2013 PLANNING STUDIES: RESPONSE TO CONSULTATION

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

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1 Executive Summary

This report summarises and provides AEMO's responses to stakeholder submissions received as part of the 2013 Planning Consultation.[1]

The Consultation, which closed on 15 March 2013, received five formal submissions from: Stanwell, GDF SUEZ Australian Energy (GDFSAE), TransGrid, Alinta Energy and ElectraNet. In addition, AEMO collected feedback from presentations at other forums including the Planning and Modelling Forum, National Generators Forum, Energy Networks Association, Short Term Trading Market Consultative Forum, National Gas Emergency Response Advisory Committee, Market Modelling Working Group, and a briefing of jurisdictional stakeholders.

The key themes identified include:

- Support for establishing the Planning and Modelling Forum (PMF) and requests for further information about its structure and potential scope. Comments were received regarding membership, timeframes and dissemination of information. *These comments formed an input into discussions at the first PMF meeting in April 2013.*
- The need for strong engagement with network service providers to ensure consistency when developing connection point demand forecasts, and to bolster local knowledge when integrating short- and long-term network planning. *AEMO remains committed to stakeholder engagement in the development of its planning information and reports.*
- The importance of transparency regarding input assumptions; with further clarification requested about demand forecasting, treatment of intermittent generation, carbon price assumptions, and AEMO's gas modelling approach. *In response, AEMO is providing additional explanation and clarification of these assumptions in this response document, and on our planning assumptions website.*
- Concerns that AEMO's current scenario descriptions may warrant review, particularly with respect to gas and carbon price assumptions. Stakeholders were keen to be involved in any review of scenario definitions, and suggested that sensitivity studies may help to address concerns in the short term. *In response, AEMO intends to explore the need for scenario review with the PMF during 2013.*
- Support for the use of probabilistic modelling in the Electricity Statement of Opportunities (ESOO), and limited concern regarding AEMO's plan to decommission the existing supply-demand calculator. *As a result, AEMO will adopt the new modelling approach in the ESOO, and the existing supply-demand calculator will be decommissioned. All data sets previously available in the calculator will continue to be published alongside the ESOO.*
- Support for improving the accuracy of emissions intensity data, though with concerns raised about the confidentiality and appropriateness of historical data for this purpose. *AEMO has subsequently requested consent from generator participants for access to more recent emissions intensity data. The response was mixed, and AEMO proposes to supplement the consented data with a broader set of information planned for publication by the Clean Energy Regulator in February 2014.*
- The value of ongoing engagement with AEMO through the consultation process, and continued discussion or peer review throughout the year as analysis and results become available. *AEMO will continue to engage with stakeholders across the year using peer review processes, briefing sessions, industry forums, and working group discussions.*

[1] AEMO. Available: http://www.aemo.com.au/Consultations/National-Electricity-Market/~/media/Files/Other/planning/2013Consultation/Planning_Studies_2013_Information_and_Consultation_Paper.ashx. Viewed 30 January 2013.

Following furher discussions with relevant stakeholders to clarify and address the issues, AEMO's response to 2013 Planning Consultation comprises of:

- Publication of this response paper on AEMO website "2013 Plannig Consulation"[2]
- Updated input data files and methodology assumptions papers identified in section 2 and available on AEMO website " 2013 Planning Assumptions"[3]
- Clarifications and responses to specific technical questions in tables 3.2.1 to 3.2.8 in this document

2 Changes to Input Data & Assumptions

AEMO's input data and assumptions change throughout the year as stakeholder feedback is received, new data becomes available, or modelling improvements are explored. The most up-to-date set of assumptions is maintained on AEMO's website.[4]

Since publication of the Consultation Paper in January 2013, the following changes have occurred:

- The latest sets of marginal loss factors have been published.[5]
- Forecast fuel and capital costs have been updated to reflect a common basis of currency exchange rates.
- Wind contribution factors to peak demand have been aligned with AEMO's most recent calculations based on historical data.[6]
- Wind network connection costs and build limits for new investment have been provided in line with the 2012 National Transmission Network Development Plan (NTNDP) assumptions.
- Carbon price trajectories[7] are have been provided on a consistent basis with the 2012 NTNDP trajectories (and Treasury modelling assumptions), while AEMO is in the process of reviewing these values for the 2013 National Electricity Forecasting Report (NEFR).
- The 2013 Planning Consultation Methodology and Input Assumptions[8] document has been updated to provide greater clarity on modelling methodology (gas, power system, and capacity expansion modelling).
- A separate document titled 'Demand Trace Development'[9] has been produced covering AEMO's demand trace development process.

3 Response to Stakeholder Feedback

AEMO sought feedback from industry and jurisdictional stakeholders through informal presentations to industry technical groups, and through the formal 2013 planning consultation process. The following sections provide AEMO's views on items raised through of these approaches. Section 3.1 discusses themes raised informally, while Section 3.2 addresses specific comments made through formal submissions.

[2] AEMO. Available: http://www.aemo.com.au/Consultations/National-Electricity-Market/Planning-Studies-2013-Consultation. Viewed 12 June 2013
[3] AEMO. Available: http://www.aemo.com.au/Electricity/Planning/Related-Information/2013-Planning-Assumptions. Viewed 12 June 2013
[4] AEMO. See note 2.
[5] AEMO. Available http://www.aemo.com.au/Electricity/Market-Operations/Loss-Factors-and-Regional-Boundaries. Viewed 12 June 2013.
[6] AEMO. Available: http://www.aemo.com.au/Electricity/Planning/Related-Information/Wind-Contribution-to-Peak-Demand. Viewed 12 June 2013.
[7] AEMO. Available: http://www.aemo.com.au/Consultations/National-Electricity-Market/~/media/Files/Other/planning/2013Consultation/Planning_Studies_2013_Additional_Modelling_Data.ashx. Viewed 12 June 2013.
[8] AEMO. Available: http://www.aemo.com.au/Consultations/National-Electricity-Market/~/media/Files/Other/planning/2013Consultation/Planning_Studies_2013_Methodology_and_Input_Assumptions.ashx. Viewed 12 June 2013
[9] AEMO. Available: http://www.aemo.com.au/Consultations/National-Electricity-Market/Planning-Studies-2013-Consultation. Viewed 12 June 2013

3.1 Informal feedback through presentations at stakeholder forums

AEMO collected feedback from presentations at several forums, including the Planning and Modelling Forum, National Generators Forum, Energy Networks Association, Short Term Trading Market Consultative Forum, National Gas Emergency Response Advisory Committee, Market Modelling Working Group, and a briefing of jurisdictional stakeholders.

