



24 January 2013

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
PO Box A2449  
SYDNEY SOUTH NSW 1235

Dear Mr Pierce

**RULE CHANGE REQUEST – IMPROVED DEMAND FORECASTING: PUBLIC RELEASE OF ZONE SUBSTATION DATA**

The National Generators Forum requests that the Australian Energy Market Commission consider making a Rule change which would require Distribution Network Service Providers to publish historical data on “zone substation” loads as part of the “Distribution Annual Planning Review” process.

The NEM has experienced dramatic and unprecedented changes to demand patterns over recent years. All regions have recorded falling energy use and flattening and less frequent peak demands. Uncertainty about future demand trends makes it difficult for market participants to evaluate and finalise a range of investment decisions.

AEMO demand forecasts are used in a number of public and private planning and investment processes. AEMO does not have a great track record in accurately forecasting likely demand patterns in the NEM, particularly in recent years. Most market participants do not have access to demand data at a sub-regional level which would allow independent analytical work and independent comparisons with the AEMO forecasts.

The NGF is of the view that the release of historical zone substation data would enable better modelling of the key determinants of demand changes. This type of analysis would lead to more informed, timely and efficient decision making when businesses are considering new projects, plant upgrades or plant closures. It would also give third parties access to the level of data needed to check and challenge the AEMO processes.

The attached NGF Rule change proposal sets out the proposed drafting of the Rule amendment and a description of the expected benefits and costs associated with the public release of this sub-regional data.

Yours sincerely

Tim Reardon  
EXECUTIVE DIRECTOR

## **RULE CHANGE PROPOSAL**

### **IMPROVED DEMAND FORECASTING: PUBLIC RELEASE OF ZONE SUBSTATION DATA**

#### **1 Summary**

The National Generators Forum requests that the Australian Energy Market Commission consider making a change to the National Electricity Rules which would oblige all distribution network service providers (DNSPs) to publish historical half-hourly load data for all zone substations within each DNSP's supply district. DNSPs would release this data each year as part of the "Distribution Annual Planning Review" process.

#### **2 Statement of issues**

The pattern and level of electricity consumption in the NEM have changed dramatically over the past five or six years. After several decades of annual energy demand rising broadly in line with economic and population growth, in recent years total energy use has fallen in absolute terms – actual NEM energy in 2011-12 was lower than that recorded in 2005-06. Similarly, the frequency and level of peak demands has moderated markedly in all NEM regions.

The Australian Energy Market Operator has a poor record in accurately forecasting likely demand trends. In recent years, AEMO has consistently and substantially overstated future demand growth across the NEM. These AEMO demand forecasts are used in the Electricity Statement of Opportunities, the National Transmission Network Development Plan and a range of other public and private planning and investment processes. An overstatement of demand growth runs the risk of creating a misleading perception of supply reliability in the NEM and encouraging investment in the electricity supply industry that is not economic in the early years.

Apart from the AEMO forecasts, market participants have very limited information with which to evaluate likely longer-term demand trends in different parts of the economy. AEMO publishes regional demand data for each dispatch and trading interval (the sum of scheduled and semi-scheduled generation), but there is no detailed public data at the sub-regional level to enable a more rigorous analysis of the main drivers of demand changes.

The public release of historical zone substation load data would give all market participants the raw data necessary to undertake or commission their own statistically robust analysis of demand patterns for different customer categories. Better data and better modelling would enable energy businesses to make more efficient and informed investment and plant closure decisions. NEM customers and demand-side aggregators would also have better information to consider the value of investments in various market offerings involving a demand side response. With access to key input data, industry and other third parties would be in a better position to provide an independent check on the forecasting performance of AEMO.

