



# WIND GENERATION LICENSING DRAFT PROPOSALS

**December 2008**

**ELECTRICITY**

## REQUEST FOR SUBMISSIONS

The Essential Services Commission of SA (the Commission) invites written submissions from interested parties in relation to the issues raised in this paper. Written comments should be provided by **20 February 2009**. It is highly desirable for an electronic copy of the submission to accompany any written submission.

It is Commission policy to make all submissions publicly available via its website ([www.escosa.sa.gov.au](http://www.escosa.sa.gov.au)), except where a submission either wholly or partly contains confidential or commercially sensitive information provided on a confidential basis and appropriate prior notice has been given.

The Commission may also exercise its discretion not to exhibit any submission based on their length or content (for example containing material that is defamatory, offensive or in breach of any law).

Responses to this paper should be directed to:

### **Wind Generation Licensing – Draft Proposals**

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### ***Public Information about ESCOSA's activities***

Information about the role and activities of the Commission, including copies of latest reports and submissions, can be found on the ESCOSA website at [www.escosa.sa.gov.au](http://www.escosa.sa.gov.au).

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## GLOSSARY OF TERMS

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|                 |  |
|-----------------|--|
| AEMC            | Australian Energy Market Commission, established under section 6A of the <i>Trade Practices Act 1974 (Cth)</i>       |
| AFEFS           | Australian Wind Energy Forecasting System  |
|                 |  |
| COMMISSION      | The Essential Services Commission of SA, established under the ESC Act   |
| ELECTRICITY ACT | <i>Electricity Act 1996 (SA)</i>   |
| ESC ACT         | <i>Essential Services Commission Act 2002 (SA)</i>   |
| ESCOSA          | The Essential Services Commission of SA, established under the ESC Act   |
| ESIPC           | Electricity Supply Industry Planning Council   |
| FCAS            | Frequency Control Ancillary Services   |
| MCE             | Ministerial Council on Energy  |
| MW              | Mega Watt  |
| NEM             | National Electricity Market  |
| NEMMCO          | National Electricity Market Management Company   |
| NER             | National Electricity Rules   |
| PASA            | Projected Assessment of System Adequacy  |
| SA              | South Australia  |
| TCA             | Transmission Connection Agreement  |
| VAR             | A unit of electrical power in an AC circuit equal to the power dissipated when 1 volt produces a current of 1 ampere |
| WETAG           | Wind Energy Technical Advisory Group   |

# 1 INTRODUCTION

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In South Australia, as at June 2008, there was 3,641 MW of installed conventional electricity generation (fueled by coal, natural gas, and distillate) and 857 MW of wind generation operating, under construction or considered committed.

Summer peak demand in South Australia for 2007-08 was 3,172 MW.

The Electricity Supply Industry Planning Council (ESIPC) in its most recent Annual Planning Report 2008, reported that South Australia has:

- ▲ The highest installed capacity of wind generation in Australia;
- ▲ The highest proportional contribution by wind energy to State electricity demand; and
- ▲ One of the three highest penetrations of wind generation with respect to installed capacity world wide.<sup>1</sup>

## 1.1 Commission's Licensing Function

One of the functions of the Essential Services Commission of South Australia (the Commission), under section 5(1) (a) of the *Essential Services Commission Act 2002* (ESC Act) is perform licensing functions under relevant industry regulation acts. Under Part 3 of the *Electricity Act 1996*, the Commission licenses entities carrying on operations (retail, generation, transmission, distribution and system control) within the South Australian electricity supply industry. Part 3 also authorises the Commission to vary licences already issued.

A person carrying on the generation of electricity is required to hold a licence under the Electricity Act if the generating plant has a rated nameplate output of > 100 kVA (or about 0.1 MW). The Electricity Act makes no distinction between generating plant using renewable or non-renewable energy sources: all are subject to the same licensing requirements.<sup>2</sup>

The advent of large amounts of wind generation in South Australia over recent years has raised a number of issues for the Commission in the discharge its licensing function.

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<sup>1</sup> Electricity Supply Industry Planning Council – Annual Planning Report June 2008  
<http://www.esipc.sa.gov.au/site/page.cfm?u=269>

<sup>2</sup> It is noted that many domestic (roof-top) photovoltaic electricity generation systems have capacity < 100 kVA and hence are not required to be licensed.



The Commission is required to determine the outcome of a licence application in accordance with specified criteria.<sup>3</sup> It is those criteria that must be used in determining the outcome of all licence applications. The same criteria are assessed by the Commission in determining whether to vary or amend a licence.

The Electricity Act specifies that the Commission may only issue a generation licence if satisfied that:

- ▲ the applicant is a “suitable person” to hold the licence (section 17(2)(a));
- ▲ the proposed generating plant will generate electricity of the appropriate quality for the relevant transmission or distribution network (section 17(2)(b)).

In deciding whether the applicant is a suitable person, the Commission may consider the previous commercial dealings of the applicant (and of the officers and major shareholders of the applicant) and the standard of honesty and integrity shown in those dealings; and the financial, technical and human resources available to the applicant (section 17(3)). These matters are not dealt with, however, in this Statement of Principles.

In terms of the appropriate quality requirement, that matter is dealt with more fully below.

In addition, the Electricity Act requires that, in considering a licence application, the Commission must have regard to the general factors specified in Part 2 of the ESC Act (section 17(2)).

These general factors are specified at section 6(1) of the ESC Act, which provides that the Commission, in performing its functions, must:

- (a) *have as its primary objective protection of the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services; and*
- (b) *at the same time, have regard to the need to –*
  - (i) *promote competitive and fair market conduct; and*
  - (ii) *prevent misuse of monopoly or market power; and*
  - (iii) *facilitate entry into relevant markets; and*
  - (iv) *promote economic efficiency; and*
  - (v) *ensure consumers benefit from competition and efficiency; and*
  - (vi) *facilitate maintenance of the financial viability of regulated industries and the incentive for long term investment; and*
  - (vii) *promote consistency in regulation with other jurisdictions.*

The Commission must thus consider whether or not electricity operations proposed by a licence applicant might compromise the achievement of these objectives.

The objectives may, in some situations, conflict, so that the Commission needs to consider whether a negative impact on the achievement of one objective was being offset by a positive impact on the achievement of another objective.

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<sup>3</sup> A detailed description of the Commission’s licensing powers and the process followed in considering a licence application is available from Advisory Bulletin No. 4, *Licensing Arrangements for the Electricity and Gas Supply Industries*, available from the Commission website, refer [www.escosa.sa.gov.au/webdata/resources/files/050414-D-AdvBull4Licensing.pdf](http://www.escosa.sa.gov.au/webdata/resources/files/050414-D-AdvBull4Licensing.pdf)

The fact that one objective is expressed as being the primary objective, provides clear direction that stronger weight should be given to that objective in the Commission's deliberations than to the subsidiary objectives.

