Planning and Forecasting 2019 Consultation Process

Briefing Webinar

Wednesday 3 April 2019
Agenda

Welcome and overview
Summary and analysis of submissions
Next steps
Time for clarification
Welcome and overview
Today’s facilitation team and participants

Facilitators

Nicola Falcon
General Manager, Forecasting, AEMO

Andrew Turley
Manager, Integrated Energy Systems, AEMO

Phil Hirschhorn
Senior Partner and Managing Director, BCG

Participants

• Angela Taljaard, ACCC
• Trish Auld, Adani
• Oliver Nunn, AEMC
• Adam Day, AER
• Jacqueline Bridge, AusNet
• Ben Skinner, Australian Energy Council
• Lillian Patterson, Clean Energy Council
• Peter Wormwald, Delta Energy
• Terrence Hogan, Department of the Environment and Energy
• Tyson Vaughan, Enel
• Jill Cainey, ENA
• Jillian Vanderstoep, Energy Queensland
• Justin Gardner, Energy Queensland
• Craig Pollard, Energy Queensland
• Donovan Marsh, Energy Security Board
• Ron Logan, ERM
• Nick Cutler, EY

• Clare Giacomantonio, EY
• Tarek Alsampaile, FRV
• Umer Siddique, FRV
• Prajit Parameswar, Hydro Tasmania
• Vedran Kovac, Hydro Tasmania
• David Headberry, Major Energy Users
• Tom Hare, North Queensland Bio-Energy
• Susan Cunningham, NSW Treasury
• Alex Fattal, Origin Energy
• Chris Lim, PIAC
• Enrique Montiel, Powerlink
• Samuel Oosterholt, SA Power Networks
• John Sligar, Sligar and Associates
• Joe Hemingway, Stanwell
• Bradley Woods, TasNetworks
• Dev Tayal, Tesla
• Michael Vawser, Total Eren
• Lulu Shao, Transgrid
AEMO is committed to continually improving our suite of planning publications to better meet stakeholder needs.

We respect your expertise and value all feedback, which is critical in guiding meaningful progress and developing a strategic vision for the future development of Australia’s energy system.
Today’s webinar is part of our broader stakeholder engagement and consultation process.

**Deliverables**
- **5 Feb** Forecasting and planning consultation published
- **20 Mar** Submissions on forecasting and planning consultation
- **Date TBC** Final scenario and assumptions report published

**Engagements and consultations**
- **19 Feb** Stakeholder workshop to address questions of clarification
- **3 Apr** Briefing webinar to summarise submissions
- **12 Apr** Stakeholder workshop to finalise scenarios and resolve issues
- **Date TBC** Potential additional stakeholder workshop

*Today*
We have taken steps to ensure this consultation process is objective and rigorous

An objective lens

- Engaged BCG to support in analysis of submissions and workshop design
- Deep expertise within the energy sector, as well as in process design and analysis

A rigorous approach

- Submission analysis approach employed an academic qualitative research methodology
- All submission content was thematically coded to a node structure using industry standard qualitative data analysis software
Thank you for your participation in Workshop 1; we have taken on board your feedback

<table>
<thead>
<tr>
<th>Key takeaways</th>
<th>Actions taken</th>
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| Improve the narratives that support each scenario | • We have designed Workshop 2 so that a core element is further developing the narratives of the scenarios  
• Additional scenario material is also being developed to support the scenario narratives |
| Consider role of policy in scenarios and modelling | • Consistent with themes of written submissions  
• Response being considered |
| A range of feedback on inputs, assumptions and material issues | • Consistent with themes of written submissions  
• We address some areas in this session and other areas are being considered  
• We have also designed elements of Workshop 2 specifically to address certain areas of concern |
| Increase transparency of submissions process | • We have publically published submissions received in this process  
• We are holding this Webinar to play back our findings to prepare all stakeholder for Workshop 2 |
Objectives for today’s session

1. Provide a high-level summary of the submissions received in order to frame areas of agreement, contention and uncertainty

