

11 December 2009

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By online submission

Dear John

Re | NEM Greenhouse Intensity Index

AEMO requests the AEMC consider making a Rule under sections 91 and 96 of the *National Electricity Law (NEL)*. The proposed Rule would require AEMO to calculate and publish a Greenhouse Intensity Index (**GII**) for the national electricity market (**NEM**).

In conjunction with NEM participants, the Australian Financial Markets Association (**AFMA**) has developed a mechanism to facilitate forward financial market trading in light of the possible future introduction of a price on carbon emissions. The mechanism relies on a **GII** as a reference point for financial contract settlement purposes. Accordingly, AFMA has requested that AEMO develop and publish a suitable **GII**.

A statement of the issue concerning the Rules, a description of the proposed Rule, and how the proposed Rule addresses those issues and advances the national electricity objective is in Attachment A. A draft of the proposed Rule is in Attachment B and AFMA's letter which indicates its desire for AEMO to develop and formally publish the **GII** is in Attachment C.

AEMO considers that the proposed Rule change is non-controversial in nature as it is unlikely to have a significant effect on the NEM, as is required for an expedited consultation process under section 96 of the NEL, and we understand there to be support for it from industry stakeholders.

This letter supersedes earlier correspondence from AEMO to the AEMC dated 13 November 2009. AEMO would be pleased if you could have these matters considered by the AEMC. For further details, please do not hesitate to contact Murray Chapman on 02 9239 9106.

Yours sincerely



for Matt Zema
Managing Director and Chief Executive Officer



cc:

Attachment A: Requests for Rule change

Attachment B: Draft version of the proposed Rule

Attachment C: Letter from Australian Financial Markets Association

Attachment D: December 2009 Australian Carbon Benchmark Addendum

ATTACHMENT A

1. Statement of issues

This section identifies the issue with the National Electricity Rules (**NER**) regarding AEMO producing and publishing a Greenhouse Intensity Index (**GII**) to support forward financial trading in the National Electricity Market (**NEM**).

1.1 Background

In January 2000, NEMMCO began calculating and publicly reporting a GII for the NEM, in response to a request from the Commonwealth Department of Industry, Science and Resources (**department**). NEMMCO used the methodology and some of the input data initially provided by the department to calculate the GII. It provided an indicative, low cost index based on the inputs available at the time, and required little maintenance by NEMMCO.

The GII was reported on a weekly basis and was a single number which represented the amount of carbon dioxide equivalent greenhouse gas emitted per megawatt hour (**MWh**) of electricity sent out by generators operating in the NEM during the previous week. A summary of the approach that was used to calculate the GII follows.

The calculation required the following two discrete data sets:

1. The volume of the gross energy (MWh) sent out from each generating unit, and
2. The greenhouse gas emissions per unit of electricity (t CO_{2-e}/MWh) sent out by each generator (generator specific emission factor).

The resultant GII for the NEM was reported in tonnes of CO_{2-e} per megawatt hour (t CO_{2-e}/MWh).

The following formula was used to calculate the greenhouse gas emissions for an individual generator for the particular period of interest:

$$GHG_i = EF_i \times E_i$$

where:

| | | |
|----------|---|--|
| GHG | = | greenhouse gas emissions (t CO _{2-e}) from a generating unit |
| EF | = | Emission Factor for individual generator (t CO _{2-e} /MWh) |
| E | = | Gross Energy (MWh) generated from a generating unit |
| <i>i</i> | = | Generator with available energy data and emission factor |

The total greenhouse gas emission for the NEM was calculated as:

$$GHG_{Total} = \sum_i GHG_i$$

The GII for the NEM was calculated by:

$$GI = \frac{\sum_i GHG_i}{\sum_i E_i}$$

where:

GII = Greenhouse Intensity Index for the NEM (t CO_{2-e} /MWh)

The above equation produced a volume weighted average of the rate of greenhouse gas emissions of the generating units involved.