Once satisfied of the matters set out in the Electricity Act, the primary matter addressed by the Commission in considering issuing (or varying or amending) electricity generation licences is how will the proposed generator operations impact on the long-term interests of consumers with respect to price, quality and reliability of electricity supply? In the case of wind generator developments consideration of such impacts has assumed major importance in the Commission's licensing decisions.

## ***1.2 Development of 2005 Statement of Principles for Wind Generation Licensing***

From January 2002, when the Commission issued the first generation licence to a wind generator in South Australia, until November 2004, the Commission issued licences to seven wind generators with a total capacity of 450MW. By early 2005 the Commission had received an additional eleven licence applications with a total installed capacity of 1,260MW.

As a result of this unprecedented number of wind generation licence applications, during 2005 the Commission undertook an intensive deliberative and consultative process on both the impacts of increased wind generation capacity in South Australia and the means of dealing with those impacts. The Commission took the view that given the very large number of generation licence applications by wind generator proponents, the imperatives of the statutory licensing regime were such that it was no longer possible to treat wind generation licence applications in the same way as other, more conventional, generation licence applications which are not attended by the same concerns in relation to network impacts.

Mindful of the (then) unusual operating nature of wind generators (intermittent and non-scheduled within the National Electricity Market (NEM)), the Commission sought the independent expert advice of the ESIPC<sup>4</sup> as to any impacts that the issuing of licences to all applicants might have on the long term interests of South Australian consumers with respect to the price, quality and reliability of electricity supply - these being the fundamental matters to which the Commission is required to have regard under the ESC Act when considering whether or not to grant an electricity generation licence.

ESIPC's advice, provided to the Commission in April 2005, indicated that the national market design and rules, then applying (as encapsulated within the National Electricity Rules (NER)), did not adequately cater for the installation of significant amounts of wind generation capacity in South Australia.

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<sup>4</sup> ESIPC is established under Part 2 Division 2 of the Electricity Act 1996. One of the functions of ESIPC is to advise the Commission on matters relating to the capacity and future reliability of the South Australian power system (see section 6E (1) (c)).

In relation to the Commission's primary objective - how will the proposed wind generator developments impact on the long-term interests of consumers with respect to price, quality and reliability of electricity supply – the findings of ESIPC<sup>5</sup> and the Commission's conclusions<sup>6</sup> can be summarised as follows:

**(i) The price of electricity supply**

The ESIPC report made no specific predictions as to actual outcomes. Nevertheless, the ESIPC report indicated that it was likely to be the balance between the upward pressures caused by any price volatility arising from the rapid output changes of wind generators and the downward pressure of increased competition that more wind generation would place on conventional generation that would dictate actual price outcomes.

In addition, the Commission noted that any long-term upward pressures on price were likely to be ameliorated through the market-based measures recommended by ESIPC to address the reliability and system security, efficient market operation and cost allocation impacts associated with wind generation.

Having considered all of these matters, the Commission could not conclude there was clear evidence that the long-term interests of consumers would be adversely affected by price impacts associated with significant amounts of additional wind generation.

**(ii) The quality of electricity supply**

In contrast, the conclusions of the ESIPC report on quality impacts were unequivocal. ESIPC concluded that the combination of improving wind turbines and the high standard of connection agreements provided adequate assurance that power quality levels would not be adversely impacted by wind generation.

The Commission was therefore satisfied that the long-term interests of consumers would not be adversely affected by the power quality impacts associated with significant amounts of additional wind generation.

**(iii) The reliability of electricity supply**

The Commission interpreted the term "reliability" as contained in section 6(1) of the ESC Act as incorporating the reliability and system security impacts examined in the ESIPC report.

In brief, ESIPC found that, in the absence of upgraded technical standards for network connections, high quality wind energy forecasting, and market

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<sup>5</sup> ESIPC Wind Report to ESCOSA April 2005 <http://www.escosa.sa.gov.au/webdata/resources/files/050429-R-ESIPCwindreport.pdf>

<sup>6</sup> ESCOSA Draft Wind Generation Licensing Statement of Principles 2005  
[http://www.escosa.sa.gov.au/webdata/resources/files/050615-D-WindFarm\\_StatofPrinc-FINAL.pdf](http://www.escosa.sa.gov.au/webdata/resources/files/050615-D-WindFarm_StatofPrinc-FINAL.pdf)

arrangements that would integrate wind generators more fully into the NEM, wind developments in SA at the 800 MW and 1,000 MW cases posed significant risks to reliability and security of the South Australian power system. Such risks arise chiefly from the inherent variability associated with the output of wind generators, and include:

- ▲ reduced ability of the system to remain operational through low voltage events or through network disturbances;
- ▲ insufficient capacity of the system to generate and absorb reactive power;
- ▲ greater variability and uncertainty in market operations;
- ▲ ineffective management of ramp rates, requiring the commitment of additional conventional generation; and
- ▲ system instability arising from a credible contingency (particularly at times when high levels of wind generation coincide with low State demand).

As a result, ESIPC advised the Commission that unless the Commission addressed four key matters, the issuing of licences to wind generators would be likely to have significant impacts on the reliability of electricity supply in South Australia. Those matters related to the need for wind generators to:

- ▲ operate with higher technical operating standards than the minimum permitted by the Rules;
- ▲ participate in NEM optimised dispatch processes;
- ▲ provide data for, and assist the development of, state of the art wind energy forecasting; and
- ▲ pay for ancillary service market impacts which they cause and earn revenues for those which they provide.

The Commission consulted widely on the ESIPC's advice and subsequently, based on that advice, stakeholder submissions and further advice from ESIPC<sup>7</sup>, issued a Statement of Principles for Wind Generation Licensing in September 2005<sup>8</sup>.

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<sup>7</sup> ESIPC assessment of submissions on Draft Statement of Principles

<http://www.escosa.sa.gov.au/webdata/resources/files/050929-L-WindGenerationESIPCResponseSubmissions.pdf>

<sup>8</sup> ESCOSA Wind Generation Licensing Statement of Principles 2005 <http://www.escosa.sa.gov.au/webdata/resources/files/050930-R-WindGenerationStatementofPrinciples.pdf>

### **1.3 Requirements of Statement of Principles**

The licensing principles for wind generators, established in the Commission's Statement of Principles in 2005, and presently applied by the Commission are as follows:

▲ *Conditions precedent for consideration of application for an electricity generation licence*

A wind generator licence applicant must provide evidence to the Commission that a connection agreement between the proposed wind generator and the relevant network service provider has been executed or fully negotiated.

A wind generator licence applicant must certify in writing to the Commission that the generation plant and associated equipment that is the subject of the licence application will be operated to comply in all respects with applicable licence conditions as enunciated in the Statement of Principles. Necessary detail must be provided where relevant as to the reasons why the wind generation proponent believes that the plant will be able to comply (usually this involves the provision of technical studies to the Commission which are evaluated by ESIPC).

