CARBON DIOXIDE EQUIVALENT INTENSITY INDEX PROCEDURES

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~~This document is current to version 65 of the National Electricity Rules.~~

Approved for distribution and use by:

APPROVED BY:	~~Matt Zema~~Peter Geers
TITLE:	Chief Strategy and Markets Officer~~Chief Executive Officer~~
DATE:	~~4 / 12 / 2014~~ TBA

Australian Energy Market Operator Ltd ABN 94 072 010 327 www.aemo.com.au info@aemo.com.au
NE Australian Energy Market Operator Ltd ABN 94 072 010 327 www.aemo.com.au info@aemo.com.au
NEW SOUTH WALES QUEENSLAND SOUTH AUSTRALIA VICTORIA AUSTRALIAN CAPITAL TERRITORY TASMANIA

~~IMPORTANT NOTICE~~

~~Purpose~~

~~This document has been prepared by AEMO as required by clause 3.13.14 of the National Electricity Rules (Rules), and has effect only for the purposes set out in the Rules. The Rules and the National Electricity Law (Law) prevail over this document to the extent of any inconsistency.~~

~~Disclaimer~~

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- ~~are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it.~~

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VERSION RELEASE HISTORY

Version	Effective date	Summary of changes
0.1	6 September 2010	Initial Draft
0.2	4 November 2010	Draft Determination
1.00	2 December 2010	Final
2.00	23 July 2013	Amended in accordance with 'National Electricity Amendment (Small Generation~~or~~ Aggregator Framework) Rule 2012 No. 8'.
3.00	11 December 2014	Incorporate the document titled "Carbon Dioxide Equivalent Intensity Index Notice July 2012" into the CDEII Procedures and other administrative changes.
4.00	TBA	• Procedure moved to new AEMO procedures template. • Updates for grammatical errors, inconsistencies and removal of obsolete references. • Updates to source of emission factor data. • Updates to website links.

CONTENTS

~~1.~~ ~~ABBREVIATIONS AND GLOSSARY~~

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~~Term~~	~~Definition~~
~~Carbon Dioxide Equivalent Intensity Index (t CO_2-e/MWh)~~	~~Carbon Dioxide Equivalent Intensity Index for the NEM.~~
~~Carbon Dioxide Equivalent Intensity Index Procedures or Procedure~~	~~This document.~~
~~CO_2-e~~	~~Carbon Dioxide equivalent, which includes other gases which have an equivalent Greenhouse impact such as CH_4 and N_2O.~~
~~Emission Factor (t CO_2-e/MWh)~~	~~The factor representing the amount of greenhouse gas emissions per unit of electricity (t CO_2-e/MWh) produced by each power station.~~
~~Fuel Type~~	~~Type of fuel used by a generator to produce electricity.~~
~~Gross Energy~~	~~The gross energy generated by the generating units, including the station house load.~~
~~MWh~~	~~mMega Watt hour~~
~~NEM~~	~~National Electricity Market~~
~~Sent Out Energy~~ ~~*sent out generation*~~	~~The net energy from generating units supplied to the wholesale pool. This energy does not include the station house load.~~
~~t CO_2-e/MWh~~	~~Tonnes of CO_2-equivalent gas per mMega-Watt hour, (expressed in metric tonnes).~~
~~Carbon Dioxide Equivalent Intensity Index (t CO_2-e/MWh)~~	~~Carbon Dioxide Equivalent Intensity Index for the NEM.~~

~~(a) In this Procedure, a word or phrase has the meaning set out opposite that word or phrase in the Glossary.~~

~~(b) In this Procedure terms have the same meaning as in the Law and Rules.~~

~~(c) In this Procedure, unless the context otherwise requires, this Procedure shall be interpreted in accordance with Schedule 2 of the National Electricity Law.~~

~~2.~~1. INTRODUCTION

1.1. Purpose and scope

Thesei~~s~~ are the Carbon Dioxide Equivalent Intensity Index Procedures (**Procedures**) ~~is~~ made ~~in accordance with~~under clause 3.13.14(a) of the National Electricity Rules (**NER**) ~~Rules~~ (**Procedures**).

These Procedures have effect only for the purposes set out in the NER~~ational Electricity Rules~~ (**NER**). The NER and the National Electricity Law prevail over these Procedures to the extent of any inconsistency.