### **3 Proposed Rule change**

The Rule change would introduce an additional reporting requirement for DNSPs as part of the *Distribution Annual Planning Report* process. An amendment to Chapter 5, Schedule 5.8 of the National Electricity Rules would include the annual publication of half-hourly load data for all zone substations within a DNSP supply district. The proposed drafting of the Rule change is as follows:

*Schedule 5.8 Distribution Annual Planning Report*

*For the purposes of clause 5.13.2(c), the following information must be included in a Distribution Annual Planning Report.*

*Insert:*

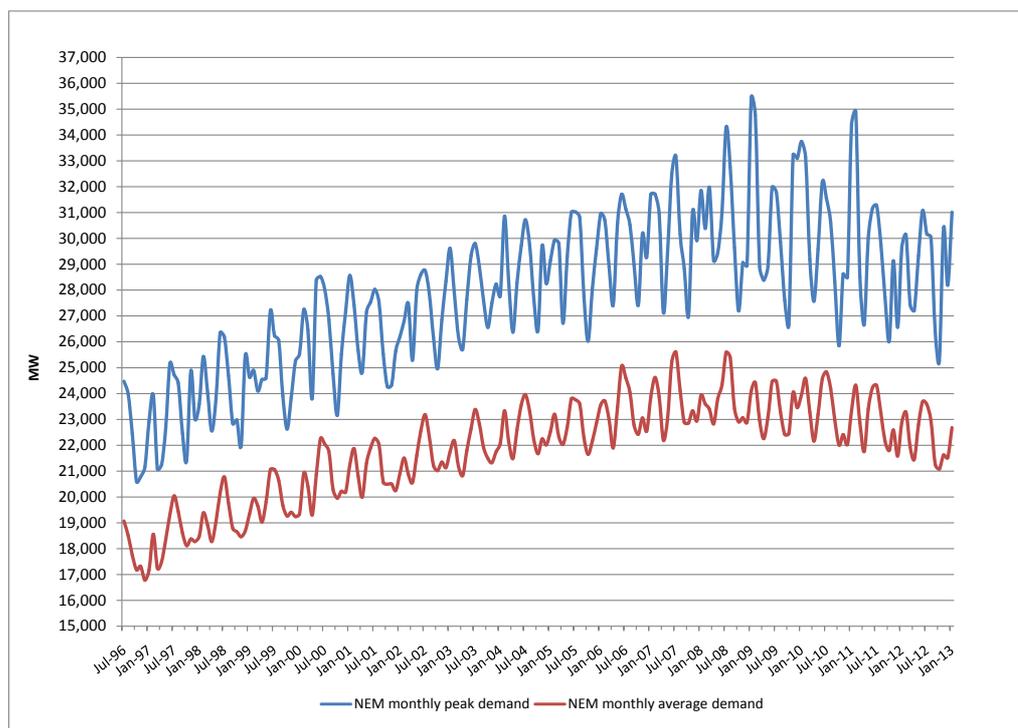
- (o) the Distribution Network Service Provider's website address where information is available on load collated in trading intervals for each of the preceding 10 years for zone substations.*

Although not listed in the NEM Rules Glossary, a zone substation is generally defined in the industry as a substation forming part of the distribution system, which provides the network link between the sub-transmission network and elements of the distribution system. Voltage levels generally range from 11kV to 132kV. There are approximately 1,500 zone substations in the NEM.

## 4 Demand trends in the NEM

Chart 1 shows NEM-wide average monthly energy demand and monthly peak demand since July 1996. After steady rises in energy and peak demands to the period around 2008, the NEM has since seen flat or falling consumption levels. A common pattern was repeated in each NEM region. This unprecedented drop in demand is flowing through to low wholesale prices, which is in turn increasing investment uncertainty and forcing generators to consider retiring plant or taking units out of service for indefinite periods.

Chart 1: NEM average monthly demand and NEM monthly peak demand, July 1996 to December 2012



Source: AEMO data compiled by the NGF from scheduled and semi-scheduled demand data for all regions.

## 5 Accuracy of AEMO demand forecasts

AEMO has performed poorly in forecasting demand trends in the NEM, most noticeably in recent years where AEMO modelling has forecast a recovery in demand growth that has not eventuated.