▲ *Additional Licence Conditions*

Additional licence conditions imposed on wind generators are as follows:

- The first licence condition relates to technical standards for wind generators with a nameplate rating of greater than 5MW. The technical standards required by the Commission are supplementary to any standards prescribed by the NER and relate to Fault Ride Through Capability and Reactive Power Capability.
- The second licence condition relates to optimised dispatch and applies to wind generators with a nameplate rating of greater than 30MW; it requires the licensee to be classified as a scheduled generator in the NEM and to provide forecasts of expected generation output to NEMMCO
- The third licence condition relates to the provision of wind forecasting data and models and requires cooperation with the development and implementation of national wind forecasting systems.
- The fourth licence condition relates to cost allocation of ancillary services and applies to wind generators with a nameplate rating of greater than 5MW.

In addition, the Commission has also adopted a new practise in relation to the issue of all licences:

▲ *Condition precedent to issue of licence – payment of licence fee within 30 days of Commission approval*

Following a public consultation period, receipt of advice from ESIPC (which is sought in relation to each generation licence application, whether for wind or other generation), the Commission considers the licence application.

If the Commission agrees to issue a licence, in accordance with the Electricity Act the licence cannot not be issued until the relevant licence fee is paid.

The Commission now gives all licence applicants 30 days from the date on which the Commission approves the issue of a licence in which to pay the licence fee.

If the fee is not paid within 30 days the Commission's approval for the issue of the licence lapses. If the approval lapses, the applicant must re-submit the application and the Commission reserves the right to undertake a further round of public consultation and to request further advice from ESIPC. Further advice is especially important if other generators have also been licensed to operate in the same general area of the network as network.

#### **1.4 Transitional nature of licence conditions**

In 2005, the Commission emphasised its view that the licence conditions set out in the Statement of Principles were intended to be of a transitional nature only.

The Commission expressed the view that a national market-wide solution to the issues associated with the introduction of greater amounts of wind generation capacity would be the best and the most appropriate outcome.

It was expected that a national market-wide solution to large volumes of intermittent electricity generation would be finalised within two years. The Commission noted that it would review its licence conditions and take steps to make necessary amendments to generation licences once the nature and timing of national solutions had crystallized.

In the absence of a national market-wide solution, the licence conditions established by the Commission have enabled electricity generation licences to be issued to wind generators in South Australia which ensure that the Commission meets its primary objective under the ESC Act, i.e. to protect the long term interests of consumers with respect to price, reliability and quality of essential services.

#### **1.5 Developments since 2005**

Prior to 2005 the Commission had licensed 450 MW of wind generation and since the release of the Statement of Principles for Wind Generation Licensing the Commission has issued licenses to a further four wind generators with a combined capacity of 412MW.

As at June 2008, there was 857 MW of wind capacity in South Australia operating, under construction or considered committed<sup>9</sup>.

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<sup>9</sup> Electricity Supply Industry Planning Council – Annual Planning Report June 2008  
<http://www.esipc.sa.gov.au/site/page.cfm?u=269>

### Wind generation plant – operational, under construction, advanced planning

(Source: ESIPC Annual Planning Report p 74)



Slide: 38

The actual and prospective growth of wind generation in the NEM has driven changes to the national arrangements and the NER to better integrate wind generation into the National Electricity Market.

These changes have to a greater or lesser extent dealt with the same four key matters outlined in section 1.2 above and are described briefly below:

- ▲ During 2006, the AEMC reviewed the technical standards in the NER that apply to generators, particularly wind generators. Final changes were determined by the AEMC in March 2007. These changes dealt with some of the short-comings in the standards;
- ▲ New Rules applying from March 2009 implement the new “semi-scheduled” category of generation which provides for the participation of wind in the dispatch process;
- ▲ NEMMCO is currently running an interim wind forecasting tool and are well advanced in the development of the “Australian Wind Energy Forecasting System” (AWEFS). This is a state of the art wind forecaster developed by the ANEMOS Group with funding from the Commonwealth Government; and
- ▲ Changes have been made to the arrangements for recovering the cost of ancillary services in the market.

These matters are dealt with in more detail in section 2 of this paper.

## 2 STATEMENT OF PRINCIPLES – PROPOSALS

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In view of the range of national developments in relation to the better incorporation of intermittent generation into the NEM, in 2007 the Commission requested ESIPC to provide advice and recommendations on the continuing relevance and appropriateness of the Commission's four key wind generation licence conditions dealing with optimised dispatch; wind energy forecasting; cost allocation and technical standards licence conditions, as set out in the Statement of Principles.

ESIPC's response and letter of advice dated 29 September 2008 is attached to this paper in Appendix 1.

The conclusions of the ESIPC advice are summarised below with respect to each of the Commission's current specific wind generation licence conditions (as established by the Statement of Principles), together with the Commission's proposed action on each licence condition going forward.

### 2.1 *Central Dispatch*

#### 2.1.1 Current Licence Requirement

The current licence requirement (which applies to wind generators with a nameplate rating of 30MW or more) is expressed in the following terms:

*NATIONAL ELECTRICITY MARKET*

*... the licensee must hold and comply with the conditions of any registration required under the National Electricity Rules granted by NEMMCO (or the person responsible for the granting of such registrations under the National Electricity Law or the National Electricity Rules) at all times that such registration is required for the operations authorised by this licence.*

*The licensee must be registered as a market generator under the National Electricity Rules.*

*The licensee must not apply to be classified as a non-scheduled generator under the National Electricity Rules.*

*(underlining added)*

## 2.1.2 Rationale for 2005 Requirement

### 2005 National Electricity Rules

In 2005, the NER required a person owning, controlling or operating a generating system that supplies electricity to a transmission or distribution network to register with NEMMCO as a generator and classify each generating unit as either a *scheduled* (clause 2.2.2) or *non-scheduled* (clause 2.2.3) generator, and as a *market* (clause 2.2.4) or *non-market* (clause 2.2.5) generator.

### Scheduled/Non-scheduled

In general, a generating unit with nameplate rating of 30 MW or greater was classified as a scheduled market generator and required to be operated in accordance with the co-ordinated central dispatch process operated by NEMMCO under the provisions of Chapter 3 of the NER. Central dispatch processes require each scheduled generating unit to bid its generation capacity for each trading period into the NEM, and is subsequently dispatched by NEMMCO in order to match the demand on the system. This process ensures optimal dispatch of generation whilst maintaining the security of the power system.

At the time the Statement of Principles was developed, wind generators typically applied to NEMMCO for classification as non-scheduled generating units on the basis that the output of the generating unit is intermittent. Non-scheduled generating units do not participate in NEMMCO's central dispatch process; non-scheduled generating units simply generate electricity as they determine.

