

A few
words.

Mr Nathan Petrus
Director, Pricing and Analysis
Essential Services Commission of South Australia
Level 8, 50 Pirie Street
Adelaide SA 5000

13 February 2012

Dear Nathan

Application for a variation to the 2011 – 2014 Electricity Standing Contract Price Determination due to “special circumstances”

This letter is an application from AGL South Australia Pty Ltd (**AGL**) to the Essential Services Commission of South Australia (**the Commission**) as a result of “special circumstances” due to the Commonwealth Government’s *Clean Energy Act 2011*. As a consequence of these “special circumstances”, AGL proposes that the Commission vary the existing 2011 – 2014 Electricity Standing Contract Price Determination (**ESCPD**) from 1 August 2012 to 30 June 2014 based upon the approach put forward in this application.

Clean Energy Act 2011

On 18 November 2011 royal assent was given to the Commonwealth Government’s *Clean Energy Act 2011*. The Act sets up the carbon pricing mechanism and deals with assistance for emissions-intensive trade-exposed industries and the coal-fired electricity generation sector.¹

Under a carbon pricing mechanism, liable parties will be required to surrender a carbon unit for every tonne of greenhouse gases, measured as carbon dioxide equivalent (CO₂e), that they emit. For electricity generators that operate in the National Electricity Market (NEM), the majority of generators (by sent out generation) generate electricity through the combustion of fossil-fuels, which in turn, results in the emission of greenhouse gases. The carbon pricing mechanism will require electricity generators to purchase enough carbon units to cover their requirements for surrender at the end of the year. As this will increase generators’ marginal running costs, they will seek to recover this in the market. The Act establishes that the cost of a carbon unit for surrender is \$23 per unit for 2012/13, increasing to \$24.15 per unit in 2013/14.

The carbon pricing mechanism will also lead to other increased costs for electricity generators such as managing their compliance requirements with the mechanism and related legislation (i.e. monitoring, reporting and verification of CO₂e emissions) and increased capital requirements associated with the purchase and surrender of carbon units.

The result of this increase in generators’ costs and a longer term shift away from fossil-fuel electricity generation will be to increase the wholesale cost of electricity. This will increase the cost to purchase electricity, which will be passed on to consumers.

¹ Department of Climate Change and Energy Efficiency, *Securing a clean energy future: Implementing the Clean Energy Legislation. Stakeholder information note (Version 2)*. December 2011. Appendix 1A. Page 15.

Special circumstances

On 14 December 2010, the Commission completed the ESCPD that would apply to standing contract prices from 1 January 2011 to 30 June 2014. A feature of the ESCPD was a new price setting methodology, the Relative Price Movement (**RPM**) methodology. The RPM methodology calculates a price index (**RPM index**) which measures the change in weighted average market contract prices for the coming year. This index then determines the allowable change in standing contract prices for the coming year.² The Commission also noted in their 2010 Final Price Determination that the standing contract price should be set on the basis of a new entrant retailer supplying a small customer load in South Australia.³

Changes in the standing contract price resulting from the RPM index calculation are bound by a floor and a cap. In establishing the tolerance band, the Commission considered forecasts of electricity retail price inputs, using high-case outcomes to set the cap and low-case outcomes to set the floor. In the 2010 ESCPD, the Commission noted:

*If there are sufficient grounds to allow standing contract prices to move beyond the floor or cap, the Commission may undertake a "special circumstances" review to consider whether or not such a move is justified.*⁴

Understandably, no allowance was made in the current ESCPD for the impact of a carbon pricing mechanism, or an equivalent scheme, due to prevailing uncertainty in relation to carbon policy at the time. However, ESCOSA previously flagged that it would likely consider the introduction of a carbon pricing scheme as a potential trigger for a "special circumstances" review.⁵

On this basis, AGL considers that the introduction of the Clean Energy Act creates "special circumstances" under the current ESCPD.