Each year AEMO is required to provide the Reliability Panel with a report examining the accuracy of the demand forecasts in the most recent ESOO, and any improvements made by AEMO or other related parties to the forecasting process that will apply to the next ESOO. The *Electricity Demand Forecasting Accuracy Report 2012*<sup>1</sup> provides a back-assessment comparing the two previous ESOO energy and peak demand forecasts with actual demand levels in the relevant year. Some observations from the report include:

- In the period 2007-08 to 2011-12, the ESOO forecasts overstated annual energy in every year in every region apart from two years in Victoria and one year in Tasmania. In 2011-12, the 2011 ESOO energy forecasts against actual annual demand were overstated by 5.3% in New South Wales, 8% in Queensland, 8.8% in South Australia, 5% in Tasmania and 10.4% in Victoria.
- In the same five year period, ESOO 50% POE forecasts for New South Wales, Queensland and Tasmania were above the actual summer peak demand in all years apart from one year in New South Wales and one year in Tasmania. ESOO forecasts for peak loads in Victoria and South Australia have been relatively accurate.

In June 2012, AEMO published the first National Electricity Forecasting Report (NEFR) looking out ten years from 2012-13. This is the first time that AEMO has prepared forecasts for all regions using a consistent methodology, assumptions and data sources. As part of this work, AEMO has published independent modelling of the economic outlook and data on solar PV uptake. AEMO has also initiated an industry consultation process to review improvements to its methodology.

The NEFR 2012 included a substantial revision downwards of demand forecasts in all regions over the next few years. The NGF remains concerned that these revisions do not go far enough, and that forecasts towards the end of the decade remain overly optimistic.

During the period 1 December 2012 to 24 January 2013, all regions in the NEM experienced record or near record heat wave events. Table 1 compares AEMO NEFR 2012 10% POE and 50% POE peak demand forecasts for summer 2012-13 with actual peak demands in each region across this period of extreme temperatures. The difference in forecasts versus actual peak demands show a significantly overstatement of demand in all regions against the 10% POE forecasts. Even the 50% POE forecasts exceeded actual peak demands in all but one region.

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<sup>1</sup> <http://www.aemc.gov.au/panels-and-committees/reliability-panel/standards.html>

*Table 1: AEMO NEFR 2012 summer 2012-13 peak demand forecasts versus actual, 1 December 2012 to 24 January 2013*

Region	AEMO 10% POE MW	AEMO 50% POE MW	Actual MW	Difference 10% POE to actual	Difference 50% POE to actual
Queensland	9,299	9,007	8,543	8.1%	5.2%
NSW	14,065	13,399	13,788	1.9%	-2.9%
Victoria	10,624	9,690	9,139	13.9%	5.7%
SA	3,271	2,990	2,991	8.5%	0%
Tasmania	1,412	1,371	1,319	6.5%	3.8%
NEM system	35,135	33,086	31,775	9.6%	4%

Note: Actual demand includes only scheduled and semi-scheduled generation. The AEMO forecasts were adjusted to reflect a best estimate of forecast scheduled and semi-scheduled demand based on the native demand forecasts included in the 2012 NEFR. This adjustment was made using a de-escalation factor based on a comparison of native demand and scheduled and semi-scheduled forecasts in the 2011 ES00.

AEMO's NEFR 2012 forecast positive energy growth in the NEM and all regions in 2012-13. Table 2 sets out a year-on-year comparison of scheduled and semi-scheduled demand in the six month period to 31 December in 2011 and 2012. This shows a continuing fall in actual energy usage in the NEM and all regions apart from Queensland where there was a negligible increase.

*Table 2: AEMO NEFR 2012 energy demand forecast for 2012-13 versus actual for six months to 31 December 2012*

Region	NEFR 2012 50% POE growth forecast, 2012-13	Actual growth 1 July 2012 to 31 December 2012 relative to same period in 2011
Queensland	2.9%	0.1%
NSW	1.2%	-5.6%
Victoria	1.4%	-1.9%
SA	0.9%	-0.2%
Tasmania	0.9%	-2.2%
NEM system	1.7%	-2.7%

### *Measuring and reporting significant non-scheduled generation*

AEMO measures demand by metering supply to the network from scheduled and semi-scheduled generators. AEMO also includes estimates of small but significant non-scheduled generating units. These are typically small scale generation installed by customers and embedded in the distribution system – back-up generators that rarely run, roof-top PV, landfill generators, small cogeneration and very small wind farms.

AEMO makes forecasts of the contribution of this small scale generation and includes it with scheduled and semi-scheduled generation to calculate various measures of demand, also known as “native demand”.