### Market/Non-market

A market generating unit is one for which the generation output is not purchased in its entirety by the "local retailer" as defined in the NER (the local retailer for SA is AGL SA Pty Ltd) or by a market customer located at the same connection point.

A market generator must sell its generation output through the wholesale (spot) market operated by NEMMCO under the provisions of Chapter 3 of the NER. A non-market generator, for which generation output is purchased in its entirety by the local retailer or by a market customer, does not participate in market settlements. Importantly, as a market generator is part of market settlements, it is part of the arrangements for the recovery of ancillary services.

### Commission 2005 decision

In 2005, the Commission accepted the advice of ESIPC that some form of dispatch control should be applied to wind generators.

The problem with wind generation being non-scheduled identified by ESIPC was that in the NEM such generation is treated as a negative demand rather than a source of supply. As a consequence, neither the forecast nor the actual quantity of wind energy is visible to the market. In particular, as non-scheduled wind generators do not participate in the normal market bidding and dispatch processes to determine which generators operate to satisfy market demand, NEMMCO is unable to manage market stability and security through its normal market optimisation techniques. This leads to unacceptable market risks at higher levels of wind generation. ESIPC concluded that wind generators must be integrated into the security constrained, optimised dispatch system operated by NEMMCO.

While in the Statement of Principles the Commission acknowledged that work was being undertaken at the national level in relation to the possible creation of a third classification for registration namely “semi-scheduled”, that work was incomplete and the category was unlikely to be available for at least two years.

The Commission therefore determined that until appropriate arrangements (such as formalized semi-dispatch rules) were made in the NEM, it was appropriate to require wind generators to operate as scheduled generators under the NER.

### 2.1.3 Developments since 2005

On 1 May 2008, the Australian Energy Market Commission (AEMC) gave notice of its final Rule Determination for National Electricity Amendment (Central Dispatch and Integration of Wind and Other Generation) Rule 2008.<sup>10</sup> As a result of these changes the NER now reflect a “semi-scheduled” generator plant category which will become operational from 31 March 2009.

ESIPC has advised the Commission<sup>11</sup> that the operational arrangements for wind generators classified as *semi-scheduled* meet the objectives of maintaining efficiency and system security.

ESIPC also noted there would be some efficiency benefits from *all* wind generators in South Australia being classified as *semi-scheduled* (i.e. including those licensed prior to the 2005 Statement of Principles). However this could impose significant costs on some existing wind generators to implement such arrangements and the benefits in some cases could be small. In some cases, wind generators which

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<sup>10</sup> See <http://www.aemc.gov.au/electricity.php?r=20080306.153927>

<sup>11</sup> See Appendix 1



were licensed prior to 2005 have clauses in their connection agreements that require generation dispatch control by ElectraNet. Where generators are required to meet such requirements, they would have the tools to permit remote generator control. Control of some wind generators by ElectraNet and some which contribute to the same network limitations through central dispatch by NEMMCO, could lead to inefficient outcomes. ESIPC suggested that a case by case assessment may identify some existing (pre-2005) wind farms where the net benefits of reclassification to semi-scheduled are substantial and indicated it would assist the Commission in undertaking such an exercise.

## 2.1.4 Commission Proposal

In view of the availability of the new category of semi-scheduled, and the advice of ESIPC that the operational arrangements for wind farms so classified will meet the Commission's requirements for system safety and security, the Commission accepts that South Australian wind generators should be able to avail themselves of this new category.

While the current licence condition is expressed in the following way:

The *licensee* must not apply to be classified as a non-scheduled generator under the *National Electricity Rules* (underlining added)

there is technically no need for the Commission to amend it – on its existing terms it accommodates the new category.

However, it is the Commission's view that all new wind generators and all expansions to existing wind generation plant should be required to be classified as "semi-scheduled" generators.

In relation to the ESIPC suggestion that pre-2005 licences be reviewed to determine whether the Commission should amend these licences to require classification as a semi-scheduled generator, the Commission notes that Pacific Hydro Clements Gap Pty Ltd (a pre-2005 licensee) has advised the Commission of its intention to register the Clements Gap wind generator as a semi-scheduled generator.

The Commission has requested ESIPC to review other pre-2005 licences.

*The Commission proposes to:*

*Require that all future wind generation licensees must be classified as semi-scheduled under the National Electricity Rules.*

*The Commission notes that existing licensees wishing to transfer to the new classification may do so within the terms of the licence currently issued*

## 2.2 Wind forecasting

### 2.2.1 Current Licence Requirement

The Commission's current requirements with respect to wind forecasting are contained in two clauses and which apply to all wind generators with a nameplate rating of greater than 5MW.

#### *WIND FORECASTING*

1. *The licensee must, on request, provide to the Planning Council, the Commission or NEMMCO, accurate and verifiable wind energy forecasting data and temperature data, appropriately constructed wind energy conversion models, documents and other information concerning the operation of the electricity generating plant which the licensee is authorised by this licence to operate.*
2. *Any data, models, documents and information requested under this clause must be provided in the manner and form and within the time frame specified by the Planning Council, the Commission or NEMMCO.*
3. *The licensee must cooperate with the development and implementation of wind energy forecasting systems for use in the National Electricity Market and must provide timely, accurate, and verifiable information for this purpose.*

#### *INFORMATION TO NEMMCO*

1. *The electricity generating plant operated by the licensee must be:*
  - *able to meet the requirements specified by NEMMCO from time to time for the real time supply of data on active and reactive power, wind speed and wind direction; and*
  - *capable of remote control by NEMMCO.*
2. *The electricity generating plant operated by the licensee must meet the information provision requirements specified in clause [ ] for at least 3 hours following total loss of supply at the connection point.*
3. *The licensee must provide NEMMCO with forecasts of expected generation output for the purposes of incorporation into pre-dispatch, medium term and long term PASA data.*

## 2.2.2 Rationale for 2005 requirements

In 2005, the Commission noted that a fundamental strategy to deal with the variability of wind energy available to the market was to have techniques to ensure accurate wind forecasting. The need to have such forecasting techniques was regarded as critical because the output of wind generators varies significantly over time and affects the efficiency of the market and the security of the power system.

The Commission formed a view that it would be appropriate to require wind generators to provide forecasting data as required, to participate in the development of a centralised wind forecasting system, and to provide other data required for incorporation into pre-dispatch, medium term and long term PASA data.

## 2.2.3 Developments since 2005

The NEM has operated with an interim wind forecasting tool for some time. The Australian Wind Energy Forecasting System (AWEFS) which aims to provide better forecasts using the latest ensemble forecasting techniques developed in Europe is now close to complete.

All generators which are in the new semi-scheduled category will be required to participate in the operation of the AWEFS system and will be obliged to provide NEMMCO with wind forecasting data in a certain form.