Governance of the previous GII

NEMMCO calculated and reported the GII on an informal basis, that is, there were no formal requirements such as NER obligations obliging NEMMCO to report the GII. Input data was sourced by NEMMCO as follows:

- Input data relating to generating plant energy production (in MWh) was sourced from revenue quality metering where possible, and was therefore from a verifiable source; and
- Greenhouse intensity factors for individual generators were based on information that was provided informally to NEMMCO in 2000. Intensity factors for many new generating units had not been included in the GII.

The GII became progressively less accurate over time due to new entrants that were not included in the GII and the use of dated input data. This diminished the value of the GII.

Emergence of commercial reliance on the GII

The GII was published by NEMMCO on an information only basis and not intended to be used to underpin commercial transactions. However since 2000, the importance of a robust GII has gained significance because of the emergence of policy initiatives such as the introduction of a carbon pollution reduction scheme (**CPRS**). This has resulted in NEM participants and financial markets investigating commercial mechanisms to account for the impact of these changes through time, including during periods of uncertainty.

NEMMCO became aware of increased industry focus on the published GII when the Australian Financial Markets Association (**AFMA**) advised that, in conjunction with their members, they were developing an addendum to the existing standard over the counter (**OTC**) contract documentation which would reference the GII previously published by NEMMCO.

AFMA's letter to AEMO¹ indicates that the AFMA Electricity Committee "recognised that uncertainty as to the impact of a Carbon Pollution Reduction Scheme (CPRS) on the National Electricity Market (NEM) pool price post introduction of the Scheme was inhibiting forward trading past mid 2010 (the then commencement date). The Committee typically includes retailers, financial institutions and brokers participating in the over-the-counter (OTC) electricity hedge market."

The letter from AFMA explains that the Committee developed the "December 2008 Australian Carbon Benchmark Addendum" (Addendum) to facilitate the adjustment of the fixed price in a swap contract, and that "the Addendum has been fairly widely adopted by participants in OTC forward electricity markets". The price adjustment facilitated by the Addendum provides a means for a relevant carbon price, should one be present, to be taken into account in the settlement of a contract, when the settlement takes place. Therefore, the GII would be relied on for commercial purposes in circumstances where there is a carbon price.

A copy of the latest version of the Addendum has been provided by AFMA, who has agreed that it can be attached to this letter to provide transparency of its mechanics. It is evident that the Addendum relies on the availability of a GII (referred to as an average carbon intensity or ACI in that document), for its operation. In the absence of a GII, the parties are required to negotiate an outcome, or to appoint an independent expert if agreement cannot be reached within twelve days (see section 3 of the Addendum in Attachment D). Availability of the GII would therefore serve to provide confidence to contracting parties that they would not need to engage in these activities, which are likely to be time consuming and costly, to settle their contracts.

Independently of this, NEMMCO had also understood that interest had been growing in the use of the GII to assist pricing carbon into other instruments, such as retail contracts.

Role of OTC contracts in the NEM

The OTC market, which is a part of the financial market, supports the efficient operation of the NEM through the trade of derivative products for the forward management of spot price risk. Generally, the prices of derivative products reflect the expected electricity spot price and premiums which cover a number of risks such as default and market risk. Derivative products that are commonly traded in the OTC market to hedge exposure to the spot price are forward contracts. These are most often entered into between generators and retailers as they face opposing spot market risks and provide the buyer and seller with a fixed price for a specified quantity and for period time in the future. Spot market trading and settlement occurs

¹ See Attachment C of this proposal.

separately to this financial activity, however, they are both influenced by perceptions of future price outcomes. The importance of financial markets to the efficient and effective operation of the NEM has often been acknowledged. The ERIG Report² stated:

“Transparent and effective energy financial markets provide instruments for market participants to manage risks. More importantly financial markets are a critical element in fostering efficiency. Financial markets also provide the signals for investment.”

It is broadly acknowledged that climate change initiatives, such as the CPRS, are likely to have a material effect on electricity spot prices, and this will depend on the future market price of carbon. Parties seeking to trade forward contracts for electricity are therefore looking for a mechanism to allow them to agree on the impact of the future price of carbon in their negotiations, and the mechanism developed through AFMA is one means of doing so. Availability of a mechanism for encapsulating the price of carbon in forward electricity contracts is therefore important to liquidity of those contract markets.