AGL proposal for carbon cost allowance

AGL has developed a simple and transparent methodology to incorporate the impact of the Clean Energy Act as a variation to the current ESCPD, instead of developing an entirely new standing contract price determination prior to the expiry of the current ESCPD. This is consistent with the reasons for adopting the RPM methodology which were to provide greater price flexibility and alleviate many of the difficulties in developing forecasts of total retailer costs in the energy market.

In summary, AGL proposes that the carbon cost allowance in the cap under the RPM comprises of the following:

- i) Wholesale Carbon Cost;
- ii) Allowance for an increase in cost for distribution losses; and
- iii) Adjustment for the variation in standing offer prices from 1 August 2012, due to the fact that the carbon pricing mechanism commences on 1 July 2012.

In line with the methodology used in the ESCPD, the cap will also be adjusted to maintain the benchmark percentage margin.

² ESCOSA, 2010-2014 *Electricity Standing Contract Price Determination, Part A – Statement of Reasons*. Page A-36.

³ Ibid. Page A-31

⁴ Ibid. Page A-36.

⁵ ESCOSA, 2010 *Review of Retail Electricity Standing Contract Price Path Final Inquiry Report & Final Price determination (December 2010)*. Page A-115

Wholesale Carbon Cost

AGL refers to the main cost due to the carbon pricing mechanism as the *Wholesale Carbon Cost*. The *Wholesale Carbon Cost* is determined as follows:

$$\text{Wholesale_Carbon_Cost}_y = \text{ACI}_x * \text{CRP}_y \quad (\text{Eq.1})$$

where :

- ACI_x Average Carbon Intensity in period x (tonne CO₂e/MWh)
- CRP_y Carbon Reference Price in period y (\$)

The Average Carbon Intensity (ACI_x) is calculated on a volume-weighted basis using historical emissions and sent out generation data over the period x . The Carbon Reference Price (CRP_y) represents the cost of a carbon unit for the relevant year i.e. period y . A detailed discussion of the inputs and assumptions in *Eq.1* and the approach to calculating the *Wholesale Carbon Cost* is provided in Appendix A.

The proposed methodology to determine this *Wholesale Carbon Cost* is based on the approach used in the Australian Financial Markets Association (**AFMA**) standard commodity contract for electricity trading. In order to mitigate the risk associated with uncertain carbon pricing policy, AFMA developed an addendum to the standard commodity transaction contract (i.e. Australian Carbon Benchmark (**ACB**) Addendum) which allows the parties to deal on a "carbon exclusive" basis and adjust the price of the transaction upon the introduction of a carbon price. To this end, AEMO publishes a Carbon Dioxide Equivalent Intensity Index (**CDEII**) which is used to calculate the ACI over the period of settlement of the contract. An extract from the ACB Addendum setting out the formula to adjust the contract price due to the introduction of a carbon price is provided in Appendix B.

The CDEII has been published by AEMO since 19 June 2011. In order to have as close as possible to a full year of CDEII data, AGL proposes that the Commission update the ACI_x based on published data from 19 June 2011 to 31 May 2012. AGL propose that this ACI_x is to be used to update the *Wholesale Carbon Cost* component for both 2012-13 and 2013-14 in the Final Variation Price Determination in June 2012.

For the purpose of estimating the *Wholesale Carbon Cost* for this application, AGL has calculated an ACI_x based on a volume-weighted NEM CDEII from 19 June 2011 to 28 January 2012 (i.e. 0.9201 tonne CO₂e/MWh). If for any reason the Commission is concerned about the lack of a complete year of data, AGL has developed an alternate methodology to calculate ACI_x . This approach is discussed in further detail in Appendix C.