In November 2008, NEMMCO commenced consultation on energy conversion model guidelines<sup>12</sup> required for participation in wind forecasting by generators classified as semi-scheduled.

## 2.2.4 Commission Proposal

ESIPC has advised the Commission it is satisfied that being classified as a *semi-scheduled generator* and hence part of AWEFS meets the intentions of the current licence requirements in relation to wind forecasting.

*The Commission proposes to:*

*Remove the licence condition relating to the provision of wind forecasting information to NEMMCO, from 31 March 2009 for all new wind generators in South Australia registered as "semi-scheduled" generators.*

*Retain the conditions relating to the provision of information and models to both the Commission and ESIPC.*

<sup>12</sup> Refer <http://www.nemmco.com.au/powersystemops/268-0002.pdf>

## 2.3 Ancillary Services

### 2.3.1 Current Licence Requirement

The Commission's current requirements with respect to ancillary services apply to all wind generators with a nameplate rating of greater than 5MW. The licence requirement is a companion to the requirement to register as a market generator.

#### **ANCILLARY SERVICES**

*The licensee must ensure that it has installed, and keeps operational, metering suitable for the purposes of clause 3.15.6A(h) of the National Electricity Rules to allow the individual contribution of the electricity generating plant to the aggregate deviation in frequency of the power system to be assessed within each trading interval of the National Electricity Market.*

*The licensee must comply with requirements imposed under the National Electricity Rules from time to time in relation to ancillary services arrangements.*

### 2.3.2 Rationale for the 2005 requirements

In 2005, the Commission highlighted the importance of NEMMCO being able to maintain the power system frequency within secure limits - variations in the output of generating units and loads disturb the supply/demand balance and routinely cause power system frequency to move away from the nominal 50 Hz. NEMMCO procures *regulation* frequency control ancillary services (FCAS) through a spot market to ensure that power system frequency stays within the operating limits set by the Reliability Panel as established under the NER

The Commission noted, having received advice from ESIPC and examined the findings of the Wind Energy Technical Advisory Group (WETAG)<sup>13</sup>, that in relation to cost recovery of *regulation* FCAS, the "causer pays" mechanism is defined at clause 3.15.6A of the NER for market generating units that have real time operational metering that records short-term variations in plant output.

*The causer-pays mechanism identifies relevant generators that are causers of frequency variations and allocates a causer pays factor to each. The remaining cause of frequency deviations is allocated to market customers, shared on a pro-rated basis. The causer pays factors are then used in market settlements to recover the procurement costs for regulation FCAS. (WETAG report, p 32)*

Thus, wind generators registered as market generators under the NER participate in the causer pays arrangements for *regulation* FCAS only if appropriate operational metering is installed. If such metering is not installed, that generator's contribution to regulation FCAS will be met by customers. Non-market generators will not participate in such arrangements. In this case, the generator's contribution will default to market customers as a group.

<sup>13</sup> See <http://www.mce.gov.au/assets/documents/mceinternet/WEPWGDDiscussionPaperMarch0520050322094836.pdf>

The Commission noted the WETAG concerns about the cross subsidy caused by wind generators that are registered as market generators but do not have appropriate operational metering. It suggested that a preferred option for addressing this issue was to amend the NER to require that all significant market generating systems (> 30 MW) be included in the causer pays arrangements under the NER.

The Commission therefore concluded, while changes to the NER were the most desirable way of dealing with this issue, wind generators in South Australia should be subject to the payment of ancillary services costs to the extent that they contribute to the costs of those services (and earn revenue for services they provide). The Commission's view was that this would drive appropriate investment and operational decisions on the part of wind generators.

For this to apply, a wind generator must be a *market participant* and hence be part of NEMMCO's settlement processes. This was achieved by the Commission requiring wind generators to be classified as market generators. In addition, to ensure appropriate processes to calculate the contribution factors (or "causer pays" factors) applicable to wind generators, the Commission required a licence condition that wind generators must install metering suitable for the purposes of clause 3.15.6A(h) of the NER. In addition, the clause required compliance with any future ancillary service arrangements established under the NER for wind generators.

### 2.3.3 Developments since 2005

On 30 July 2008, NEMMCO published its final determination with respect to the calculation of user pays factors for the allocation of the costs of obtaining regulation FCAS in the market.<sup>14</sup>

This determination extends the calculation of such factors in an explicit manner to cover *semi-scheduled* generators from March 2009.

### 2.3.4 Commission Proposal

ESIPC has advised the Commission that the determination extending the calculation of causer pays factors in an explicit manner to cover *semi-scheduled* generators from March 2009, has the effect that under new arrangements, wind generators which are classified as *market semi-scheduled* will meet the intention of the current licence requirements.

*The Commission proposes to:*

*Remove specific provisions in relation to ancillary services and metering, for wind generators classified as "semi-scheduled" from March 2009.*

<sup>14</sup> See <http://www.nemmco.com.au/powersystemops/168-0100.pdf>

## 2.4 Technical Standards

### 2.4.1 Current Licence Requirements

The Commission's current requirements with respect to the technical standards with which wind generators must comply are reflected in two licence conditions which apply to wind generators with a nameplate rating of 30MW or more:

#### *FAULT RIDE THROUGH CAPABILITY*

*Each generating unit of the electricity generating plant operated by the licensee must be capable of continuous uninterrupted operation during the occurrence of a normal voltage fluctuation caused by a transmission network fault involving a single phase or two phase to ground condition with a loading level after the fault is cleared that is at, or reasonably about, the loading level immediately prior to the fault.*

*For the purposes of clause [ ], normal voltage fluctuation means voltage remaining within a band for 3 minutes, 10 seconds and 175 milliseconds following a fault, with the band having:*

- ▲ an upper boundary of 110% of nominal voltage at all times; and*
- ▲ a lower boundary of 0% of nominal voltage for the first 175 milliseconds during the fault, 80% of nominal voltage for the first 10 seconds after the fault is cleared and 90% of nominal voltage for the next 3 minutes.*

#### *REACTIVE POWER CAPABILITY*

*At full rated power output the electricity generating plant operated by the licensee must be capable of:*

- ▲ absorbing reactive power of 0.395 times that power output; and*
- ▲ delivering reactive power of 0.395 times that power output.*

*At generation levels below full rated output the electricity generating plant operated by the licensee must be capable of:*

- ▲ absorbing reactive power at a level at least pro-rata to that of full output; and*
- ▲ delivering reactive power at a level at least pro-rata to that of full output.*

*The electricity generating plant operated by the licensee must at all times be capable of providing:*

- ▲ at least 50 percent of the reactive power capabilities referred to in clause [ ] and clause 0 on a dynamically variable basis; and*
- ▲ the balance of any reactive power capability referred to in clause [ ] and clause [ ] not supplied dynamically on a static basis.*

*The reactive power capability of the electricity generating plant operated by the licensee must be capable of operating to a power factor set by the network service provider from time to time.*

## 2.4.2 Rationale for 2005 requirements

In 2005, the Commission concluded that higher technical standards would need to be imposed on future wind generators, in view of the anticipated high levels of wind generation in South Australia. In particular, the Commission determined that wind generators should have the ability to:

- ▲ ride through a prescriptive and more severe low voltage event than is usually negotiated in connection agreements;
- ▲ generate and absorb reactive power and to control voltage;
- ▲ smooth short term fluctuations in output; and
- ▲ be remotely controlled and to curtail output where necessary.