2. Prepare participants for key areas related to the activities of Workshop 2

3. Ensure AEMO has accurately understood stakeholder submissions

Note: The purpose of today’s session is not to be a forum for debate of the accuracy or veracity of submissions
Summary and analysis of submissions
Summary and analysis of submissions

Overview and main themes
AEMO received 24 written submissions

Generators and Retailers

Network Service Providers

Other

Consulting Firms
Content within the submissions was analysed and synthesised into four broad topics

**Topic 1** — Approach to Engagement, 15 Organisations responded

**Topic 2** — Approach to Scenarios, 17 Organisations responded

**Topic 3** — Inputs and Assumptions, 24 Organisations responded
- Generation and Storage, 24 Organisations responded
- Networks, 13 Organisations responded
- Consumption, 10 Organisations responded
- Cross value chain, 9 Organisations responded
  - E.g., resilience modelling and system strength

**Topic 4** — Other Topics, 7 Organisations responded

A number of main themes emerged
## 10 main themes emerged from the analysis

<table>
<thead>
<tr>
<th>Theme</th>
<th>Frequency</th>
<th>Consensus</th>
</tr>
</thead>
<tbody>
<tr>
<td>- The <strong>consultation process</strong> and the efforts being made to increase engagement with stakeholders are positive</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>1</strong> Emissions reduction modelling needs to explicitly incorporate policies and account for stricter trajectories</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td><strong>2</strong> The current <strong>scenarios</strong> do not sufficiently capture the range of possible energy futures</td>
<td>High</td>
<td>Medium</td>
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<td><strong>3</strong> The modelling of <strong>generator retirements</strong> needs to account for earlier retirements, and be based on more than technical retirement age</td>
<td>High</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>4</strong> Improvements can be made to the <strong>Distributed Energy Resources</strong> modelling approach</td>
<td>High</td>
<td>Low</td>
</tr>
<tr>
<td><strong>5</strong> A commercial <strong>discount rate</strong> should be used, as opposed to a social discount rate below the WACC</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td><strong>6</strong> Increase the transparency and dynamism of <strong>Marginal Loss Factor</strong> modelling</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>7</strong> The establishment of more <strong>Renewable Energy Zones</strong> and their modelling</td>
<td>Medium</td>
<td>Low</td>
</tr>
<tr>
<td><strong>8</strong> When modelling benefits, incorporate <strong>ancillary benefits and services</strong>, or establish a market for these services</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td><strong>9</strong> <strong>System strength</strong> is an important issue and improvements need to keep being made in terms of how to incorporate it effectively into the models</td>
<td>Low</td>
<td>Medium</td>
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<tr>
<td><strong>10</strong> <strong>Resilience modelling</strong> approach: both HILP and mitigation options</td>
<td>Low</td>
<td>Low</td>
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High and medium frequency themes will be discussed in detail today.

<table>
<thead>
<tr>
<th>Consensus</th>
<th>Frequency</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
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<tbody>
<tr>
<td>Low</td>
<td>Low</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Low</td>
<td>Medium</td>
<td>4</td>
<td>5</td>
<td>6</td>
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<td>Low</td>
<td>High</td>
<td>7</td>
<td>8</td>
<td>9</td>
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<tr>
<td>Medium</td>
<td>Low</td>
<td>10</td>
<td>11</td>
<td>12</td>
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<tr>
<td>High</td>
<td>Medium</td>
<td>13</td>
<td>14</td>
<td>15</td>
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<tr>
<td>High</td>
<td>High</td>
<td>16</td>
<td>17</td>
<td>18</td>
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</table>

- **High** frequencies: Ancillary benefits and services, Discount rate, Emissions reduction modelling, System strength, MLF modelling, Scenario modelling approach, Generator retirement modelling, Resilience modelling, REZ modelling, DER modelling.

- **Medium** frequencies: Low, Medium, High.