As noted above, AFMA has indicated that a GII provides a suitable reference point for use in the management of uncertainty in the future price of carbon in OTC contracts and would support the liquidity of the electricity financial markets, which in turn provides options to incumbents and new investors for the management of price risk. The GII can therefore provide some support to both market efficiency and investor confidence.

Discontinuation of the previous GII by NEMMCO

Despite the emerging reliance on the GII, NEMMCO discontinued publishing the GII because of concerns over whether it was robust enough for commercial use due to it becoming less accurate over time. Furthermore, there was no formal framework to define NEMMCO's role in providing an index for what was soon to become a commercial trading application. NEMMCO considered that the lack of a governance framework for the GII gave rise to risks for:

- NEMMCO because it did not have a clear role to produce the GII; and
- Users because there was no guarantee about the continuation and form of the GII.

As a result, and following discussion with AFMA and industry groups, NEMMCO terminated publication of the GII in April 2009, pending clarification of whether it would have a formal role in providing the GII in the future, and the governance regime under which it should be provided.

Since then, NEMMCO (now AEMO) has continued working with industry bodies to identify and formalise an agreed future arrangement.

² Page 15, Report to CoAG by the Energy Reform Implementation Group

1.2 The Issue with the Current Rules

As noted earlier, AFMA has requested that AEMO produce and publish a GII to support financial market trading. Currently, there is no suitable index available that AFMA can rely on to support the mechanism it has developed to account for future carbon prices in the settlement of OTC contracts.

The NER does not include a governance arrangement which requires AEMO to produce, maintain and publish the GII. In order to produce a GII to facilitate trading in electricity forward contracts, AEMO considers it is necessary to include a governance framework for the GII in the NER for the following reasons:

- to remove uncertainty as to whether AEMO is the appropriate provider of the GII, and to provide it with the necessary clarity and protection to carry out that role;
- to reduce uncertainty faced by commercial parties particularly when entering into financial contracts, as to whether a GII will be available in the future;
- to provide formal framework that allows the form of the GII to be clarified formally for use in commercial transactions, and that specifies the process to be followed if the GII is to be changed;
- to clarify how suitable inputs for the calculation of the GII should be identified; and
- to clarify whether certain inputs to the GII are to be treated as confidential.

2. Proposed Rule

This section provides a description of the proposed Rules developed by AEMO, AEMO's right to submit the proposed Rule to the AEMC, and the power that the AEMC has under the *National Electricity Law (NEL)* to consider this proposed Rule change.

Description of Proposed Rule

The proposed Rule would include the calculation and publication of the GII in the NER's governance framework. It seeks to formalise the calculation and publication of the GII by requiring:

- AEMO to establish, maintain, update and publish a GII for the NEM;
- AEMO to determine and publish the detailed procedures for calculation and publication of the GII, and also any supplementary indicators, after consulting with interested parties. The following matters would be determined through consultation:
 - the methodology for calculating the GII;
 - the means AEMO would use to identify suitable input data to allow the methodology to be carried out, including the mechanism for estimation of some inputs if necessary;

- the procedure for updating the inputs; and
- the frequency and means of publication of the GII.
- AEMO to place timing obligations related to the GII in the spot market operations timetable;
- AEMO to maintain and publish a list of all generating units that have been included in the GII, the intensity factors used in respect of those generating units for calculation of the GII.

The proposed Rule includes a transitional arrangement which is intended to ensure AEMO has adequate time, after commencement of the new Rule, to:

- develop GII procedures in consultation with stakeholders, which is likely to take approximately 6 months; and
- assemble the data and develop the necessary computer systems to produce the GII, which will take approximately a further 6 months, assuming some overlap in these processes.

In recognition of these development periods, the proposed Rule requires AEMO to commence publishing the GII 12 months after the proposed Rule is made, but the exact date should ideally be determined during the Rule change process, to co-ordinate with the scheduled market systems release program.