Until 2007, AEMO published energy and peak demand forecasts on a scheduled and semi-scheduled basis in the annual Electricity Statement of Opportunities. In 2008, AEMO first reported separate forecasts for small scale generation. In 2009 and 2010, AEMO published all forecasts on a “native demand” basis but in addition provided separate scheduled and semi-scheduled forecasts for use by market participants. For the NEFR 2012, all forecasts were provided on a native-demand basis only with no separate information provided on forecast scheduled and semi scheduled demand. The NGF does not support the aggregation of demand data – it reduces transparency by making it difficult for industry to compare regional dispatch information with AEMO demand forecasts

AEMO regularly revises actual historical demand information, presumably because of changes to its estimates of significant small scale generation. Given the lack of published information on scheduled and semi-scheduled forecast energy and peak demand, it is difficult for industry to calculate the contribution of small scale generation and assess whether the AEMO forecasts are accurate or not. Frequent and substantial revision of past actual demands diminishes industry confidence in the AEMO forecasting processes.

## **6 Related developments**

### *AEMO publication of connection point data*

AEMO published a *Proposal to publish connection point demand data* during August 2012<sup>2</sup>. This proposal followed a request from the NGF asking for the release of historic half-hourly demand data for each connection point (also known as ‘bulk supply points’ or ‘terminal stations’) in the NEM.

AEMO had indicated that it would release 2 years of historical data and all actual data as it became available. AEMO proposed to aggregate connection points where there were three or fewer customers receiving supply from that metering point.

The NGF supported the AEMO proposal on the basis that it released ten years of historical data.

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<sup>2</sup> <http://www.aemo.com.au/Consultations/National-Electricity-Market/Open/Proposal-to-publish-Connection-Point-Demand-Data>

AEMO released a *Proposal to Publish Connection Point Demand Data: Response to Stakeholder Submissions* in December 2012. AEMO noted that most submissions to the earlier consultation supported the release of the connection point data. Some submissions expressed a concern that commercially sensitive information may still be disclosed.

AEMO also expressed its view that “*given significant changes in demand and the effects of these changes on future investment decisions, publishing the data will benefit the industry considerably*”. AEMO noted that it was yet to put together a business case, but indicated that costs of the initial upload of historic data would be relatively small. AEMO intends to consult with stakeholders on aggregation criteria in the second half of 2013 and develop a production system for ongoing publication.

While the NGF expects the AEMO connection point data will provide a useful information source, the historical zone substation data offers the additional benefit of providing a more complete cross section of customer types throughout the NEM, particularly at the residential level where we consider much of the change in peak demand patterns may be taking place. The NGF understands that there are more zone substations than connection points in the NEM. Implementing this Rule change proposal would also ensure that DNSPs are obliged to provide a time series of data updated annually which is needed for any meaningful statistical analysis.

#### *Distribution Network Planning and Expansion Framework*

The AEMC made the *Distribution Network Planning and Expansion Framework Rule* in October 2012. A key part of the new arrangements is the requirement for DNSPs to publish a Distribution Annual Planning Report detailing a range of asset planning information for a minimum planning period of five years. The new requirements introduce a consistent NEM-wide set of reporting obligations that replace a mix of jurisdictional-based licence requirements.

The Distribution Annual Planning Reports will detail DNSP *forecasts* related to key asset investments. Schedule 5.8 of the NEM Rules sets out the reporting requirements, which include:

- capacity and load forecasts at the sub-transmission, the zone substation level and primary distribution feeders;
- system limitations, which may include limitations resulting from forecast load exceeding total capacity, the need for asset refurbishment or the need to improve network reliability; and

- other high level summary information “to provide context to DNSPs’ planning processes and activities”, including a description of the network and performance standards and compliance against these standards.

While the DNSPs are also required to provide analysis and explanation of any aspects of forecasts and information provided in the planning reports that have changed significantly from the previous year, they are not required to report any historical data on loading levels for particular assets on a regular basis. Licence conditions in some jurisdictions had previously required DNSPs to publish historical peak load levels for various distribution assets including zone substations.

DNSPs must publish their Distribution Annual Planning Report on their website by the date specified by the relevant jurisdiction.