### *Fault Ride Through*

In forming its Statement of Principles in 2005, the Commission's view was that a robust approach to fault ride through capability was necessary, in light of the proposed high levels of wind generation in South Australia. The ability of generators to remain connected to the system through a fault is essential to prevent cascading failures. Cascading failures might otherwise occur where a system fault or the loss of one generator leads to further generators tripping off and making the situation worse.

The Commission received advice from ESIPC that standards higher than the minimum which could otherwise be negotiated by the wind generator proponent and the network service provider under the NER were required to ensure appropriate reliability (security) of electricity supply for South Australian electricity customers.

Rather than specify the application of the automatic access standard for fault ride through, ESIPC recommended the adoption of a specific standard similar to that established by the National Electricity Tribunal in the matter of *National Electricity Code Administrator Ltd and NRG Flinders Operating Services Pty Ltd*.<sup>15</sup>

The Commission thus determined that each generating unit must be capable of continuous uninterrupted operation during the occurrence of a normal voltage fluctuation caused by a transmission system fault involving a single phase or two phase to ground condition with a loading level after the fault is cleared that is at, or reasonably about, the loading level immediately prior to the fault.

For the purposes of this condition, normal voltage fluctuation would be defined to mean voltage remaining within a band for 3 minutes, 10 seconds and 175 milliseconds following a fault, with the band having:

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<sup>15</sup> *National Electricity Code Administrator Ltd (A.C.N. 073 942 775) and NRG Flinders Operating Services Pty Ltd (A.C.N. 094 130 837)* National Electricity Tribunal, Number 1 of 2005, 15 August 2005 (refer <http://www.netribunal.net.au/1-2005-DirectionsOrders.pdf>)

- ▲ an upper boundary of 100% of nominal voltage at all times; and
- ▲ a lower boundary of 0% of nominal voltage for the first 175 milliseconds during the fault, 80% of nominal voltage for the first 10 seconds after the fault is cleared and 90% of nominal voltage for the next 3 minutes.

### Reactive Power

The minimum reactive power requirements that a generator must offer to the power system under the NER, as they stood in 2005, were very limited.

Most wind generators seeking to connect to the system were induction generators and were simply required to offer sufficient static reactive capability to ensure the power factor at the connection point could be maintained at, or close to unity.

Static reactive reserve capability, usually capacitors and reactors, are used in the system to maintain a satisfactory voltage profile across the grid. These units need to be progressively switched in and out of service as the generation loads vary. Voltage control is important for wind generators as the generation output is variable and can vary counter to local loads. Dynamic reserve capability can be provided by generators themselves through their automatic voltage regulator (AVR) system or by power electronic devices called Static Var Compensators (STATCOM).

In 2005, ESIPC advised the Commission that it was of the view that wind generators should be required to have reactive power capabilities greater than the minimum standard, so that:

- ▲ contribution could be made to local voltage control during and immediately after a fault; and
- ▲ the impact of further wind generators on the power system would be minimised, thereby deferring the time at which voltage control might become an issue.

ESIPC proposed that:

- ▲ At full rated power output, the generation plant operated by a wind generator must be capable of delivering or absorbing reactive power of 0.395 times its power output.
- ▲ At generation levels below full rated output, the generation plant operated by a wind generator must be capable of delivering or absorbing reactive power at a level at least pro-rata to that of full output.
- ▲ At least 50% of the reactive power capability of the generation plant operated by the wind generator must be dynamically variable, with the balance able to be provided by non-dynamic plant.

- ▲ The reactive power capability of the generation plant operated by the wind generator must be controlled by a fast-acting, continuously variable, voltage control system which is able to receive a voltage set point.
- ▲ The wind generator must be able to operate its generation plant to a set power factor if that is the preferred mode of control at any time.

The Commission accepted this advice and adopted the proposals which are less onerous than the automatic access standard under the NER, but appropriate to ensure voltages on the network can be managed and voltage stability maintained.

### 2.4.3 Developments since 2005

In February 2006, NEMMCO proposed changes to generator technical standards in the NER to the AEMC. The AEMC completed its consideration of these proposed changes in March 2007.<sup>16</sup>

The NER changes adopted by the AEMC implemented a number of significant changes to the technical standards applying to connecting generators and particularly to the application of those standards to wind generators.

ESIPC has advised that the tighter definition of the term 'continuous uninterrupted operation', the introduction of the consideration of impacts on reliability of the system as a result of connection and a range of other measures are clear improvements to the NER. The work was, however, recognised as incomplete and the AEMC advised that it would conduct a broader review of technical standards in the future. The Reliability Panel is currently undertaking that further review.<sup>17</sup>

### 2.4.4 Commission Proposal

In establishing the 2005 licence conditions requiring specific technical standards for reactive power and fault ride through, the Commission was informed by reports and advice provided to it by ESIPC. The ESIPC conclusions were developed from a detailed South Australian specific analysis using local data, actual projects and real market conditions; and a review of the international experience with wind generation. The local analysis considered situations in which 400 MW, 500 MW, 800 MW and 1,000 MW of wind generation capacity were installed across the State, based upon the currently licensed developments, as well as additions of certain of the other (then) proposed developments.

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<sup>16</sup> Full details of the AEMC's Rule change process *Technical Standards for Wind Generation and Other Generator Connections* is available at <http://www.aemc.gov.au/electricity.php?r=20060324.143345>

<sup>17</sup> See <http://www.aemc.gov.au/electricity.php?r=20080509.151254>

The further up-dated advice from ESIPC, which takes account of the changes in the NER which have occurred since 2005, recommends the Commission continue to impose specific technical standards in licence conditions.

### *ESIPC Advice 2008 - Technical Standards*

In its recent advice to the Commission, ESIPC notes that South Australia is presently reaching world leading levels of wind generation as a percentage of total installed generation.

ESIPC advises that this level of wind generation makes it very difficult to develop appropriate rules for the connection of wind generation in the NEM, given that such rules need to apply in South Australia which has a relatively high penetration of wind generation at the same time as applying to Queensland and New South Wales, where the relative contributions of wind are small.

ESIPC advised that the NER remain generally deficient in their treatment of reactive power and in provisions relevant to generator access arrangements as they affect network congestion. Both of these issues are important in the context of South Australia's growth in wind generation capacity and in the number of applicants seeking connection.