- **Low** frequencies: Low, Medium, High.
Summary and analysis of submissions

Deep-dives on main themes
Theme 1: Emissions reduction modelling needs to explicitly incorporate policies and account for stricter emissions reduction trajectories

17 of 24 organisations responded: High frequency, high consensus

Main issue raised

Emissions reductions policies and targets are not explicitly considered within the scenarios

- “... AEMO should publish, consult on, and apply explicit emissions trajectories.”
- “... recommends AEMO clearly define policy settings in the core scenarios and consider potential alternative mainstream emission policies.”

Alternatives proposed

Explicitly include emissions reduction policies and targets as drivers

- Publish and consult on incorporated targets
- Model feasible alternative policies to maintain apolitical approach

Implications

AEMO is reflecting on our approach to modelling emissions reduction policies and targets. This area will be explored more in Workshop 2.
Theme 1: Emissions reduction modelling needs to explicitly incorporate policies and account for stricter emissions reduction trajectories (cont...)

17 of 24 organisations responded: High frequency, high consensus

Main issue raised

Emissions reductions trajectories for the Neutral scenario are too conservative

- “The Neutral scenario should represent a reasonable extrapolation of existing policies ...”
- “The approach to emissions proposed by AEMO implicitly assumes Australia does not fulfill its commitments under the Paris Agreement.”

Alternatives proposed

- Adopt a stronger emissions reduction trajectory as an input (including a number of specific suggestions ranging from 40% to 60%)
- Align emissions reduction trajectory to achieve the outcome of net zero emissions by 2050

Implications

AEMO acknowledges Australia’s commitment to the Paris Agreement on climate change and the role the electricity sector will play in meeting these objectives. We are reflecting on the feedback received around how this bipartisan commitment should be considered in the scenarios and will further explore this issue in Workshop 2.
Theme 2: Current scenarios do not sufficiently capture the range of possible energy futures

14 of 24 organisations responded: High frequency, medium consensus

<table>
<thead>
<tr>
<th>Main issue raised</th>
<th>Alternatives proposed</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>The fast change scenario does not represent a realistic edge case</td>
<td>Lower maximum demand</td>
<td>AEMO acknowledges the high level of uncertainty in the energy sector and the need to capture a range of plausible scenarios. We are open to the inclusion of a fifth scenario that addresses the points that have been raised here. This scenario will be developed in more detail in Workshop 2.</td>
</tr>
<tr>
<td>• “... recommends a scenario with significantly higher emission reduction be considered as a “book end” and to inform participants and policy makers of its practicality and cost.”</td>
<td>Higher energy efficiency induced reductions</td>
<td></td>
</tr>
<tr>
<td>• “Expanding modelling to include a combined high DER, high utility-scale storage uptake, and strong emissions policy scenarios”</td>
<td>Higher DER uptake</td>
<td></td>
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<tr>
<td></td>
<td>Higher EV uptake</td>
<td></td>
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<tr>
<td></td>
<td>Zero net emissions</td>
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</table>
Theme 3: The modelling of generator retirements needs to account for earlier retirements, and be based on more than technical retirement age

17 of 24 organisations responded: High frequency, high consensus

### Main issue raised

Modelling of generator retirements is based on a static technical retirement age
- “There is a high level of uncertainty on ... timing of coal retirements ... and the impact on reliability and security of supply are significant”
- “Greater focus (required) on understanding the reliability of aging plant”

### Alternatives proposed

- Consider early exit of coal generation (e.g., as a scenario)
- Consider revenue/cost adequacy as a key retirement factor
- Consider reliability of aging plants as a key retirement factor
- Greater consultation with participants on retirement and emission reduction approach

### Implications

At a minimum, AEMO is going to adopt and incorporate expected closure dates for generators instead of the blanket 50 year end of life assumption. The interactions of this area with other elements of the modelling, and additional proposed approaches, will be discussed in more detail in Workshop 2.
**Theme 4: Improvements can be made to the Distributed Energy Resources modelling approach**