The proposed Rule does not provide AEMO with any explicit powers to require greenhouse intensity factors to be provided by generation businesses in respect of their generating units. Therefore, AEMO would need to source the generating unit intensity factors from public sources. The proposed Rule requires AEMO to publish the emission factor for each generating unit and the source of the data. A likely source of data that has been identified in conjunction with industry stakeholders, is the “Fuel resource, new entry and generation costs in the NEM”.³ If an explicit emission factor in respect of a particular generating unit cannot be found, it is anticipated that AEMO would need to determine an estimate of the data. The means of estimation would be determined through consultation in advance and included in the procedures.

AEMO’s Right to Submit this Proposal

AEMO is requesting that the AEMC make this proposed Rule in accordance with sections 91 and 96 of the NEL.

AEMO has the following relevant functions under the NEL:

- to operate and administer the NEM; and

³ This report is prepared by ACIL Tasman and the latest version is published on the AEMO website at: <http://www.aemo.com.au/planning/419-0035.pdf>

- to promote the development and improve the effectiveness of the operation and administration of the NEM.

Under section 91(1) of the NEL, the AEMC may make a Rule at the request of any person, the MCE or the Reliability Panel. As such, AEMO may request the AEMC make a Rule.

Power to Make this Rule

AEMO considers that the AEMC is empowered to make this proposed Rule by section 34 of the NEL. Specifically by sections 34(1)(a)(i), 34(1)(a)(iii) and 34(1)(b) permitting the AEMC to make rules for or with respect to:

- the operation of the National Electricity Market;
- the activities of persons (including Registered participants) participating in the NEM or involved in the operation of the national electricity system; and
- any matter or thing contemplated by this Law, or is necessary or expedient for the purposes of this Law.

The publication of a Greenhouse Intensity Index falls within these powers, because it relates to the activities of persons participating in the NEM. Furthermore, it facilitates an effective and liquid financial hedging market, which is inextricably linked with the efficient operation of the NEM. It is therefore both "necessary" and "expedient for the purposes of this law", by facilitating more efficient operation of the market.

Request for a Non-controversial Rule

AEMO requests that the AEMC considers this Rule change proposal under section 96 of the NEL. Section 96 applies if the AEMC considers that a request for a Rule is a request for a non-controversial Rule. A non-controversial Rule means a Rule that is unlikely to have a significant effect on the NEM.

AEMO considers that section 96 Applies to this proposal as the Rule would:

- not have a significant effect on the market, however it would provide support for trading in the NEM; and
- does not impose further reporting obligations on Generators because it uses data that is available publicly.

AEMO has discussed the issues, the available solutions and proposed draft Rule with nominated representatives of the NGF and AFMA, and believes these discussions have resulted in agreement and support for the proposed Rule change and draft Rule.

3. How the Proposed Rules Contribute to the National Electricity Objective

Before the AEMC can make a Rule change it must apply the rule making test set out in the NEL which requires it to assess whether the proposed Rule will or is likely to contribute to the national electricity objective (**NEO**). Section 7 of the NEL states the NEO is:

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

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

AEMO submits that the proposed Rule is likely to contribute to the NEO because it would require publication of an index that would be used to support a mechanism that has been designed to overcome difficulties being experienced by NEM participants in trading OTC financial contracts in relation to future time periods. These difficulties are discussed in section 1. By assisting to overcome these identified difficulties, the proposal supports price discovery and liquidity in the OTC financial market, which in turn assists to inform efficient investment decision making in the NEM.


AEMO submits that the proposed Rule would act to assist market participants and the market to determine the efficient future price of electricity and this will encourage efficient investment in electricity services in the NEM. It would therefore be likely to support the NEO by promoting the efficient investment in, and efficient operation of electricity services for the long term interests of consumers with respect to price, reliability and security of supply of electricity.

4. Expected Benefits, Costs and Risks associated with the Proposed Rule

AEMO expects the benefits of the proposed Rule would accrue to consumers and market participants by supporting the liquidity of the financial market, and thereby supporting efficient operation of and investment in the NEM. These matters are discussed above in sections 1 and 3.

The proposed Rule is not expected to impose any compliance costs on market participants, as it places obligations only on AEMO. It might however result in cost savings for those participants using the Addendum, through the avoidance of settlement negotiation or independent expert costs as would apply under clause 3 of the addendum in the absence of a GII.