The NER allow applicants seeking to connect to the system to negotiate technical standards within a range. The lower limit, below which connection must not be allowed, is referred to as the *minimum access standard* and the upper limit at which connection is allowed without negotiation is the *automatic access standard*. In a number of cases, the criteria for any *negotiated access standard* between these levels are also outlined.

Schedule 5.2 of the NER sets out all the technical standards applicable to generators seeking to connect (clause S5.2.5). ESIPC advises the Commission that it is satisfied that the majority of these technical standards are satisfactory for wind farms and other generators seeking to connect in South Australia.

However, for a number of the standards, ESIPC considers the technical standards which should apply to wind generators and which are necessary for network and system reliability in South Australia, lie within the range specified in the NER, but are above the minimum access standards specified.

For these standards ESIPC is of the view that the Commission should continue to impose (by licence condition or otherwise) a specific standard which is higher than the minimum access standard, i.e. the standard below which negotiation cannot occur. In other words, the Commission should continue to apply a narrower band in which negotiation can occur between the network service provider and the wind generator.

The technical standards which ESIPC has identified to be of most concern are:

- ▲ S5.2.5.1 Reactive Power Capability
- ▲ S5.2.5.5 Generating system response to disturbances following contingency events
- ▲ S5.2.5.12 Impact on network capability

ESIPC also suggests consideration should be given to:

- ▲ S5.2.5.5 Generating system response to voltage disturbances
- ▲ S5.2.5.13 Voltage and reactive power control

ESIPC therefore concluded that:

- ▲ additional requirements in regard to technical standards should continue to apply in South Australia; and
- ▲ there is likely to be a medium to long term need for such requirements given the increasing number of wind generators operating, under construction or negotiating connection arrangements in South Australia.

ESIPC also recommended to the Commission that the licence conditions relevant to the technical standards be reviewed for consistency with the NER, redrafted in a more permanent form and refined to improve the effectiveness of the conditions.

The Commission accepts the advice of ESIPC that there is a continuing need for higher technical standards for fault ride through and reactive power capability in South Australia, and proposes to continue to impose the technical standards licence conditions.

ESIPC has commenced the process of reviewing the current technical standards licence conditions, with the aim of improving the effectiveness of the conditions.

The Commission notes that the review of the conditions is not intended to vary the effect of the technical requirements but to make them more consistent with the NER. The Commission will release the revised form of the technical conditions when the work currently being undertaken by ESIPC is completed.

*The Commission proposes to:*

*Retain the technical standards for fault ride through and reactive power.*

*Review and refine the technical licence conditions for consistency with the NER but not so as to vary their technical effect.*

### **3 CONCLUSIONS AND NEXT STEPS**

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National developments to better incorporate wind generation into the NEM, together with the scale of further wind generation currently considering connecting in South Australia, and the high level of wind generation already operating, under construction or committed, have led the Commission to reassess whether the licensing approach outlined in the Statement of Principles for Wind Generation Licensing developed by the Commission in 2005, remains appropriate or requires modification.

Based on the advice received from ESIPC, the Commission has concluded that while some conditions can be removed for plant which is classified in the new category of “semi-scheduled”, it is appropriate to retain the technical standards licence conditions for reactive power and fault ride through.

The Commission has reached this conclusion taking into account its primary objective which is to protect the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services.

The Commission remains of the view that provided wind generator proponents can satisfy the Commission that the plant and equipment to be connected at the connection point will satisfy the Commission’s technical licence conditions, together with meeting the other licensing criteria, the Commission will be discharging its legislative functions in an appropriate manner

The Commission expects further advice from ESIPC following a review of the wording of the technical conditions for consistency with the NER, and will continue to receive advice from ESIPC on the nature and impact of wind generation in South Australia and will modify licence conditions if necessary, having considered advice from ESIPC.

The Commission invites comments on the proposals outlined in this paper by 20 February 2009.



## APPENDIX 1

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29 September 2008

Dr Patrick Walsh  
Chairperson  
Essential Services Commission of South Australia  
Level 8, 50 Pirie St  
Adelaide SA 5000

**Re: Future Licence Conditions for Wind Generators**

Dear Pat,

The Planning Council is actively examining a number of issues associated with the connection of additional wind generation in South Australia. We are writing to update the Essential Service Commission of South Australia (the Commission) on the current status of our analysis and to outline the general conclusions that can be drawn from this work.

On 30 September 2005 the Commission released its Statement of Principles for the licensing of wind generators in South Australia. The Statement of Principles set out additional obligations on wind generators seeking to connect to the South Australian electricity system and followed the publication of the Planning Council's report on wind, further advice from the Planning Council and consultation with the industry. Since then, the Commission has licensed four wind farms with a combined capacity of 412.5 MW under those principles. The Planning Council's 2008 Annual Planning Report (APR) identifies a total of 857 MW of wind capacity that is already operating, under construction or considered committed.

The addition of 857 MW of wind capacity to the South Australian system means that it is now among the international leaders with respect to the percentage contribution of wind to total generation on any measure. Experience suggests that the imposition of the additional requirements on new wind farms in South Australia has not acted as a significant barrier to entry. That view is reinforced by the scale of continuing interest in wind generation in the State. However, when these measures were adopted by the Commission they were seen as interim. The Commission stated that:

"The measures established under the Statement of Principles are designed to operate until such time as a whole of national market solution to the

challenges posed by wind generators is reached. At that time, the Commission will take steps to review and, where necessary, amend or remove its licensing requirements.”

The Planning Council notes that there have been a range of changes at a national level to better integrate wind generation into the market. The issues of relevance to the Commission licensing principles include:

- the provision of a “semi-scheduled” category of plant in the market which is particularly tailored to wind generation and provides for security constrained central dispatch of such plant;
- the introduction of wind forecasting;
- amendments to the arrangements for the calculation of ancillary service costs; and
- changes to technical standards.

#### Central dispatch

The *National Electricity Rules* now reflect a “semi-scheduled” plant category but the arrangements do not become operational until 31 March 2009. The Planning Council is satisfied that the operational arrangements for wind farms classified as *semi-scheduled* meet the objectives of maintaining efficiency and system security and can replace the current South Australian licence requirement to be scheduled from 31 March 2009.

There would be at least some efficiency benefits from all wind farms in South Australia being classified as *semi-scheduled*. However this could impose significant costs on some existing wind farms to implement such arrangements and the benefits in some cases could be small. In some cases, wind farms which were licensed prior to 2005 have clauses in their connection agreements that require generation dispatch control by ElectraNet. Where generators are required to meet such requirements, they would have the tools to permit remote generator control. Control of some wind farms by ElectraNet and some, that contribute to the same network limitations, through central dispatch by NEMMCO, could lead to inefficient outcomes. A case by case assessment may identify some existing (pre 2005) wind farms where the net benefits of reclassification to semi-scheduled are substantial. The Planning Council would be pleased to assist the Commission should they wish to consider this further.