Proposed changes to tolerance band

Using this approach, AGL proposes that the change in the tolerance band should be as follows:

- Floor: No change, so as to reflect a range of retailer costs within the tolerance band.
- Cap: Increase the cap to reflect:
 - i) Wholesale Carbon Cost for each year based on an average NEM ACI for electricity (t CO₂e/MWh) multiplied by the relevant CRP for the period;
 - ii) Allowance for an increase in cost for distribution losses;
 - iii) Adjustment for the variation in standing offer prices from 1 August 2012, noting that the carbon pricing mechanism commences on 1 July 2012; and
 - iv) Adjustment to maintain the benchmark percentage retail margin (10% of WEC + ROC) resulting from the increase in the WEC.

The proposed increases in the cap for 2012 – 2014 in July 2012 dollars are as outlined below:

Table 1 – Proposed change in RPM cap 2012-2014

	\$/MWh (\$July12)	
	1 Aug 2012 – 31 Jul 2013	1 Aug 2013 – 30 Jun 2014
Wholesale Carbon Cost	\$21.16	\$21.69
Distribution losses	\$1.72	\$1.77
Adjustment for 1 August price variation	\$2.00	-
<i>Carbon cost allowance</i>	<i>\$24.88</i>	<i>\$23.46</i>
Adjustment for retail margin allowance	\$2.49	\$2.34
Increase in Cap	\$27.37	\$25.80

A detailed description of the methodology used to calculate each component in the cap increase is provided in Appendix A.

AGL note that the increases in the cap described above will need to be adjusted after the release of the March 2012 CPI to normalise to the March 2010 CPI base used in clause 2.A(d) of Schedule 2, as varied under the Variation Price Determination in June 2011.

AGL understands that the Commission will be amending the Variation Price Determination made in June 2011 to allow for further increases in ETSA Utilities' network charges from 1 July 2012. This amendment for network charges will be additional to the cost allowance proposed in this letter. If you have any queries in relation to this matter, please do not hesitate to contact me on (03) 8633 6207 or at elizabeth.molyneux@agl.com.au.

Yours sincerely,

Elizabeth Molyneux
Head of Regulated Pricing

Appendix A – Methodology to calculate the carbon cost allowance in the cap

AGL has developed a methodology to calculate the cost to retailers that will result from the introduction of the *Clean Energy Act 2011* and how this should be accounted for in the current ESPCD. In summary, AGL proposes that the carbon cost allowance in the cap under the RPM comprises of the following:

- i) Wholesale Carbon Cost;
- ii) Allowance for an increase in cost for distribution losses; and
- iii) Adjustment for the variation in standing offer prices from 1 August 2012, whereas the carbon pricing mechanism commences on 1 July 2012.

In line with the methodology used in the ESPCD, AGL also proposes an adjustment to the cap to maintain the percentage margin in the Standing Contract Price.

AGL anticipates that there will also be increases in retail operating costs for reporting and compliance obligations under the Clean Energy Act, but these costs have not been included in the calculation of the carbon cost allowance. At this stage, AGL believes that it would be difficult to forecast these costs for the purpose of including them in the tolerance band.

A.1 Wholesale carbon cost

Overview

AGL proposes the following calculation be used to represent the allowance for the cost for retailers due to the carbon pricing mechanism from 1 July 2012 to 30 June 2014.

$$\text{Wholesale_Carbon_Cost}_y = \text{ACI}_x * \text{CRP}_y \quad (\text{Eq.1})$$

Where : ACI_x Average Carbon Intensity in period x (tonne CO₂e/MWh)
 CRP_y Carbon Reference Price in period y (\$)

The following provides a detailed discussion of the inputs and assumptions in *Eq.1*.

Using AEMO Carbon Dioxide Equivalent Intensity Index (CDEII) for 'benchmark' ACI

AGL has developed a methodology to calculate a 'benchmark' ACI to be applied in the remaining years of the ESPCD (i.e. 2012-13 and 2013-14) based on the AEMO calculation of the Carbon Dioxide Equivalent Intensity Index (**CDEII**) for the NEM.

The CDEII includes a set of emission intensity figures for sent out generation across the entire NEM. It is calculated daily based on the AEMO preliminary settlement statements. The procedure for the calculation of the CDEII is published on the AEMO website.⁶ The procedure details the data inputs, assumptions, calculation formulas and protocols for publishing CDEII data.