AEMO has made preparations for the implementation of this proposed Rule, should the Rule be made by the AEMC. Development work will include consultation with stakeholders on the Greenhouse Intensity Index Procedures, and subsequent design and implementation of an automated system for production of the GII. Ongoing management of the GII will also incur some staff commitment. Development activities relating to the implementation of the proposed Rule would leverage, to the extent possible, off the earlier design of the GII which was used by NEMMCO. The incremental cost associated with design and implementation will depend on timing of the project with respect to other projects, but overall, it is anticipated that the incremental costs incurred to develop and operate the GII would not be significant.



In terms of risk, development risks associated with the proposal are not expected to be material, particularly as a similar, more manual mechanism has been operated in the past. There is, however, a risk that input data such as the emission factors used in this process could be challenged by a stakeholder. There are also some procedural issues to be worked through with stakeholders as to how revised metering data should be dealt with in the context of the proposed index. The key consideration in this regard will be to ensure that the index meets the needs of its key users, and the proposed approach aims to achieve that through consultation and transparency.

The proposed NER governance framework for the GII is intended to assist in mitigating risk, as it provides for the development of a transparent mechanism for calculation of the index, including consultation with stakeholders on the process to be used. Through consultation on the GII process, it is anticipated that the GII will be designed to meet stakeholder requirements, including the method of deriving input data. AEMO considers that including the GII development framework in the NER will help to formalise the outcomes of that development process, so the index can be relied on for commercial purposes as discussed in section 2.

GLOSSARY

| Term or Abbreviation | Explanation |
|----------------------|---|
| AEMC | Australian Energy Market Commission |
| AEMO | Australian Energy Market Operator |
| AFMA | Australian Financial Markets Association |
| CO _{2-e} | CO2 equivalent, which includes CO2, CH4 |
| CPRS | Carbon Pollution Reduction Scheme |
| GII | Greenhouse intensity index |
| MCE | Ministerial Council on Energy |
| MWh | Megawatt hour |
| NEM | National Electricity Market |
| NEMMCO | National Electricity Market Management Company Limited |
| NEO | The national electricity objective as stated in section 7 of the NEL. |
| NEL | National Electricity Law |
| NER | National Electricity Rules |
| OTC | Over the counter |

ATTACHMENT B

It is proposed that a new clause be included in the Rules as follows:

3.13.X Greenhouse Intensity Index

- (a) *AEMO* must establish, maintain, update and *publish* a *greenhouse intensity index* for the *national electricity market* in accordance with the *greenhouse intensity index procedures*.
- (b) The *greenhouse intensity index* must represent an approximation of the volume weighted average of the greenhouse gas emissions from all *market generating units* and *scheduled generating units* for a specified time period.
- (c) Subject to paragraph (f), *AEMO* may, define, calculate and *publish* one or more *supplementary greenhouse intensity indicators* relating to a subset of *market generating units* and *scheduled generating units*.
- (d) Subject to clause 3.13.X(f)(3), *AEMO* must determine any *emission factor* that is required in respect of each *scheduled generating unit* and *market generating unit*, for calculation of the *greenhouse intensity index* and any *supplementary greenhouse intensity indicator*
- (e) *AEMO* must maintain and *publish* a list of all *generating units* included in the *greenhouse intensity index* or *supplementary greenhouse intensity indicator*, the *emission factor* used in respect of each *generating unit*, and the source of each *emission factor*.
- (f) *AEMO* must, after consultation in accordance with the *Rules consultation procedures*, determine and *publish greenhouse intensity index procedures*, which include the following information:
 - 1. the mechanism for calculation of the *greenhouse intensity index*, and any *supplementary greenhouse intensity indicator*, including any approximations that are used;
 - 2. The mechanism and timing of *publication* of the *greenhouse intensity index*, and any *supplementary greenhouse intensity index*;
 - 3. the form of the *emission factors* *AEMO* will use in respect of *scheduled generating units* and *market generating units* for the purpose of calculating the *greenhouse intensity index* and any *supplementary greenhouse intensity indicator*; and
 - 4. the mechanism by which *AEMO* will determine the *emission factors*.
- (g) *AEMO* may modify the *greenhouse intensity index procedures* after consultation in accordance with the *Rules consultation procedures*.
- (h) *AEMO* must modify the *timetable* to reflect the period for update determined under clause 3.13.X(f)(2) for the *greenhouse intensity index* and any *supplementary greenhouse intensity indicator*.