#### Wind forecasting

The national market has operated with an interim wind forecasting tool for some time. The Commonwealth Government has funded NEMMCO to develop the Australian Wind Energy Forecasting System (AWEFS) which aims to provide better forecasts using the latest ensemble forecasting techniques developed in Europe. This system is now close to complete. All generators who are classified as semi-scheduled are included in the operation of the AWEFS system and have certain obligations to contribute to its operation. The Planning Council is satisfied that being classified as a *semi-scheduled* generator and hence part of AWEFS meets the intentions of the interim licence requirements in relation to wind forecasting and that the

South Australian licence condition referring to wind forecasting can be removed from 31 March 2009.

#### Ancillary Services

The Planning Council recommended that wind farms in South Australia should be subject to the payment of ancillary services costs to the extent that they contribute to the costs of those services. For this to apply, wind farms would first need to be a *market participant* and hence be part of NEMMCO's settlement processes. This is achieved by being classified as a market generator. In addition, there needs to be an appropriate process to calculate the contribution factors (or "causer pays" factors) applicable to wind generators. On 30 July 2008, NEMMCO published its final determination with respect to the calculation of user pays factors for the allocation of the costs of obtaining Regulating FCAS in the market. This extends the calculation of such factors in an explicit manner to cover *semi-scheduled* generators from March next year. The Planning Council considers that with these new arrangements, wind generators which are classified as *market semi-scheduled* meet the intentions of the interim licence requirements in relation to ancillary services.

#### Technical Standards

In February 2006, NEMMCO delivered to the Australian Energy Market Commission (AEMC) a set of proposed changes to the technical standards in the *Rules*. The AEMC completed its consideration of these proposed changes in March 2007. The *Rule* changes adopted by the AEMC implemented a number of significant changes to the technical standards applying to connecting generators and particularly to the application of those standards to wind generators. The tighter definition of the term 'continuous uninterrupted operation', the introduction of the consideration of impacts on reliability of the system as a result of connection and a range of other measures were clear improvements on the old *Rules*. The work was, however, recognised as incomplete and the AEMC advised that it would conduct a broader review of technical standards in the future. The Reliability Panel is currently undertaking that review.

It is very difficult, however, to write appropriate *Rules* in regard to the connection of wind generation in the national electricity market given that they need to apply in South Australia, where we are reaching world leading levels of wind generation as a percentage of total generation, at the same time as they apply to Queensland and New South Wales, where the relative contributions of wind are small. It is also apparent that the *National Electricity Rules* are generally deficient in their treatment of reactive power and in provisions relevant generator access arrangements as they affect network congestion. Both of these issues are important in the context of South Australia's growth in wind generation capacity and in the number of applicants seeking connection. The Planning Council, therefore, considers that there may be a medium to longer term need for specific South Australian technical standards in some areas.

The *National Electricity Rules* allow applicants seeking to connect to the system to negotiate technical standards within a range. The lower limit, below which connection must not be allowed, is referred to as the *minimum access standard* and the upper limit at which

connection is allowed without negotiation is the *automatic access standard*. In a number of cases, the criteria for any *negotiated access standard* between these levels are also outlined. Schedule 5.2 of the Rules sets out all the technical standards applicable to generators seeking to connect (clause S5.2.5). The Planning Council is satisfied that the majority of the technical standards are satisfactory for wind farms and other generators seeking to connect in South Australia. For a number of technical standards, the Planning Council considers that the technical standards that are necessary for new wind generators in South Australia to fulfil the Commission's objectives lie within the range specified in the Rules, but are above the minimum access standards specified. The technical standards of most concern are:

S5.2.5.1 Reactive Power Capability

S5.2.5.5 Generating system response to disturbances following contingency events

S5.2.5.12 Impact on network capability

Consideration also needs to be given to:

S5.2.5.5 Generating system response to voltage disturbances

S5.2.5.13 Voltage and reactive power control

The Planning Council therefore recommends that additional requirements in regard to technical standards should continue to apply in South Australia. The scale of further wind generation currently considering connecting in South Australia reaffirms this need when considering the Commission's primary objective to protect the long term interests of South Australian consumers with respect to the price, quality and reliability of essential services and the interest in promoting economic efficiency.

While requirements broadly consistent with those in the interim licence conditions should continue to apply, they should be:

- redrafted in a more permanent form;
- reviewed to ensure that they are consistent with the revised national Rules; and
- refined to improve their efficiency and effectiveness.

The *National Electricity Rules* apply the technical standards primarily through imposing requirements on the network service provider from whom connection is sought. One possible approach to making the interim licence conditions more refined, consistent and permanent would be to amend the South Australian Electricity Transmission Code. The requirements in the Electricity Transmission Code at the time of negotiating connection would also need to be reflected in a generator's licence conditions.

A review of the ongoing requirements for licensing of new wind farms in South Australia could be extended to consider compliance issues. It is the Planning Council's intention that any recommended South Australian generator licence conditions should be complementary to

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arrangements in the *National Electricity Rules*. Compliance should then be assured by including the requirements for each generator in the:

- *offer to connect* which must include the negotiated or automatic access standard determined for each technical requirement (clause 5.3.6(b)(1)) through the connection process set out in section 5.3 of the Rules;
- *connection agreement* which under clause 5.3.7 (b) must include their *performance standards*; and
- *performance standards* which must be forwarded to NEMMCO in accordance with clause 5.3.7 (g) and registered by them.

With the technical requirements embedded in the *connection agreement* and the registered *performance standards*, the provisions for compliance under the Rules apply including:

- proving initial compliance with commissioning testing under clauses 5.7.3 and 5.8 and potentially inter-network testing under clause 5.7.7;
- satisfying NEMMCO that it is able to meet its *performance standards* for the purposes of registration under clause 2.2.2 (e)(3); and
- meeting the obligation to comply and the requirement to have a satisfactory compliance plan under clause 4.15.

Any redrafting of Codes or licence conditions should ensure that there are no gaps in this chain of responsibility.

The Planning Council has been reviewing the performance of the system with the current level of wind generation and has been advancing analysis of higher levels of wind generation. As a part of this work, the Planning Council has been working closely with ElectraNet examining the mid-north area of the State in particular and its capability to connect more wind generation. The Planning Council intends to use the results of this work in future advice to the Commission.

The Planning Council commends the Commission for its action to date in respect to wind generation in South Australia. Rather than act as a barrier to entry, experience indicates that these requirements have allowed South Australia to connect more wind generation and contributed to protecting the long term interests of South Australian consumers and maintaining efficiency. I assure the Commission that the Planning Council will continue to provide the Commission with support in this important area.

David Swift  
Chief Executive