The majority of comments received through these forums were also captured through the formal submission process. This section outlines comments and responses that are not covered specifically in Section 3.2. Detailed technical discussion is not presented here, and has been addressed through follow-up discussions with relevant stakeholders.

- Stakeholders supported AEMO's proposal to only undertake extensive NTNDP modelling if required due to significant economic, policy, or technology changes.

  Some participants suggested that AEMO's current scenario descriptions may be due for review, given changes in the economic and policy space since they were developed in 2011. AEMO is currently assessing the need for such a review, and intends to discuss this with the Planning and Modelling Forum.

- Stakeholders highlighted the usefulness data provided with the NTNDP and other AEMO publications. Examples cited were the constraint workbooks, hourly demand profiles and generation cost information.

  AEMO will continue to publish this data and refresh it as new information comes to light.

- Stakeholders were generally positive about AEMO's 2012 forecasting report[10] but raised concerns about demand definitions and requested that forecasts be expressed in a way that is consistent with how AEMO publishes demand operationally and in its other planning publications.

  AEMO is currently undertaking an internal review and standardisation process for demand defitions to improve consistency in our reporting and publication materials.

- There was some concern that the Heywood interconnector upgrade was a forced inclusion in the NTNDP prior to the RIT-T for that project being finalised.

  The Hewyood interconnector option was not included as a committed project in the 2012 NTNDP, but rather as a conceptual project that had shown sufficient market benefits. Given the NTNDP's long-term nature, it mostly includes augmentation opportuniteis that have not yet commenced the RIT-T process.

  The long-term plans identify interconnector upgrades where modelling indicates optimal net market benefits, and AEMO uses the best available modelling to identify these upgrade opportunities. During development of the 2012 NTNDP, AEMO and ElectraNet were conducting detailed modelling of upgrade options to the Heywood interconnector. These studies were well advanced and indicated that an upgrade would deliver positive net market benefits. For these reasons it was included in the NTNDP.

- Participants stressed the importance of transparency in modelling assmptions and input data for both electricity and gas; with further clarification requested on demand traces for all scenarios, plant retirements, wind developments, carbon pricing, gas storage facilities, and linepack.

  Much of this information is available on AEMO's website[11][12], and has now been supplemented with further details based on specific stakeholder questions.

- Stakeholders commented that there may be an unwillingness to provide consent for the release of NGER Emissions Intensity data due to commercial confidentiality issues.

[10] AEMO. National Electricity Forecasting Report (NEFR) 2012. Available: http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2012. Viewed 12 June 2013.
[11] AEMO. See note 9.
[12] AEMO. Available: http://www.aemo.com.au/Gas/Planning/Gas-Statement-of-Opportunities. Viewed 12 June 2013.

Since initiating the emissions intensity review project, AEMO has been advised that (following changes to NGER Act 2007) the Clean Energy Regulator will publish 2012-13 emisisons intensity data in February 2014 for all generation facilities. Once published, AEMO intends to undertake a comprehensive review of the data ahead of use.

3.2 Formal feedback through planning consultation submissions

Five formal submissions[13] were received in response to the Planning Consultation. These were from Stanwell, GDF SUEZ Australian Energy, TransGrid, Alinta Energy and ElectraNet. Through the Consultation Paper, AEMO specifically sought comments regarding the:

- Value of scenario/sensitivity modelling (Section 3.2.1).
- Accuracy and relevance of input data and modelling assumptions (Section 3.2.2).
- Improving emissions intensity data accuracy (Section 3.2.3).
- Topics and information sharing approaches for the Planning and Modelling Forum (Section 3.2.4).
- Development of a connection point energy forecasting methodology for electricity and gas (Section 3.2.5).
- Value of integrating short- and long-term modelling (Section 3.2.6).
- The use of time sequential modelling in the Electricity Statement of Opportunities (Section 3.2.7).
- Proposed consolidation of AEMO's planning publications to improve the accessibility and timeliness of published information (Section 3.2.8).

The tables below, grouped by topic, provide a summary of submissions and AEMO's responses.

[13] AEMO. See note 2.

3.2.1 Scenario modelling

AEMO sought stakeholder views on AEMO's scenarios, and potential areas of sensitivity. Feedback was broadly supportive of scenario-based planning; however, some stakeholders questioned whether the current scenario definitions were due for revision due to environmental and political changes.

AEMO's current scenarios were defined via a stakeholder reference group in late 2011, ahead of the 2012 NTNDP modelling. Although the scenario descriptions have not been updated, specific input data (such as demand and carbon trajectories) are updated over time to ensure continued relevance.

AEMO agrees that scenario modelling is important to capture the possible impact of uncertainties. However, prudent use of resources does limit the number of detailed studies that can be undertaken in any year. As such, AEMO prioritises its investigations based on stakeholder feedback, and internal assessment, to determine which studies are likely to deliver the most value.

AEMO is currently reviewing the need to refresh its scenario definitions, and intents to discuss this with the Planning and Modelling Forum.