CDEII data is available to NEM participants from the AEMO NEM Database by using the *MMS Data Model* interface⁷ and to the general public on the AEMO website. The CDEII is published daily along with *Total Sent-out Energy (TSOE)* and *Total Emissions (TE)* for the period.

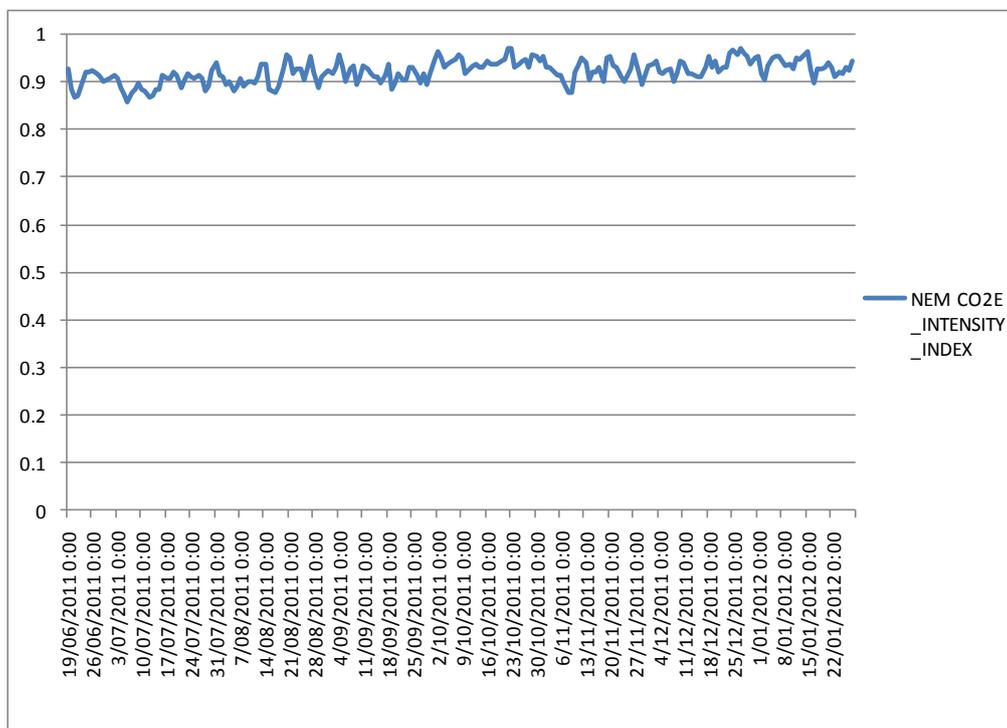
As the CDEII is a volume-weighted average of the emissions intensity of sent out generation over time, a change in the generation mix can vary the CDEII from one period

⁶ AEMO, *Carbon Dioxide Equivalent Intensity Index Procedure*, Version 1.00 (2010) available at <http://www.aemo.com.au/electricityops/0910-0009.pdf>

⁷ The MMS Data Model is a logical data model provided and supported by AEMO for participants operating in the wholesale electricity market. Further information on the MMS Data Model is available at http://www.aemo.com.au/data/market_data.html.

to the next. Figure A1 shows the change in the NEM CDEII since AEMO commenced calculating the index on 19 June 2011 to the 28 January 2012.

Figure A1 –AEMO Carbon Dioxide Equivalent Intensity Index for NEM (19 June 2011 – 28 Jan 2012)



In order to set a 'benchmark' ACI using the CDEII data for the cost allowance in the tolerance band cap, AGL proposes the following assumptions:

- *NEM Region*

The AFMA Addendum discussed previously uses an ACI for the purpose of calculating the carbon cost amount for an OTC contract, based on the NEM-wide value of the AEMO CDEII for the relevant time period. Using a NEM-wide approach to calculate the cost recognises that this approach is the most efficient manner in which to manage costs in an interconnected market such as the NEM. We also note that under AGL's proposal, use of the 'NEM Region' and the subsequent calculation for the carbon price impact only applies to the cap, and not the floor.