## **7 How the Rule change proposal satisfies the National Electricity Objective**

The NEO is stated in section 7 of the National Electricity Law:

*“... to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:*

- a. price, quality, safety, reliability and security of supply of electricity; and*
- b. the reliability, safety and security of the national electricity system.*

A secure, reliable and affordable power system requires timely and efficient investment in all sectors of the electricity industry. At the generation level, investment decisions about the fuel and technology type, location and scale of any new project requires good information on likely future demand growth and load shape as a key input to any business case. If investors and debt providers have access to better data and more reliable modelling on which to prepare demand forecasts, some of the uncertainty with evaluating the merits of individual projects is reduced.

Much has been made about the likely changes to the NEM generation mix over the next decade and beyond as climate change policies take effect and relative fuel prices change. The Renewable Energy Target will underwrite substantial new capacity, which is likely to exceed actual demand growth over the period to 2020 given existing settings. Owners of thermal plant will need to consider retirement or “mothballing decisions, which will have consequences for suppliers and employees. Good information on future demand conditions would improve the efficiency of these decisions, bearing in mind that coal-fired plant may have useful technical lives extending well beyond their economic lives.

The changes in NEM demand patterns over recent years are profound and unprecedented. They are likely to have been driven by a number of key factors – retail electricity prices, changes to the industrial mix of the economy, energy efficiency policy, subsidies for distributed generation uptake and other government policies. There is not sufficient granularity of data in the public domain to undertake any valid empirical assessment of the relative contributions of each of these factors.

## **8 Expected benefits of the proposed change**

### *Commissioning detailed econometric studies*

The Rule change proposal would give any interested party access to detailed demand data at a sub-regional over a ten-year period. By identifying broad categories of customers taking supply from different parts of the distribution network, independent modelling could measure changes in electricity consumption against a range of economic variables in particular parts of the economy. Given that there appears to be a structural break point around 2008, patterns of consumption before and after this period would provide insights into likely future demand conditions.

There are no recent authoritative studies of price elasticity in the NEM for different customer categories – sharply rising prices are probably the over-riding influence on recent customer behaviour. The release of historical load data within the distribution network would enable the commissioning of this type of analysis.

### *Enable third party scrutiny of AEMO forecasts*

The AEMO demand forecasts play an important role in the NEM. Policy makers look to AEMO for advice on likely supply-demand balances through the ESOO process. Investors, particularly banks and foreign equity investors, look to AEMO as an independent, official source of analysis. The AEMC's Transmission Frameworks Review has recommended that the AEMO demand forecasts should be used in the preparation of TNSP revenue resets rather than forecasts prepared by the network businesses.

Access to data would enable industry participants to undertake or commission their own work to assess likely future demand growth, using both top down and bottom-up modelling approaches. Currently, there is no way for industry to replicate key parts of the modelling inputs to the AEMO work, which is made more difficult by the take-up of small-scale distributed generation across the economy. Release of this data would place industry in a better position to provide an independent “check and balance” on the NEFR forecasts.

### *Information asymmetry*

On the supply side of the NEM, AEMO publishes complete details of all aspects of plant operations. Since the end of 2010, AEMO has reported the real-time, five minute dispatch level of every scheduled generating unit in the NEM. Within a few hours of the trading day, AEMO publishes bid data for each generating unit showing bid volumes in each price band, unit ramp rates, minimum generation levels, maximum unit availabilities and any fixed loads. Every unit rebid reason is made public at this time. Additionally, AEMO publishes details of the operating characteristics of all scheduled generators including information on the fixed and operating costs of all plant.

While information asymmetry is not a reason by itself to release this sub-regional demand data, there is an inconsistency in establishing a centralised trading platform that provides market participants with comprehensive details on supply-side conditions but no disaggregated information on the other side of the market.

### **9 Costs of implementing the Rule change proposal**

As with the AEMO proposal to publish connection point data, the NGF does not anticipate significant implementation or compliance costs for the publication of zone substation data. There would be a one-off cost of extracting the historical data from existing records and publishing via a website link. The Rule change proposal is for an annual update as part of the Distribution Annual Planning Report. Any compliance costs should fall through time as DNSPs develop systems and processes to automate data collection and publication.