No.	Stakeholder	In submission	Specific comments	AEMO's response
1	ElectraNet	Page 2	If AEMO does not choose to undertake detailed modelling for minor assumption changes, it is important AEMO quantify what changes are necessary to require a refresh of the outputs.	Deciding whether or not to redo the modelling is initially based on a review of the input data. The key inputs that might change this year are load forecasts. AEMO does not intend to nominate a specific threshold change that will trigger remodelling. Rather AEMO will conduct high level analysis and preliminary modelling to identify whether changes in these forecasts would have a material impact on generation expansion.
2	TransGrid	Section 6, page 7	TransGrid considers that provision of demand traces for the Fast Rate of Change scenario and the Decentralised World scenario would add value to the 2013 NTNDP.	AEMO intends to provide a set of demand traces for relevant scenarios after the 2013 demand projections become available.

3.2.2 Input modelling

AEMO sought feedback on the accuracy and relevance of proposed input data and modelling assumptions for use in the 2013 planning studies. Stakeholder feedback on this topic included the specific technical questions addressed in the table below.

No.	Stakeholder	In submission	Specific comments	AEMO's response
3	Stanwell	Section 3, page 2	Further clarification is sought on carbon pricing assumptions. Under each price path carbon prices are held constant at $23.00/tonne in the first three years, despite there being legislated pricing until 2014–15. Also, the 'No Price' case actually has a $2.00/tonne price throughout the modelling period. It is unclear why carbon price would not move to zero to reflect successful repeal of the legislation. Finally, the 'High' case transitions to $48.00/tonne in 2015–16 and then grows relatively aggressively beyond this point. This case forms part of Scenario 1 (fast rate of change) which suggests that strong economic growth is associated with a higher carbon price. This may require further explanation.	The carbon prices presented in the additional modelling data files have been revised, and are now consistent with those used in the 2012 NTNDP (based on Treasury modelling). AEMO may update these during 2013 if a new set of trajectories becomes available. AEMO notes that the high carbon price is intended for use in the 'Fast Rate of Change' scenario. The narrative for this scenario is described on AEMO's website.[14] In particular, it is characterised by strong legislated carbon reduction targets, coupled with fast recovery from the global financial crisis and strong resource demands in China and India.
		Section 4.2.3, page 3	In terms of the price paths identified in the initial modelling, there appear to be some inconsistencies in terms of forecast carbon prices beyond the fixed price period. Stanwell would appreciate some further advice from AEMO regarding the rationale that underpins the carbon price path assumption.	

[14] AEMO. Available at: http://www.aemo.com.au/Electricity/Planning/Related-Information/~/media/Files/Other/planning/2012_Scenarios_Descriptions.ashx. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
4	Stanwell	Section 3, page 2	It is unclear as to why Green Power is falling in Scenario 1. In the event that there is a high gas price, high carbon price, and high emissions reduction target, the expectation would be that there is an even greater drive towards additional renewable investment.	In recent years, the rate of growth in Green Power sales seems to have slowed, although no audited data has been made available since 2009. This observed reduction in growth may be due to a combination of the global financial crisis, the pending carbon price, rising energy prices, and a shift in the green consumers focus to solar panels. Accordingly, scenario 1 uses low Green Power sales. This assumption is driven by higher expected energy bills and a perception that the country is already doing a lot.
5	Stanwell	Section 3, page 2	Stanwell seeks clarification about the rationale behind moderate R&D support under Scenario 5. It is unclear why an environment of low coal price, low gas price and no reduction target would provide the necessary incentives to invest in innovation at a moderate level rather than at a weak level.	AEMO concurs that R&D support under Scenario 5 should be 'low'. The scenario summary table has been updated in the methodology and assumptions paper.
6	Stanwell	Section 3, page 2	What is the rationale behind the inclusion of geothermal generation in the current modelling? Is there sufficient certainty around such generation for its inclusion?	The inclusion of geothermal generation is based on discussions at the Scenario Reference group and supported by documents by Worley Parsons report[15] (Section 5.8, page 65) and the BREE report[16] on major electricity generation projects (Table 3, page 16). The BREE report, *Australian Energy Technology Assessment*, suggests geothermal will be available from 2020. This is supported by AEMO's generation information survey.

[15] AEMO. Available at: http://www.aemo.com.au/Electricity/Planning/National-Transmission-Network-Development-Plan/~/media/Files/Other/planning/WorleyParsons_Cost_of_Construction_New_Generation_Technology_2012%20pdf.ashx. Viewed 12 June 2013.
[16] AEMO. Available at: http://www.bree.gov.au/documents/publications/megp/MajorElectricityGenerationProjectsNov2012.pdf. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
7	Stanwell	Section 3, page 2	What assumptions are made surrounding wind in Queensland?	Assumptions about new entry wind generation including wind bubble[17] definitions, the profiles for the bubbles, connection points, connection costs, build limits and capital costs are contained in the excel file accompanying the consultation paper.[18]
8	Stanwell	Section 3, Page 2 Section 4.2.2, Page 3	The new entrant fuel price grows strongly across the modelling period in all scenarios. Does this assume that the international Liquefied Natural Gas (LNG) market moves in a similar manner (i.e. uncapped increases)? It would be beneficial if AEMO could provide some clarity around some of the assumptions in the modelling such as new entrants and future gas prices. In particular, we seek clarity around the assumptions made for LNG (e.g. does the modelling assume a net-back parity?) and any assumptions about price floors and ceilings.	Following clarifications with Stanwell, AEMO advises that the scenario descriptions document that includes descriptions about what is happening in relation to LNG in the environment is available at: *http://www.aemo.com.au/Electricity/Planning/Related-Information/~/media/Files/Other/planning/2012_Scenarios_Descriptions.ashx.* The ACIL Tasman report, which translates these short descriptions into numbers that are used in AEMO's planning publication's modelling and analysis is available at: *http://www.aemo.com.au/Electricity/Planning/Related-Information/~/media/Files/Other/planning/ACIL_Tasman_Fuel_Cost_ Projections_2012.ashx.* The LNG assumptions, data, and prices used in AEMO's planning publications are outlined in Section 2 of the ACIL Tasman report.[19] This includes assumed Asia-Pacific LNG, Gladstone LNG, and effective LNG net-back prices. These price projections are linked to the scenarios in the scenario description document.