- *Use of single year benchmark ACI*

AGL has assumed that a single 'benchmark' ACI is applied in both remaining years of the existing price path i.e. 2012-13 and 2013-14. It could be argued that the policy intent of the carbon pricing mechanism is to reduce the carbon intensity of generation in the NEM and therefore the NEM intensity should reduce over time. While AGL agree that this is the intent of the policy, the allowance in the tolerance band represents a benchmark rather than a specific forecast cost, and therefore AGL believes that it is appropriate to set a single ACI across the two years, again noting that this is only relevant to the RPM Cap.

- *Choice of time period*

AGL believes that calculating an ACI over a one year period is the most appropriate approach to set a 'benchmark' ACI for the tolerance band cap. Using an ACI calculated over one year ensures that any seasonal variation in dispatch outcomes is captured i.e.

increased levels of peaking generation plant being dispatched over summer to meet load requirements at times of peak demand.

It could be argued that a more accurate representation of the cost that retailers might be exposed to use a forecast of the ACI for the relevant period i.e. as the amount of carbon pass-through allowed in an OTC contract using the AFMA addendum is based on the ACI published for the period of the contract. But the ACI depends on the level of generation by different types of plant, and this means that the ACI will vary over time with generation output. In order to forecast an ACI for a future period, a detailed modelling exercise would be required. This exercise would likely involve running a model to forecast the dispatch outcomes of generators over a specific period, using the dispatch information to determine the intensity (t CO₂e/MWh) of generation. This approach would rely on a complex set of assumptions and inputs. In AGL's view, such an approach would not provide any additional benefits beyond AGL's proposed methodology.

Calculation of Average Carbon Intensity 2012-2014 using AEMO CDEII

Based on a 1 August 2012 commencement of the 2012-14 ESCPD it is likely that the Commission will need to release a Final Variation Price Determination in June 2012. On this basis AGL proposes that the final ACI_x (applied in Eq.1) is updated by the Commission prior to the release of the Determination, as close as possible up to 19 June 2012 i.e. 31 May 2012. This will provide a sufficient sample of NEM CDEII data to account for any seasonal variation in the NEM CDEII.

The ACI_x could be calculated over a period of up to 365 days using the following calculation:

$$ACI_x = \frac{\sum_{n=365} TE_n}{\sum_{n=365} TSOE_n} \quad (Eq.2)$$

where : ACI_x Average Carbon Intensity in period x (tonne CO₂e/MWh)

TE_n Total Emissions for NEM in day n (tonne CO₂e)

TSOE_n Total Sent-Out Energy for NEM in day n (MWh)

For the purpose of calculating the *Wholesale Carbon Cost* for retailers to be included in the calculation of the tolerance band cap, and demonstrating how the calculation in Eq.2 is applied, AGL has calculated the volume-weighted ACI_x using NEM CDEII data from 19 June 2011 to 28 January 2012 (i.e. n = 224).

Table A1 - Average Carbon Index (tonne CO₂e/MWh)

	July 2012- June 13	July 2013 – June 2014
ACI _x	0.9201	0.9201

Carbon Reference Price 2012-2014

The Carbon Reference Price (**CRP**) represents the cost of a carbon unit (as defined under the *Clean Energy Act 2011*) for the relevant period i.e. period *y*. Under the *Clean Energy Act 2011*, in the fixed price stage that runs from 1 July 2012 to 30 June 2015, the carbon price will start at \$23 per unit and rise by 2.5 per cent a year in real terms.⁸

On this basis, Table A2 sets out the CRP proposed to be used as part of the calculation in each year of the price path.

