-study/news-story/567baa5e07f98ac5c20cd182106063c4

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

3.1 Does this analysis capture the full range of potential REZs in eastern Australia?

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

Response

At the outset, it is unclear why AEMO would be more concerned about trying to increase REZ's as opposed to ensuring a low cost and reliable grid. As noted in section 4.3.8 of the ISP "The displacement of synchronous generation by non-synchronous generation is projected to greatly reduce system strength". System strength and the ability to ensure a reliable, lowest cost grid should be AEMO's primary concern. 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, 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 low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as part of the range of allowed power generation and storage options.

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 time[5]. Another proposed sensitivity is "How could the deployment of dispatchable HELE coal-fired power generation initially and subsequently with carbon capture and storage in Queensland, NSW and Victoria using hubs under development such as the Surat Basin in Queensland, Darling Basin in NSW and the Gippsland Basin in Victoria, impact generation and transmission development across the NEM?"

[5] https://www.aer.gov.au/communication/wholesale-electricity-price-spikes-in-victoria-and-south-australia-trigger-regulator-report

3.2 What other factors should be considered in determining how to narrow down the range of potential REZs to those which should be prioritised for development?

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

Response

In regard to scenarios to be modelled, 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, 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 all available technologies including low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage.

3.3 What are the potential barriers to developing REZs, and how should these be addressed?

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

Response

At the outset, it is unclear why AEMO would be more concerned about trying to increase REZ's as opposed to ensuring a low cost and reliable grid. As noted in section 4.3.8 of the ISP "The displacement of synchronous generation by non-synchronous generation is projected to greatly reduce system strength". System strength and the ability to ensure a reliable, lowest cost grid should be AEMO's primary concern. 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 to ensure the highest reliability possible at the lowest cost while also achieving future emissions targets. This would include low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as well as to seek new REZ's. 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 low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as part of the range of allowed power generation and storage options.

4.1 Have the right transmission options been identified for consideration in the ISP?

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

Response

The transmission options have been limited to increasing the integration of renewable technologies. The options have not considered how to minimise additional grid costs while ensuring a highly reliable grid and achieving future 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 so that the lowest overall cost system, including lowest cost grid options, were considered. This would include low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage that would use the current grid system and require very little additional grid infrastructure.

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 low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as part of the range of allowed power generation and storage options that would enable the lowest total system cost.

4.2 How can the coordination of regional transmission planning be improved to implement a strategic long-term outcome?

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

Response

Regional transmission planning should include all potential future generation options to ensure the most reliable and lowest cost solution while also achieving emissions reduction targets. As noted in the ISP, adequate system strength is essential in ensuring the grid remains stable and reliable. While requirements exist in SA for sufficient synchronous generation to be on line, further work is required for each region of the NEM as well as on a whole of NEM basis to ensure each region has sufficient synchronous generation at all times. As such, 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 providing for the most reliable and lowest cost solution while also achieving emissions reduction targets. This would include low emissions dispatchable power generation technologies such as HELE coal and subsequently 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. Scenarios to be modelled therefore would need to include low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as part of the range of allowed power generation and storage options.

4.3 What are the biggest challenges to justifying augmentations which align to an over-arching long-term plan? How can these challenges be met?

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

Response

The ISP does not represent an overarching long term plan. The ISP is not technology neutral and is limited to enabling a single technology choice namely renewable technologies. All the scenarios considered in the grid augmentation are adding cost with the only end gain being increased renewable technology penetration.

As noted in section 4.3.8, the displacement of synchronous generation by non-synchronous generation is projected to greatly reduce system strength. While we agree with this statement, what is unclear is why is it a given that synchronous generation is to be displaced by non-synchronous. The key contextual setting for the ISP would be to ensure the broadest range of technology solutions were available for selection and application in an integrated system to achieve the most reliable grid possible at the lowest cost while achieving the long term emissions targets. This would include low emissions dispatchable power generation technologies such as HELE coal and subsequently 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. Scenarios to be modelled therefore would need to include low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as part of the range of allowed power generation and storage options.

4.4 Is the existing regulatory framework suitable for implementing the ISP?

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

Response

The question has no place in this analysis as the ISP does not represent a long term plan. The ISP is not technology neutral and appears to be a renewables biased attempt at gaining support for increased grid infrastructure while appearing as an overarching long term plan in name only.

The key contextual setting for the ISP would be to ensure the broadest range of technology solutions were available for selection and application in an integrated system to achieve the most reliable grid possible at the lowest cost while achieving the long term emissions targets. This would include low emissions dispatchable power generation technologies such as HELE coal and subsequently 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. Scenarios to be modelled therefore would need to include low emissions dispatchable power generation technologies such as HELE coal and subsequently with carbon capture and storage, and gas with carbon capture and storage as part of the range of allowed power generation and storage options.