[17] Wind bubbles – geographical locations where wind profiles are considered to be similar. Further details can be found on the Planning Consultation Document. See note 1.

[18] AEMO. Available at: http://www.aemo.com.au/Consultations/National-Electricity-Market/~/media/Files/Other/planning/2013Consultation/Planning_Studies_2013_New_Generation_Technical_Data.ashx. Viewed 12 June 2013.

[19] AEMO. Available: http://www.aemo.com.au/Electricity/Planning/Related-Information/~/media/Files/Other/planning/ACIL_Tasman_Fuel_Cost_ Projections_2012.ashx. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
9	ElectraNet	Page 1	ElectraNet has some concerns regarding the basis for some of the input assumptions that have been used in the 2012 NTNDP, and that AEMO proposes to use in the 2013 planning documents. Where these assumptions are implicitly linked to ElectraNet's transmission network, ElectraNet would like to see greater early engagement with AEMO to properly understand and agree on these inputs.	AEMO is committed to stakeholder engagement on its planning assumptions and methods. During the 2012 NTNDP study phases, two TNSP peer review sessions were held to obtain early feedback from the TNSPs on the inputs, methodology and results of the analysis. AEMO found these sessions to be of high-value, and intends to continue with, and build on these types of interaction throughout its suite planning processes.
10	ElectraNet	Page 1	As an example, the build limits on wind farm development of 895 MW in Northern South Australia (NSA) and 495 MW in South East South Australia (SESA) are used by AEMO. These limits are consistent with ElectraNet's understanding of the capacity of the SA network to connect commercially viable wind farms with no new investment in transmission services beyond the incremental upgrade to the Heywood Interconnector.	Build limits in the least-cost modelling reflect two factors: the availability of resources and economic considerations of potential generation expansion. The first factor is covered by advice provided by ACIL Tasman as input into the 2010 NTNDP. The second factor reflects refinement through network studies and TNSP advice during the 2012 NTNDP analysis itself. The limits provided by ACIL Tasman primarily reflect availability of fuel and land and some aspects of labour and construction resource availability that may have been included, though these weren't documented in ACIL's report. Once an investment pattern was produced using these build limits, AEMO assessed the network limitations caused by the resulting generation expansion – and the costs of resolving these network limitations. In some cases, this leads us to modify the build limits to ensure that our (less detailed) investment model has some visibility of the (more-detailed) network limitations. This process of iteration was repeated several times to settle on the final set of build limits used by the model.
11	ElectraNet	Page 1	However, ElectraNet would like to understand whether it might be economically efficient for additional investment in the transmission network to unlock renewable resources beyond these levels. The absence of a clear rationale for forcing these limits into the economic model potentially leaves some questions as to the	Joint AEMO/ElectraNet modelling indicated that an upgrade to the Heywood (Vic–SA) interconnector is economic.[20] This upgrade was reflected in the 2012 NTNDP. Meeting the Large-scale Renewable Energy Target (LRET) through more than 1350 MW of wind in SA would require further upgrades to the Heywood interconnector to enable this energy to be exported. However,

[20] AEMO. Available at: http://www.aemo.com.au/Electricity/Planning/Regulatory-Investment-Tests-for-Transmission-RITTs/Heywood-Interconnector-RIT-T. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
			reasonableness of AEMO's conclusion that network investment is not economic.	modelling indicated that it is more economic for wind in excess of 1350 MW to be located elsewhere in the NEM compared to the cost of further interconnector upgrade.
12	ElectraNet	Page 2	Additionally, capacity factors modelled and applied to wind farms should be reconciled with actual wind farm performance in specific locations to the extent that the data is available. Related to this, AEMO previously published actual generation capacity factors in the South Australian Supply and Demand Outlook (SASDO) which is no longer published; ElectraNet considers that this was a very valuable planning reference resource and should be made available again.	Capacity factors for scheduled generators are published within the report suite for the South Australian Advisory Functions (see the 2012 South Australian Electricity Report, Figure 7, Chapter 3[21]). In addition, the 2012 Wind Study Report for South Australia also provides detailed wind performance information by location, including wind contribution to peak demand.[22]
13	ElectraNet	Page 2	Connection point cost differences between the NEM regions assumed in the modelling also need to have their basis clearly explained in the NTNDP.	The consultation dataset has been updated to reflect uniform connection point costs across regions. Details will be provided if these are revised through further study.
14	ElectraNet	Page 3	ElectraNet would also like to see some focus put on Murraylink in the 2013 NTNDP. The 2012 NTNDP did not identify any limitations associated with Murraylink's transfer capability over the planning horizon, yet operationally some issues are emerging. Similarly, other existing and emerging constraints would benefit from some more analysis, valuation and discussion.	The 2012 NTNDP did not assess local transmission network adequacy to meet localised peak demand at times outside the 10% POE regional maximum demand. AEMO has suggested the transfer capability constraints of Murraylink to be resolved as part of the Murraylink transfer/Riverland supply joint planning work package between AEMO and ElectraNet.