12 of 24 organisations responded: High frequency, low consensus

<table>
<thead>
<tr>
<th>Main issue raised</th>
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<th>Implications</th>
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</thead>
<tbody>
<tr>
<td>DER modelling approach should be clarified and modified in areas</td>
<td>Provide full DER datasets</td>
<td>AEMO acknowledges the high level of uncertainty around DER and we have engaged two consultants to help update our projections. Draft outcomes have been shared at our Forecasting Reference Group and there will be opportunities for clarification in Workshop 2. In addition we are running a series of Electric Vehicles workshops to better understand future potential (next is on 30 April). The broader development of DER integration is an area we continue to refine.</td>
</tr>
<tr>
<td>• “... the forecast uptake of DER would be improved through the consideration of the following technical factors impacting uptake ...”</td>
<td>Assign DER an effective cost and allow the model to allocate</td>
<td>And a number of others ...</td>
</tr>
<tr>
<td>• “The significant potential impact of DER highlights the importance of incorporating accurate and transparent ... forecasts across modelled scenarios.”</td>
<td>Incorporate emerging hydrogen technologies</td>
<td></td>
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Theme 5: Improvements can be made to the discount rate approach

6 of 24 organisations responded: Medium frequency, high consensus

<table>
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<tr>
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</table>
| The social discount rate used is lower than the weighted average cost of capital (WACC)  
  - “Using a different discount rate for the NPV assessment to the WACC used to determine the annual cost of network developments and generation can lead to non-intuitive outcomes as the NPV will be above the initial cost of investment” | Adopt a commercial discount rate  
Explore lower social discount rate through sensitivity analysis | AEMO takes this feedback on board and will adopt the same commercial discount rate for both the WACC and the calculation of the net present value (NPV). |
Theme 6: Increase the transparency and dynamism of Marginal Loss Factor modelling

9 of 24 organisations responded: Medium frequency, medium consensus

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Increase the transparency (including more forecasting) and dynamism of MLF modelling</td>
<td>Improve accuracy of assumptions (e.g., shadow connection points)</td>
<td>AEMO acknowledges the importance of Marginal Loss Factors (MLFs) in assessing the commercial viability of new developments and how different generation, transmission and storage development options may impact MLFs. A market modelling workshop will be run on 16 April to address how we can best capture MLFs in this year’s ISP.</td>
</tr>
<tr>
<td>• “The inadvertent incorrect allocation of MLF could have a material impact on study results.”</td>
<td>Increase transparency of MLF assumptions</td>
<td>Consider long-term trajectory/dynamic MLF outlook</td>
</tr>
<tr>
<td>• “The year on year variability and lack of transparency in the MLFs creates uncertainty for generators and connection proponents”</td>
<td>Consider impact of a MLF-reform scenario</td>
<td></td>
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</table>

AEMO acknowledges the importance of Marginal Loss Factors (MLFs) in assessing the commercial viability of new developments and how different generation, transmission and storage development options may impact MLFs. A market modelling workshop will be run on 16 April to address how we can best capture MLFs in this year’s ISP.
Theme 7: The establishment of more Renewable Energy Zones and their modelling

11 of 24 organisations responded: Medium frequency, low consensus

<table>
<thead>
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<tr>
<td>There are areas where the modelling of REZ in terms of assumptions, inputs, and other factors and considerations could be improved</td>
</tr>
<tr>
<td>• “While we understand the original driver for excluding either wind or solar from certain proposed renewable energy zones in the inaugural ISP, these exclusions appear somewhat misaligned with industry developments, and may eliminate economically optimum solutions”</td>
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<table>
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<tr>
<th>Alternatives proposed</th>
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<tbody>
<tr>
<td>Normalise the REZ locational costs on a more granular and national basis, rather than using regional categories</td>
</tr>
<tr>
<td>Account for transmission capacity changes</td>
</tr>
<tr>
<td>Incorporate economies of scale and synergies for generation and transmission builds (e.g., solar, wind, etc.)</td>
</tr>
<tr>
<td>Build limits for wind and solar; avoid inflating interconnector costs</td>
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<table>
<thead>
<tr>
<th>Implications</th>
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<tbody>
<tr>
<td>AEMO is updating assumptions and methodology in relation to existing zones to better reflect current market developments. Other suggestions will be considered on a case-by-case basis to evaluate merit of inclusion based on availability of information, feasibility of approach, and materiality of change.</td>
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</table>
Theme 7: The establishment of more Renewable Energy Zones and their modelling