Table A2 - Carbon reference price (July12\$)

	July 2012- June 13	July 2013 – June 2014
Carbon Reference Price	\$23.00	\$23.58

Wholesale carbon cost 2012-2014

Using *Eq.1*, Table A3 provides the proposed *Wholesale Carbon Cost* incurred by retailers from 1 July 2012.

Table A3 - Wholesale Carbon Cost (\$/MWh July12\$)

	July 2012- June 13	July 2013 – June 2014
Wholesale Carbon Cost	\$21.16	\$21.69

A.2 Distribution losses

In the current ESCPD, a distribution loss factor of 8.14% was used. Distribution losses will add a further \$1.72/MWh to retailers costs from 1 July 2012 to 30 June 2013 and \$1.77/MWh from 1 July 2013 to 30 June 2014.

Table A4 - Wholesale Carbon Cost including losses (\$/MWh July12\$)

	July 2012- June 13	July 2013 – June 2014
Wholesale Carbon Cost	\$21.16	\$21.69
Distribution losses – 8.14%	\$1.72	\$1.77
Wholesale carbon cost including losses	\$22.88	\$23.46

⁸ Australian Government, Clean Energy Future website, <http://www.cleanenergyfuture.gov.au/clean-energy-future/carbon-price/#content01> accessed 24 January 2012.

A.3 Adjustment for 1 August price variation

The financial obligations under the Clean Energy Act commence from 1 July 2012. However, the price change under the RPM is one month later from 1 August 2012.

Figure A2 - Adjustment for 1 August price variation

RPM price change		RPM price change	
1-Aug-12		1-Aug-13	
1-Jul-12		1-Jul-13	
<i>Carbon price introduction</i>		<i>Carbon increase : CPI + 2.5%</i>	
<i>\$22.88/MWh (incl losses)</i>		<i>\$23.46/MWh (real)(incl losses)</i>	

With prices increasing only from 1 August 2012, the carbon costs incurred in the month of July 2012 will not be able to be recovered by retailers. This is not a timing issue, and will be a loss if not recovered.

As noted earlier, the cost of a carbon unit is legislated to increase to \$24.15 per unit from 1 July 2013, from \$23 per unit. This increment including distribution losses will amount to \$1.13/MWh in real terms (assuming a CPI of 2.5%) from 1 July 2013 i.e. $[(23.46 \times 1.025) - 22.88]/1.025$].

AGL proposes that the carbon costs for July 2012 and the increment in carbon costs for July 2013 be recovered over the 12 month pricing period from 1 August 2012 to 31 July 2013. Assuming a flat consumption over the year, these adjustments will amount to \$2.00/MWh (i.e. $(\$22.88 + \$1.13)/12$).

A.4 Adjustment for retail margin allowance

The Commission has established a retail margin allowance of 10% of WEC + ROC in the current ESCPD. With the increase in WEC due to the introduction of carbon pricing, the retail margin allowance will increase accordingly.

Table A5 - Adjustment for retail margin allowance (\$/MWh July12\$)

	1 Aug 2012- 31 July 13	1 Aug 2013 – 30 Jun 2014
Wholesale carbon cost	\$21.16	\$21.69
Distribution losses	\$1.72	\$1.77
Adjustment for 1 August price variation	\$2.00	-
<i>Carbon cost allowance</i>	<i>\$24.88</i>	<i>\$23.46</i>
Adjustment for retail margin allowance – 10%	\$2.49	\$2.34

A.5 Summary of carbon cost allowance

The proposed increases in the cap for 2012 – 2014 in July 2012 dollars are as outlined below:

Table A6 – Proposed change in RPM cap 2012-2014

	\$/MWh (\$July12)	
	1 Aug 2012 – 31 Jul 2013	1 Aug 2013 – 30 Jun 2014
Wholesale Carbon Cost	\$21.16	\$21.69
Distribution losses	\$1.72	\$1.77
Adjustment for 1 August price variation	\$2.00	-
<i>Carbon cost allowance</i>	<i>\$24.88</i>	<i>\$23.46</i>
Adjustment for retail margin	\$2.49	\$2.34
Increase in cap	\$27.37	\$25.80

These increases in the cap above will need to be adjusted after the release of the March 2012 CPI to normalise to the March 2010 CPI base used in clause 2.A(d) of Schedule 2 as varied under the Variation Price Determination in June 2011.