[21] AEMO. Available at: http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/South-Australian-Electricity-Report. Viewed 12 June 2013.
[22] AEMO. Available at: http://www.aemo.com.au/Electricity/Planning/South-Australian-Advisory-Functions/Wind-Study-Report. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
15	ElectraNet	Page 2	Current modelling techniques used to develop the NTNDP may be insufficient to quantify the true value of transmission congestion. For example, the omission of network outages in the modelling for the NTNDP overstates the capability of the network. This may be masking the true value of potential investments in the transmission network. It is also noted that AEMO does model generator outages. Preliminary analysis by ElectraNet of network outages in South Australia demonstrates the additional cost this adds to the cost of dispatching the market.	The NTNDP modelling aims to identify the least-cost development of generation and transmission. The modelling framework is described in the methodology and input assumptions document.[23] AEMO agrees that the NTNDP has not, to date, quantified the impact of transmission outages on the cost of network congestion. This has been outside of the scope of the NTNDP and would fall more in line with shorter-term, project-specific assessments. It is unclear how long-term generation or transmission plans could aim to reduce the congestion costs added by transmission outages. The NTNDP least-cost modelling is a probabilistic assessment and does not represent outages directly. Instead, generation outages are accounted for in the minimum plant reserve margin, which ensures that there is sufficient generation available to meet the Reliability Standard when the generation is not 100% reliable. Transmission outages could be accounted for in the plant reserve margin; however their inclusion would be problematic for two reasons. Firstly, transmission outage rates are typically much lower than those for generating units; and secondly, their impact on reliability of supply is not straightforward to represent in a probabilistic supply-demand model.
16	Alinta Energy	Page 2	Still in relation to the GSOO, interest has been raised over whether or not future AEMO forecasts will include variability between maximum and low demand capacity, as well as pipeline maximum and minimum capacity. The supply of such estimates is of value to Alinta Energy's operations.	AEMO would require additional information from participants (and permission to publish it) in order to include such analysis in the GSOO. There may be commercial sensitivities with the provision and publication of this information, so it is not currently included. AEMO continues to review the information requested and presented in the GSOO as its scope and content matures. More detailed information on the Victorian system is available in the Victorian gas planning documents such as the Victorian gas DTS capacity[24] and Victorian Gas planning approach reports.[25]

[23] AEMO. Available at: http://www.aemo.com.au/Consultations/National-Electricity-Market/~/media/Files/Other/planning/2013Consultation/Planning_Studies_2013_Methodology_and_Input_Assumptions.ashx. Viewed 12 June 2013.

[24] AEMO. Available at: http://www.aemo.com.au/Gas/Planning/Victorian-Annual-Planning-Report/~/media/Files/Other/planning/Victorian_Gas_DTS_Capacity.ashx. Viewed 12 June 2013.

[25] AEMO. Available at: http://www.aemo.com.au/Gas/Planning/Victorian-Annual-Planning-Report/~/media/Files/Other/planning/Victorian_Gas_Planning_Approach.ashx. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
17		Page 3	GDFSAE seeks a forum with AEMO to discuss some detailed comments on the "2013 Planning Consultation Methodology and Input Assumptions" document including: • Correlation of wind profiles between the wind bubbles shown in Figure 11; • Plant profitability considerations (for existing and new entrant technology – particularly post entry); • Business rules used to retire plant (beyond a centrally planned outcome); and • Alternative options considered in market benefits (reliability benefits).	These topics are active areas of discussion at the Market Modelling Working Group, and will continue to be improved through those discussions. They have been noted for inclusion on the next agenda in June 2013.
18	Alinta Energy	Page 1	Alinta Energy notes that at present there exists a slight disparity between Electricity Statement of Opportunities (ESOO) and Gas Statement of Opportunities (GSOO) assumptions. Alinta Energy is supportive of increasing consistency in the primary assumptions between these two documents.	AEMO clarified this submission item with Alinta Energy. The key concern was consistency across AEMO's national planning studies (ESOO/GSOO/NTNDP) and AEMO's other studies, such as the Heywood RIT-T. For all studies, AEMO uses the latest information available at the time of commencement. These assumptions can change over time and studies that overlap may use different inputs. A new scenario was incorporated into the Heywood RIT-T analysis with updated assumptions to account for these changes. Further information on the implementation of a feedback loop between the NTNDP and GSOO modelling to ensure consistency between these studies is available in Section A.5.2 of the 2012 GSOO.

No.	Stakeholder	In submission	Specific comments	AEMO's response
19	TransGrid	Section 3, page 6	TransGrid would appreciate higher-resolution information about AEMO's modelling of potential new wind entrants into the generation market. In particular more information about potential siting would be appreciated.	AEMO's methodology on wind integration study and wind bubbles has been previously published on AEMO's website as part of the 2012 NTNDP. A typical hourly wind speed profile is developed that covers a single trading year, based on proprietary data provided by the CSIRO. The wind speed profile is re-applied without modification in each modelled year. Further information on wind contribution factors to peak demand are available in the Additional Modelling Data.[26]
20	TransGrid	Section 3, page 6	In order to inform its own market modelling for regulatory investment tests for transmission and planning purposes, TransGrid would appreciate greater transparency of the methodology used to develop the forecast demand traces. This could include a description of the input assumptions entered into the PLEXOS market model, and an explanation of how these are related to the demand traces which form the output of the model.	AEMO has prepared a demand trace development document to more thoroughly address these questions. The document is now available on AEMO's website: *http://www.aemo.com.au/Consultations/National-Electricity-Market/Planning-Studies-2013-Consultation.*
21	TransGrid	Section 4, page 6	TransGrid requests that the full intra-regional constraint set be included in the 2013 NTNDP. TransGrid would appreciate the opportunity to consult on the screening assumptions used by AEMO to determine which constraint equations will be included for the forward looking market simulation studies.	In the 2010 NTNDP, the full system normal constraint set available in the operational database was published. However, in 2012, AEMO developed a system that can more accurately generate constraint equations that reflect future network conditions. The 2012 constraint set, however, only included constraint equations for those network elements that were identified as being more heavily loaded at times of high demand and therefore more likely to bind. In 2013, AEMO intends to publish an expanded constraint set as requested. Also it is worthwhile mentioning that AEMO has been working with TransGrid during recent forums to understand which constraints are of particular interested to TransGrid.

[26] AEMO. Available: http://www.aemo.com.au/Consultations/National-Electricity-Market/~/media/Files/Other/planning/2013Consultation/Planning_Studies_2013_Additional_Modelling_Data.ashx. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
22	TransGrid	Section 4, page 7	TransGrid recommends that either AEMO revert to the National Electricity Market Dispatch Engine (NEMDE) naming convention for constraint equations, or that an interpretation guide for the new convention be included in the 2013 NTNDP.	For constraint equations that are currently used operationally, AEMO will be using the same name as in the operational systems.
23	TransGrid	Section 4, page 7	In addition to the constraint workbook which will accompany the 2013 NTNDP, TransGrid would appreciate the inclusion of 'a plain English' listing of the inter-regional constraints.	The constraint workbook published in 2012 included the facility of obtaining "plain English" listing for thermal constraints amounting to about 94% of the total constraints. This feature does not work correctly for non-thermal constraints. In 2013, AEMO intends to improve this functionality to work for all constraint equations.