- (i) *AEMO* must start *publishing* the *greenhouse intensity index* by [date A⁴].

New Chapter 10 Glossary Terms

emission factor

The factor determined by *AEMO* in respect of *scheduled generating units* and *market generating units* in accordance with clause 3.13.X(d).

Greenhouse intensity index

The index *AEMO* is required to *publish* in accordance with clause 3.13.X.

Greenhouse intensity index procedures

The procedure *AEMO* is required to *publish* in accordance with clause 3.13.X(f).

Supplementary greenhouse intensity indicator

An indicator defined and calculated by *AEMO* in accordance with clause 3.13.X(c).

⁴ 'Date A' would be determined during the Rule change process to provide *AEMO* with sufficient time after Commencement of the Rule to develop greenhouse intensity index procedures (approx 6 months) and to build the market systems to deliver the index (approx a further 6 months). It is therefore expected to be a date approximately 12 months after the Rule commences.

ATTACHMENT C

Following is a letter received from AFMA requesting AEMO to publish a GII.



11 November 2009

Mr Matt Zema
Managing Director & Chief Executive Officer
Australian Energy Market Operator
GPO Box 2008
MELBOURNE VIC 3000

By email: matt.zema@aemo.com.au

Dear Matt

Calculation of Carbon Intensity in the NEM

In the early part of 2008, the Australian Financial Markets Association (AFMA) Electricity Committee (the Committee) recognised that uncertainty as to the impact of a Carbon Pollution Reduction Scheme (CPRS) on the National Electricity Market (NEM) pool price post introduction of the Scheme was inhibiting forward trading past mid-2010 (the then CPRS commencement date). The Committee typically includes representatives of generators, retailers, financial institutions and brokers participating in the over-the-counter (OTC) electricity hedge market.

In conjunction with Mallesons Stephen Jaques, the Committee developed the "December 2008 Australian Carbon Benchmark Addendum" (the Addendum) as an equitable method of offsetting windfall gains and losses arising from the impact of carbon on NEM prices.

The Addendum proposes an adjustment to the Fixed Price in a swap (in \$/MWh) derived from the Average Carbon Intensity (ACI) and a Carbon Reference Price.

To measure the ACI, the Addendum had nominated the NEMMCO NEM Greenhouse Intensity Index (GII). However, on 12 May 2009 NEMMCO discontinued its earlier practice of calculating and publishing the Index, recognising that its calculation requires accurate input data representing the greenhouse intensity of individual generating plants. NEMMCO did not have an accurate source for the data, and was therefore concerned that the index may not be accurate.

A note on the AEMO website "... recognises that some industry participants are seeking for an index of this type to continue to support some developing processes." It notes that, to that end, AEMO is working with a number of parties including AFMA and the National Generators Forum (NGF) with the aim of facilitating a suitable replacement.

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The Addendum has been fairly widely adopted by participants in OTC forward electricity markets and a replacement for the GII would be welcomed by industry participants. Updated Addenda may be published from time to time and it is expected that parties would bilaterally agree that the new version covers existing and new trades maturing after Scheme commencement. Accordingly, switching from the NEMMCO GII to a replacement AEMO index would be quite straightforward.

The Electricity Committee believes AEMO is ideally placed to produce the index. It can readily use an adapted version of the NEMMCO methodology and, if formalised through the Rule process, would ensure continuing production of the data. Our discussions with AEMO indicate that the index could be produced on a daily basis, which would enable carbon intensity data to be exactly matched to the terms of individual derivative transactions.

A deal of discussion has taken place with stakeholders about input data and the consensus is to use generator specific input data that is already in the public domain, particularly if that makes the matter non-controversial. AFMA supports this view.


We therefore ask AEMO to proceed with implementation of a Rule to formalise this process. This will provide clarity of roles and a clear governance structure around the availability and design of the GII. We suggest the Rule requires AEMO to publish a daily GII for the NEM, but that it does not specify a particular methodology or data source. Rather the Rule should require AEMO to consult with the relevant entities (including, we would hope, AFMA) in determining those parameters.