Appendix B – Extract from Australian Financial Markets Association, Australian Carbon Benchmark (ACB) Addendum

In 2009, the Australian Financial Markets Association (AFMA) developed the ACB Addendum as an addition to the Commodity Transaction contract. The Addendum provides a mechanism for an increase to the fixed price of the Commodity Transaction in accordance with a defined formula.

The extract below from the August 2010 – ACB Addendum sets out the formula to calculate the amount which is added to the fixed price of the Commodity Transaction:

$$CA = ACI * CRP$$

where:

CA is the amount of the increase for that Calculation Period (in \$/MWh);

ACI is the Average Carbon Intensity (expressed in tonnes of CO₂-e/MWh) of generating units (as defined in the National Rules) applicable to the Billing Period in which that Calculation Period occurs:

(a) as published by AEMO (whether or not based on information provided by all market generators (as defined in the National Rules)); or

(b) if AEMO does not publish such an average carbon intensity applicable to at least part of that Billing Period on or by the tenth Business Day after the end of that Billing Period, then:

(i) as determined by agreement between the parties; or

(ii) if the parties have not so agreed the average carbon intensity within 12 Business Days after the end of the Billing Period, as determined by the Independent Expert;

CRP is a carbon reference price for that Calculation Period (expressed in \$/tonne of CO₂-e, exclusive of GST)

The CRP clause provides direction on how the CRP should be calculated in the event of different types of carbon pricing such as a Carbon Tax or a Floating Price.

Appendix C - Alternative for Calculation of Average Carbon Intensity 2012-14

AGL has developed an alternative approach for the calculation of the ACI_x by replicating the calculation of the CDEII for the NEM over a specified time period. The following provides a description of the proposed methodology, data sources and assumptions used to calculate an Average Carbon Intensity over a specified time period.

The following equation represents the calculation for the ACI_x :

$$ACI_x = \frac{\sum_i (E_{ix} * (1 - A_i) * EF_i)}{\sum_i (E_{ix} * (1 - A_i))} \quad (Eq.3)$$

- where :
- ACI_x Average Carbon Intensity (tonne CO₂e/MWh)
 - E_{ix} 'As generated' Energy for generator i over period x (MWh)
 - A_i Auxiliaries usage for generator i (% value)
 - EF_i Emission Factor per generator (tonne CO₂e/MWh)
 - x Specified period of time

The key data inputs to the ACI calculation are:

- 1) 'As generated' Energy per unit generator (E_{ix})

Data for 'As generated' Energy per unit generator is taken from the AEMO NEM database using the *MMS Data Model*. The data model defines the interface to market participants so that they are able to access data published by AEMO from the NEM system. This allows participants to set up a database containing all current participant data recorded in the main NEM production database i.e. 'As generated' Energy data reported to AEMO by each scheduled and semi-scheduled generator in the NEM for the purpose of market settlement. Data is available for scheduled and semi-scheduled generators and intermittent generators on a half-hourly basis. For the purpose of calculating an ACI generation data has been extracted on a quarterly basis.

Data for all individual intermittent generators is not reported by AEMO. AEMO report an aggregated total intermittent generation amount, but this does not cover some individual intermittent generators. It also appears that some intermittent generators are not included in the total intermittent generation amount or reported separately, however AGL believe this amount to be negligible.⁹ For Cal 2011 'As generated' Energy from total intermittent generation represented approximately 2.1% of total energy over the period.