3.2.3 Emissions intensity data

AEMO received consent from a small group of generators for the release of facility-based emissions intensity data from the Clean Energy Regulator. AEMO will use these numbers in its models for planning studies as well as for calculation of the Carbon Dioxide Equivalent Intensity Index (CDEII).

AEMO considered seeking consultancy services to provide updated estimates for generators who did not provide consent. However, since the initiation of this project, AEMO has been advised that changes to NGER Act 2007 will result in the Clean Energy Regulator publishing all 2012–13 facility-based greenhouse gas emissions and energy production data in early 2014.

Once published, AEMO intends to undertake a comprehensive review of the data ahead of use in the CDEII and future planning studies.

Attach o.	Stakeholder	In submission	Specific comments	AEMO's response
24	Alinta Energy	Page 2	Alinta Energy is of the opinion that the National Greenhouse and Energy Reporting (NGER) data contains some fundamental inconsistencies and as such is unsuitable for emissions intensity forecasts. The continually changing nature of plant modifications/upgrades, different fuel types and plant operational cycles means that NGER data is not reliable for future forecast modellings; the inclusion of such is likely to add to statistical volatility.	AEMO acknowledges that emission intensities change over time due to a range of factors. AEMO's current database of emission factors is more than four years old, so a more recent set (while still subject to changes over time) will reduce errors caused by any changes since 2009. In addition, AEMO's current set of emissions factors was collected by consultants from numerous sources, and would benefit from the use of a single source (especially where the data provider is the facility owner). AEMO intends to collect the emissions data annually, and also to collect average emission factors over time to reduce volatility and year-to-year discrepancies. Collecting 2011–12 data (to the extent consents have been provided) now gives AEMO an extra year of historical information to use in averaging when the Clean Energy Regulator begins publishing data in February 2014.
25	Stanwell	Section 3.1, page 2	In the event that this data is made public, and there are significant differences between such data and the CDEII, what are the implications for the CDEII and anything that has referenced or continues to reference this index?	To the extent consents have been provided, the CDEII would be updated to reflect the 2011–12 emissions intensity data provided to the Clean Energy Regulator. Given the small number of consents received, AEMO does not expect a material change to the NEM-wide CDEII index.
26	GDFSAE	Page 2	It is critical that any confidential information AEMO receives in relation to emission factors must remain confidential with confidentiality agreements in use to preserve this when providing consultants engaged by AEMO with data.	AEMO appreciates the importance of confidentiality, and has specifically sought consent to use and publish facility emission factor data. In cases where generators do not provide consent, the confidential data will not be published or used for CDEII and planning studies. Data sought from public sources or consultancies will be used in these cases.

3.2.4 Planning and modelling forum

AEMO received support from stakeholders for the establishment of the Planning and Modelling Forum (PMF) and requested further information about its structure and potential scope. Some concerns were raised regarding membership, timeframes and dissemination of information.

Since publishing the Planning Consultation, the first PMF meeting was held on 15 April 2013. Details of the new working group structure are available on AEMO's website.[27] AEMO is currently summarising the key outcomes of the meeting into a set of notes that will be published after PMF endorsement.

No.	Stakeholder	In submission	Specific comments	AEMO's response
27	Stanwell	Section 2.2, page 1	In relation to possible topics for the forum, Stanwell recommends consideration is given to developing and disseminating accurate data on both solar photovoltaic and large scale demand side management. This modelling should incorporate both historic actual observations and forecasts.	Technical discussions on topics such as solar photovoltaic (PV) and demand side management (DSM) are likely to continue at the working group level. The working groups reports to the PMF, which is intended to cover higher level direction and strategy.
28	GDFSAE	Page 1	In addition the group would be ideally suited to provide input into AEMO's regulatory investment test for transmission (RIT-T) consultation work. The recent Heywood interconnector upgrade project highlighted the lack of such a forum to discuss detailed planning and modelling issues related to RIT-T studies.	As the PMF includes representatives from across the industry, AEMO expects to use the PMF to efficiently form specific task-oriented working groups. These can include a RIT-T related consultative group.
29	Alinta Energy	Page 2	Alinta Energy is concerned with proposals to limit access to some membership groups, as this limitation could only lead to a decrease in the variety of insight from stakeholders. Alinta Energy is supportive of open consultative forums in order to facilitate insightful discussion which is beneficial to the market and AEMO's work	At the first forum, attending PMF representatives agreed to take responsibility for disseminating information back to their respective groups. Additionally, meeting materials and summary notes will be made public. All interested parties can also propose discussion topics and provide feedback or any other form of input.

[27] AEMO. Available: http://www.aemo.com.au/~/media/Files/Other/WorkingGroups/Proposed_Working_Group_Structure.ashx. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
30	TransGrid	Section 2.2, Page 4	TransGrid considers that it is critical for the appropriate expert from each TNSP to be given full opportunity to take part in decision-making relevant to their area. As the responsibilities of the forum are decided, caution should be applied before moving decision-making away from subject matter experts.	At the first meeting, PMF members expressed the importance of maintaining a core membership for continuity reasons. However, PMF members will also invite experts as required for topics being discussed. However, the PMF is intended to deal with a broader range of matters in relation to planning and forecasting, and more technical and specific matters will likely be delegated to task-oriented working groups.
31	ElectraNet	Page 1	However, this forum should not be seen as a replacement for ongoing engagement between AEMO and TNSPs. Specifically, ElectraNet considers the early engagement and consultations around the 2010 NTNDP to have been a very valuable exercise and would request that such consultations occur again on an annual basis	To effectively carry out its national planning functions, AEMO considers it important to continue engaging with TNSPs both one-on-one and in groups. This includes production of the NTNDP and other related activities (such as the Network Support and Ancillary Services (NSCAS) assessment). However, the PMF and any subgroups created (such as the Market Modelling Working Group) also provide an ideal avenue to engage with other relevant industry stakeholders.