11 of 24 organisations responded: Medium frequency, low consensus

**Main issue raised**

Additional REZs are required to increase strength and security of the NEM

- “The addition of a new REZ in Central Northern Victoria around the Glenrowan and Shepparton terminal stations.”
- “… several priority renewable energy zones, including: Northern NSW; South-East NSW and ACT; Southern NSW; South-West NSW; and Central NSW”

**Alternatives proposed**

- The addition of a REZ in central north Victoria
- The addition of a REZ in New England
- The addition of a network of REZs across NSW

**Implications**

AEMO is actively considering the inclusion of a new Renewable Energy Zone in central north Victoria. We are also considering the inclusion of additional Renewable Energy Zones in other regions based on feedback.
There are significant interactions between many of the main themes. These interactions will be explored in Workshop 2.
Potential implications for moving forward

Consensus

- **High**
  - Ancillary benefits and services
  - Discount rate
  - Emissions reduction modelling

- **Medium**
  - System strength
  - MLF modelling
  - Scenario modelling approach
  - Generator retirement modelling

- **Low**
  - Resilience modelling
  - REZ modelling
  - DER modelling

**Frequency**

- **Low**
  - Continue as planned

- **Medium**

- **High**
  - Adopt unless impractical

**Watch for partisan themes consider bespoke analysis**

**Important issues with diverse views consider through scenario modelling**
Proposed next steps for main themes

Adopting into approach

1. Approach to emissions reduction modelling
2. Scenario modelling
3. Generator retirement modelling
4. DER modelling approach
5. Use commercial discount rate
6. MLF modelling
7. REZ modelling

Under consideration and to be discussed at Workshop 2

1. Approach to emissions reduction modelling
2. Scenario modelling

Under consideration and being followed up via other avenues

1. Approach to emissions reduction modelling
2. Scenario modelling
3. Generator retirement modelling
4. DER modelling approach
5. Use commercial discount rate
6. MLF modelling
7. REZ modelling
In addition to the main themes, we are listening and taking on board your suggestions in a range of other areas.

As a result of your feedback we have:

- Corrected the MLFs in Tasmania
- Adjusted build limits if they were less than the current known interest reported in the Generation Information Page
- Adjusted the mix of fuels considered in REZ if known interest exists
- Changed the correlation between DER uptake and the rate of change in the scenario definitions to remove potential internal inconsistency
- Proposed to change the generation cost trajectory in the Neutral scenario based on the CSIRO's two degree scenario
- Proposed to run a demand forecasting workshop with subject matter experts on April 29 to consider the merits of suggested methodology improvements and how they could be implemented
Next steps
We welcome your participation in Workshop 2

Friday 12 April
9:00am–5:00pm AEDT (9:30am start)

The offices of Boston Consulting Group
Level 41, 161 Castlereagh St, Sydney NSW 2000

Where possible it would be appreciated if attendees from Workshop 1 attend to maintain continuity

RSVP still open by email
forecasting.planning@aemo.com.au.

Please nominate any dietary requirements
High level structure and objectives of Workshop 2

Scenario narrative development
Develop a narrative for each of the scenarios and define key factors about the world we would need to believe

Inputs and assumptions
Understand and refine key inputs and assumptions required to support each of the developed scenarios

Analyses to strengthen scenarios
Identify additional bespoke analyses required to strengthen scenarios, as well as how to perform them
AEMO is committed to continually improving our suite of planning publications to better meet the needs of our stakeholders.

Your feedback is a critical element of this process.

We look forward to continuing our work with you in developing a strategic vision for the future development of Australia’s energy system.
Time for clarification