- 2) Auxiliaries usage (A_i)

The Auxiliaries usage factor (A_i) accounts for 'in-station' use of electricity by the generator. Auxiliary usage factors for individual generators are not collected as part of the AEMO MMS Data Model and therefore the Auxiliary factors used in the calculation are based on factors published as part of the most recent National Transmission Network Development Plan (**NTNDP**).¹⁰ As total intermittent generation is made up of a number of technologies a single Auxiliary usage factor is not published. This generation is made up largely of wind energy and other renewable technology generation, therefore AGL has assumed a zero Auxiliary usage factor.

⁹ The AEMO CDEII is calculated on the basis of a published list of 'Available Generators' for the relevant week. The generation data for some non-scheduled generators in the 'Available Generators' list is not publicly available. AGL has calculated that total sent out generation from a compiled list of 'Available Generators' in H2 Cal11 is within 0.4% of the total sent out generation calculated by using data from the AEMO MMS Data Model for the same period. AGL consider that this difference would have a negligible impact on the calculation of Cal11 ACI_x .

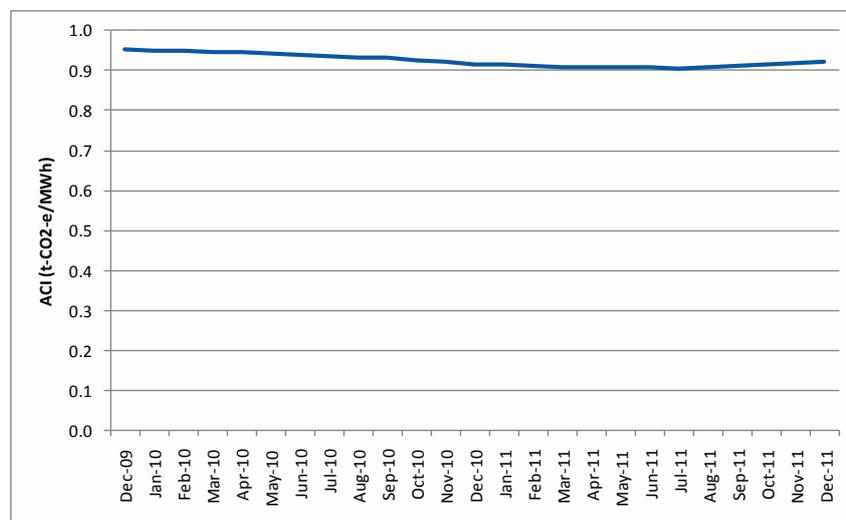
¹⁰ The 2011 National Transmission Network Development Plan (NTNDP) is the most recent publication of this series and the auxiliary factors for existing generators are available at <http://www.aemo.com.au/planning/0418-0013.zip>

3) Emission Factor of each generator (EF_i)

Emission Factors for each generator (EF_i) are published by AEMO through the MMS Data Model. Emission Factors are also published as part of the AEMO NTNDP, and the factors published through the MMS Data Model are the same as those used in the latest NTNDP. Emission Factors are on a 'sent out' energy basis (tonne CO₂e/MWh). AGL has assumed a zero Emission Factor for intermittent generation. AGL believe that this is a conservative approach to calculating the ACI_x .

On this basis, AGL proposes using an ACI calculated over the 2011 calendar year (i.e. 1 January 2011 to 31 December 2011) to ensure that any seasonal variation in dispatch outcomes is captured. Figure C1 shows the NEM annual ACI calculated as a rolling average for the preceding 12-months from 2009.

Figure C1 - ACI: Rolling Average 12-month preceding (Dec 2009 – Dec 2011)



AGL is of the view that using 2011 calendar year time period represents a reasonable benchmark of the carbon intensity of the NEM over recent years. On this basis, Table C1 sets out the proposed value for the ACI_x which could be used as an alternative instead of updating the ACI_x calculated using the AEMO CDEII data.

Table C1 – Alternative Average Carbon Index (tonne CO₂e/MWh)

	July 2012- June 13	July 2013 – June 2014
ACI_x	0.9222	0.9222