3.2.5 Energy forecasts

AEMO received general support for its energy forecasting plans, however participants stressed the need to engage with network service providers to ensure consistency when developing connection point demand forecasts. More specific comments are addressed in the table below.

No.	Stakeholder	In submission	Specific comments	AEMO's response
32	GDFSAE	Page 1, page 2	In addition to matters raised in Section 2.3, GDFSAE would like AEMO to consider how the growth in "behind the meter" generation such as rooftop solar is affecting the quality of information provided to participants. GDFSAE encourages AEMO to consider how it can provide greater information to stakeholders across all demand classes (in particular commercial and industrial load and household consumption) and whether the frequency of publishing this information is meeting industry needs.	AEMO anticipates publication of the 2013 NEFR data by 1 July, followed by the NEFR Methodology Report by 31 July. The 2013 NEFR will include annual energy and maximum demand for the mass market sector (residential, commercial and light industrial) as well as for transmission- and distribution-connected customers for the NEM states for AEMO's three main scenarios (low, medium and high). AEMO is currently working with the Energy Forecasting Industry Reference Group to assess the level of detail, timing and frequency required for energy and demand forecasts. The reference group contains representatives from TNSPs, DNSPs, retailers, generators, industry associations, and regulatory businesses. Details regarding 2012 rooftop solar and other demand forecasting information can be found on AEMO's website: *http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report-2012* Data underlying these forecast can also be found on AEMO's website: *http://www.aemo.com.au/Electricity/Planning/Forecasting/Forecasting-Data-2012*
33	TransGrid	Section 2.3, page 4	It will be imperative that if AEMO develops its own connection point forecasts, the roles of TNSPs, DNSPs and AEMO in the connection point development and publication process are made explicit.	Consistent with the COAG determination energy market reform implementation plan (released 7 December 2013), AEMO intends to provide independent connection point forecasts to the AER to facilitate its assessment of revenue reset applications. AEMO is currently working with DNSPs and TNSPs to develop a consistent methodology, identify information requirements, and discuss timing and coordination.
34	TransGrid	Section 2.3, page 4	Given that a high degree of information-sharing will be required for AEMO to glean the necessary local knowledge for developing a connection point forecast. Prima facie, it would appear that 'doubling up' of this process (which already occurs between TNPSs and DNSPs) would be inefficient.	AEMO is currently liaising with DNSPs and TNSPs to identify information requirements, and discuss timing and coordination. AEMO intends to work closely with DNSPs in developing its forecasts to ensure efficiency.

No.	Stakeholder	In submission	Specific comments	AEMO's response
35	TransGrid	Section 2.3, page 4	TransGrid considers that in times of volatile economic conditions, the economic forecasts should be undertaken using the latest available actual data wherever feasible	Economic forecasts for the 2013 NEFR were developed by the National Institute of Economic and Industry Research (NIEIR) using actual data from the Australian Bureau of Statistics' latest national accounts released in December 2013. The actual economic data corresponds to the first quarter of the 2012–13 financial year (July to September 2012–13). The timeframe to develop these forecasts was discussed and agreed with TNSPs to allow enough time for them to produce their own forecasts.
36	TransGrid	Section 2.3, page 4	Before the forecasts are finalised by AEMO, TransGrid recommends that a formal consultation be introduced (either by reinstating the Load Forecasting Reference Group or through another appropriate mechanism).	AEMO is in the process of delivering presentations directly to TNSPs on its annual energy forecasting methodology, models, assumptions, forecasts and the impact of key drivers. AEMO has liaised with TNSPs to validate and check the sources of information and data to be used as inputs for these forecasts.
37	TransGrid	Section 2.3, page 5	Three areas where TransGrid in particular would be interested: • economic inputs and the growth scenarios • historical large industrial demand local information required to accurately interpret and effectively use the historical energy and maximum demand figures.	This information is published on AEMO's website under Forecast data and will be updated in 2013 following the publication of the NEFR. Economic inputs are provided to TNSPs on a confidential basis in January every year to enable TNSPs to incorporate this information in their individual forecasting processes. This information is available in NIER's report, published with the NEFR. Growth scenarios are based on AEMO's 2012 scenario descriptions document.[28] AEMO is currently liaising with the Energy Forecasting Industry Reference Group to address their requests and provide information so they can accurately understand and interpret AEMO's assumptions. Large industrial load and other energy consumption components and drivers will be shared and presented to TNSPs on a confidential basis and with the industry's consent.

[28] AEMO. Available at: http://www.aemo.com.au/Consultations/National-Electricity-Market/Closed/~/media/Files/Other/planning/2418-0005%20pdf.ashx. Viewed 12 June 2013.

No.	Stakeholder	In submission	Specific comments	AEMO's response
38	TransGrid	Section 2.3, page 5	In previous years AEMO provided a detailed breakdown of native energy into its Scheduled, Semi-scheduled and significant Non-scheduled components. However no breakdown was provided in the 2012 NEFR. It is hoped that the breakdown will be made available in future AEMO publications.	AEMO would like to understand the purpose for this information, and will consider the provision of this information to TNSPs.
39	TransGrid	Section 2.3, page 5	Validation of model results is critical for ensuring the robustness of models used by AEMO for forecasting. It is expected that AEMO will continue to perform appropriate backcasting procedures to test the divergence of forecasts from historical actuals.	AEMO performed the energy forecasts in-house in 2011–12 for the first time. For the 2012 Reliability Panel Report, a high level summary was presented for energy and maximum demand forecasts, discussing accuracy in general terms. This report did not focus on results from the 2012 NEFR. However, AEMO did conduct back assessments, probability of exceedence comparisons, backcasts and other accuracy measures to test its maximum demand and energy forecast models at the time. This year, the results of the 2012 NEFR forecast will be examined in detail. A more statistical focus will include a more comprehensive backcasting method for the maximum demand forecasts. In addition, any improvements highlighted will be discussed, including how the 2013 NEFR models address these improvements.
40	TransGrid	Section 2.3, page 5	Going forward, it will be important that a standardised and transparent industry procedure is established to enable a meaningful comparison of the forecasts.	AEMO is currently developing a consistent methodology for connection point forecasts for implementation in 2013–14. A link will be established between regional and connection point forecasts, so that improvements identified as part of the connection point process can inform the methodology used to develop AEMO's regional forecasts.
41	Alinta Energy	Page 1	Alinta Energy believes that AEMO could further enhance its gas load forecasting (over the many different time horizons). It may also be beneficial to have some key performance indicators established for these estimations which are then reported on a regular basis, as is currently the case in the electricity market.	AEMO agrees with introducing key performance indicators for gas forecasts. This work will be prioritised after work has been completed on improving the methodology used to develop regional gas demand forecasts, which is scheduled for 2013–14.