As an example of a suitable data source, NGF, which is supportive of the initiative, has proposed initially using the data collected by ACIL Tasman for AEMO. The Committee has reviewed this and agrees with the NGF. With the flexibility we have suggested in the Rule, should for any reason this data source no longer be available, AEMO can readily consult with industry to determine an alternative.

We believe the Rule would be "Non-controversial" under the NEL and would certainly enhance electricity risk management by facilitating trading electricity derivatives which mature post the introduction of the CPRS. We ask that AEMO proceeds with a Rule change proposal. As the GII is required from CPRS commencement, we would appreciate it if its development could be given some priority.

Please contact Allen Young (02 9776 7941) should you require any further information.

Yours sincerely



Duncan Fairweather
Executive Director

ATTACHMENT D

DECEMBER 2009 AUSTRALIAN CARBON BENCHMARK ADDENDUM

- 1 This Addendum is applicable to a Commodity Transaction (as defined in June 2006 Australian Electricity Addendum) if the parties agree, at the same time as they agree the other terms of the Commodity Transaction (whether orally or otherwise), that it applies. A Confirmation in respect of such a Commodity Transaction must specify as one of the terms of the Commodity Transaction that this Addendum so applies.
- 2 In this Addendum:
 - AEMO** means Australian Energy Market Operator Limited (ACN 072 010 327), or any successor entity that is the market operator from time to time under the National Rules.
 - AFMA Resolution** means a resolution of the Electricity Committee of Australian Financial Markets Association ("AFMA") passed by not less than 75% of its members in accordance with the customary procedures of that Committee.
 - Billing Period** bears the same meaning as in the National Rules.
 - Carbon Scheme** means the carbon pollution reduction scheme of the Commonwealth of Australia embodied in the legislation that becomes law as a consequence of the passing of the Carbon Pollution Reduction Scheme Bill 2009 or any successor or replacement Bill (by whatever name called), and its associated provisions.
 - Exchange** means an Australian securities exchange:
 - (a) selected by the Electricity Committee of AFMA by way of an AFMA Resolution; or
 - (b) if no such selection is made by the date three months prior to the first date upon which Permits may be transferred under the Carbon Scheme, agreed between the parties; or
 - (c) if no such agreement is reached within five Business Days of request by a party, selected by the President of the Institute of Chartered Accountants in Australia (or any successor entity) at the request of one of the parties,or any successor entity.
 - Independent Expert** means an expert having an office in Australia:
 - (a) agreed between the parties; or
 - (b) if the parties have not so agreed the identity of an expert within two Business Days of the time as at which the Independent Expert is to be instructed in relation to a matter, nominated in relation to that matter by the Electricity Committee of AFMA by way of an AFMA Resolution; or

- (c) if no such nomination of an expert is made within five Business Days of request to AFMA by a party, selected by the President of the Institute of Chartered Accountants in Australia (or any successor entity) at the request of one of the parties.

Permit means a unit, permit, credit, offset, allowance or other right recognised by the Carbon Scheme as being capable of being held or surrendered by a person to satisfy an obligation or liability under the Carbon Scheme relating to the emission of a specified quantity of greenhouse gas.

Relevant Permit in respect of a Billing Period, means:

- (a) a Permit issued under the Carbon Scheme; and
 - (b) if the Carbon Scheme provides for Permits with different vintage years or different periods during which they are eligible for surrender, a Permit of the vintage year (or other period during which they are eligible for surrender) which corresponds to the financial year (or other relevant period prescribed by the Carbon Scheme) in which the first day of that Billing Period occurs.
- 3 Subject to paragraph 4, if a Carbon Scheme is introduced then, for each Calculation Period that occurs after the Carbon Scheme commences, the Fixed Price otherwise applicable for that Calculation Period is increased by an amount determined in accordance with the following formula:

$$CA = ACI * CRP$$

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; and

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

- (a) if a methodology for determining *CRP* is selected by the Electricity Committee of AFMA by way of an AFMA Resolution, the carbon reference price is the amount calculated in accordance with that methodology;
- (b) if for any part of the Billing Period in which the Calculation Period occurs:
 - (i) no methodology has been selected and is applicable under paragraph (a); or
 - (ii) there is a failure of the Price Source to announce or publish an amount in accordance with a methodology determined and applicable under paragraph (a);
 and:
 - (iii) the Electricity Committee of AFMA has, by way of an AFMA Resolution, determined for the purposes of this paragraph that the Exchange lists for quotation either Relevant Permits for delivery in the spot market or an instrument for the delivery of Relevant Permits in the spot market, the carbon reference price is the average of the last closing price of Relevant Permits or that instrument on each day in the Billing Period in which that Calculation Period occurs in respect of which such a price is published; or
 - (iv) if paragraph (iii) does not apply and the Electricity Committee of AFMA has by way of an AFMA Resolution determined for the purposes of this paragraph that the Exchange lists for quotation contracts for delivery of Relevant Permits in the First Nearby Month after the last day of the Billing Period in which that Calculation Period occurs, the carbon reference price is the average of the last settlement price of that contract on each day in the Billing Period in which that Calculation Period occurs in respect of which such a price is published;
- (c) if in respect of a Calculation Period no carbon reference price may be determined in accordance with paragraph (a) or paragraph (b), the carbon reference price for that Calculation Period is:
 - (A) such amount, or the amount determined under such methodology, as is determined by agreement between the parties as most closely reflecting the spot market price of Relevant Permits; or
 - (B) if the parties have not so agreed an amount or methodology within two Business Days after the end of the Billing Period, such amount as is determined by the Independent Expert.

4 The parties may:

- (a) specify Floating Price Adjustment for a Commodity Transaction to which this Addendum applies, in which event:
 - (i) the Fixed Price otherwise applicable for a Calculation Period is not increased under this Addendum and in lieu thereof the Floating Price is decreased by the amount determined in accordance with paragraph 3; and
 - (ii) the definition of *C4* in paragraph 3 is taken to be amended accordingly;

- (b) specify a Maximum Carbon Reference Price for a Calculation Period, in which event *CRP* will be the lesser of that price and the price otherwise determined for *CRP* in accordance with paragraph 3;
 - (c) specify a De-Minimis Carbon Reference Price for a Calculation Period, in which event no adjustment will be made under this Addendum for that Calculation Period unless *CRP* determined in accordance with paragraph 3 exceeds that price;
 - (d) specify a Maximum Carbon Adjustment for a Calculation Period, in which event *CA* will be the lesser of that price and the price otherwise determined for *CA* in accordance with paragraph 3; and
 - (e) specify a De-Minimis Carbon Adjustment for a Calculation Period, in which event no adjustment will be made under this Addendum for that Calculation Period unless *CA* determined in accordance with paragraph 3 exceeds that amount.
- 5 Despite any other provision of the ISDA Master Agreement between the parties:
- (a) the introduction of a Carbon Scheme does not constitute a Market Disruption Event in respect of the Commodity Transaction;
 - (b) Section 7.3 of the 2005 ISDA Commodity Definitions applies to the average carbon intensity published by AEMO and the daily closing price published by the Exchange, referred to in paragraph 3, in each case as if it comprised a Specified Price; and
 - (c) the term "Material Change in Formula" in Section 7.4 of the 2005 ISDA Commodity Definitions applies to a material change in the formula or method applied by AEMO in calculating the average carbon intensity referred to in paragraph 3.
- 6 If a matter under this Addendum is to be determined by an Independent Expert then:
- (a) the Independent Expert will determine the matter taking into account such information as in good faith the Independent Expert considers relevant;
 - (b) the Independent Expert is to act as an expert (and not as an arbitrator);
 - (c) the costs and expenses of the Independent Expert will be borne equally by the parties;
 - (d) the determination of the Independent Expert is final and binding on the parties;
 - (e) the Independent Expert is taken to be a Price Source; and
 - (f) for the purposes of Sections 7.4(a) and 7.5(a) of the 2005 ISDA Commodity Definitions, it is taken that the day upon which the Independent Expert would in the ordinary course publish the determination is the 18th Business Day after the end of the relevant Billing Period.