No.	Stakeholder	In submission	Specific comments	AEMO's response
42	Alinta Energy	Page 1	Alinta Energy would welcome a broader range of gas consumption data nationally and regionally. Alinta Energy appreciates that there is likely appropriate data related reasons that not all jurisdictions are published; however, further data in this area would be appreciated.	AEMO is aware that a number of stakeholders would like further breakdown of gas demand forecasting components, and this is being considered as part of the energy forecasting strategy in 2013–14.
43		Page 3	Currently key performance indicators are sporadically established across some of AEMO's forecast models. The provision of a consistent and ongoing review process across all forecasts would form an integral part of ensuring that accurate and reliable forecasts are maintained across AEMO's publications.	AEMO has implemented a quality control process across all its forecast models. The process involves review by internal subject matter experts, an independent external advisor (Woodhall Investment Research) and independent peer reviewer (Frontier Economics). An overview of key findings from the independent peer review report will be published on AEMO's website on 1 July 2013.

3.2.6 Integrating short- and long-term modelling

AEMO is scoping its national planning functions for 2013, and intends to begin investigating shorter-term network needs to overlay more granular information on its current long-term plans. Stakeholder feedback generally supported this additional level of detailed information.

No.	Stakeholder	In submission	Specific comments	AEMO's response
44	Stanwell	Section 4.1.1, page 3	Stanwell recommends that consideration be given to a mix of planning durations at different resolutions. As an example, AEMO could develop a more in-depth 3 to 5 year study blended with a more averaged 5 plus year view.	AEMO concurs with this view.
45	TransGrid	Section 5, Page 7	TransGrid does recommend that as part of its system operations role AEMO consider opening consultation on its existing Power System Adequacy Report. Such consultation could seek to confirm that the report is providing appropriate and sufficient information about power system capability and its impact on medium-term system security and reliability, in order to assist the jurisdictional planning bodies' short- and medium-term planning.	One of AEMO's value propositions for 2012–13 is to consolidate our publications to improve the focus and engagement of our analysis. This may result in changes to the scope, timing, or presentation of the Power System Adequacy report, particularly where there may be similar information presented in multiple reports. AEMO intends to consult on its value proposition strategy through Planning and Modelling forum.
46	GDFSAE	Page 2	An alternative approach would be for AEMO to advise on the cost impacts to consumers of various transmission investments taking into account other available information. This information could be included in the various planning publications.	AEMO acknowledges the proposed alternative approach by GDFSAE. AEMO's planning information will, however, continue to focus on identifying future network limitations and potential network and non-network options to address these limitations.

3.2.7 Supply demand calculator

Stakeholders supported AEMO's proposal to use probabilistic modelling in the 2013 ESOO; little concern was expressed regarding AEMO's plan to decommission the supply demand calculator in 2013 based on an assessment of maintenance costs, and the limited use described by most stakeholders.

No.	Stakeholder	In submission	Specific comments	AEMO's response
47	Stanwell	Section 3.2, page 3	Stanwell considers the Supply Demand Calculator to be a valuable analysis tool, and therefore does not support its removal. Stanwell would like AEMO to ensure that any differences between the maximum demands used in the calculator and those quoted in the ESOO are appropriately explained.	All input data traditionally used in the calculator will remain accessible through data files for use in participant analysis. The demand values to be used in the ESOO and their relationship to the national forecasting report will be described in detail alongside the ESOO publication.

3.2.8 Planning publications

AEMO's value proposition work on Planning Publications is in progress and involves an assessing AEMO's current suite of planning publications with a focus on providing valuable information, in a logical structure, and at a time most relevant to stakeholders. This may result in changes to the scope, timing, or presentation of AEMO's planning information, and will include a restructure of planning information on AEMO's website.

No.	Stakeholder	In submission	Specific comments	AEMO's response
48	Alinta Energy	Page 2	Whilst AEMO is a producer of high quality data and forecasts, Alinta Energy believes at present navigation through the AEMO website is at times a laborious task, especially for those unfamiliar with the work of AEMO. Whilst potentially off scope, Alinta Energy suggests that only a few minor changes could lead to AEMO's website and publications becoming far easier to navigate. A relevant question is: has the era of regular publications ended? While yearly publication releases are the standard, the use of a portal with updates may be just as, if not more, useful.	As part of AEMO's planning publications value proposition work, options to improve the layout of the website are being explored. This is being coupled with a critical review of the current suite of planning publications. The focus is on ensuring the information is logically grouped and timed, to maximise relevance and accessibility to stakeholders.

4 Abbreviations

Abbreviation	Expanded Name
ENA	Energy Networks Association
ESOO	Electricity Statement of Opportunities
GSOO	Gas Statement of Opportunities
MMWG	Market Modelling Working Group
PMF	Planning and Modelling Forum
NGF	National Generators Forum
STTM	Short Term Trading Market
NGER, AC	National Gas Emergency Response, Advisory Committee
NEFR	National Energy Forecast Report