~~This Procedure commences on [TBD] and supersedes the previous Carbon Dioxide Equivalent Intensity Index Procedure.~~

~~This Procedure may only be amended in accordance with clause 8.9 of the Rules.~~

~~If there is any inconsistency between this Procedure and the Rules, the Rules will prevail to the extent of that inconsistency.~~

~~3. PURPOSE~~

~~The purpose of this document is to define the procedure by which AEMO will calculate, update and publish the NEM Carbon Dioxide Equivalent Intensity Index. This Procedure is authorised by Clause 3.13.14 of the Rules. This Procedure was first published in July 2011 and has been available at all times since this date in accordance with Rule 3.13.14(d).~~

AEMO must review th~~i~~es~~e~~ Procedure~~s~~ at least once every three years in accordance with NER clause ~~Rule~~ 3.13.14(e).

1.2. Definitions and interpretation

1.2.1. Glossary

Terms defined in the National Electricity Law and the NER have the same meanings in these Procedures unless otherwise specified in this clause.

Terms defined in the NER are intended to be identified in these Procedures by italicising them, but failure to italicise a defined term does not affect its meaning.

The words, phrases and abbreviations in the table below have the meanings set out opposite them when used in these Procedures.

Term	Definition
AEMO	Australian Energy Market Operator
Carbon Dioxide Equivalent Intensity Index or CDEII (t CO_2-e/MWh)	Carbon Dioxide Equivalent Intensity Index for the NEM.
Carbon Dioxide Equivalent Intensity Index Procedures or Procedure	This document.
CO_2-e	Carbon Dioxide equivalent, which includes other gases which have an equivalent Greenhouse impact such as CH_4 and N_2O.
Emission Factor (t CO_2-e/MWh)	The factor representing the amount of greenhouse gas emissions per unit of electricity (t CO_2-e/MWh) produced by ~~a each~~ *generating system* ~~power station.~~
Fuel Type	Type of fuel used by ~~a~~ *generating system* ~~generator~~ to produce electricity.
GJ	Gigajoule
Gross Energy	The gross energy generated by a *generating system* ~~the generating units,~~ including auxiliary or ~~the station~~ house *load*.
MWh	Megawatt hour
NEM	National Electricity Market

Term	Definition
NER	National Electricity Rules
NGA Factors	National Greenhouse Accounts emission factors published by the Commonwealth Department with responsibility for environment.
NEMMCO	National Electricity Market Management Company
NTNDP	National Transmission Network Development Plan
Planning Database	The *NTNDP database*, or any database maintained and published by AEMO that supersedes the *NTNDP database* and includes emission factor assumptions.
~~Sent Out Energy~~	~~The net energy from generating units supplied to the wholesale pool. This energy does not include the station house load.~~
t CO_2-e/MWh	Tonnes of CO_2-equivalent gas per megawatt hour, (expressed in metric tonnes).

1.2.2. Interpretation

These Procedures are subject to the principles of interpretation set out in Schedule 2 of the National Electricity Law.

~~4. APPLICATION OF THIS PROCEDURE~~

~~This Procedure applies to AEMO.~~

~~5. ENFORCEABILITY OF THE PROCEDURES~~

~~This Procedure is enforceable in accordance with clause 3.13.14 of the Rules.~~

~~6.~~2. CARBON DIOXIDE EQUIVALENT INTENSITY INDEX CALCULATION

The methodology for measuring the ~~National Electricity Market (~~NEM~~)~~ Carbon Dioxide Equivalent Intensity Index follows a similar procedure to what had previously been followed by NEMMCO in producing the Greenhouse Intensity Index.

Sent out generation ~~Sent Out Energy~~ derived from *metering data* is~~will be~~ combined with public~~all~~y available generator ~~based~~ Emission Factors to provide a NEM-wide Carbon Dioxide Equivalent Intensity Index calculated on a daily basis and published. ~~This data will be published~~ on the AEMO website weekly, when ~~the~~ *preliminary statements* ~~Preliminary Settlement Statements~~ are posted for each *billing period*.

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Published versions of the Carbon Dioxide Equivalent Intensity Index will not be revised after publication, except as noted in section 3.6 ~~7.7~~(Manifest Errors).

~~6.1.~~2.1. Calculation

NER ~~Rule~~ 3.13.14(b)(1) requires these Procedures to specify the methodology for calculating the Carbon Dioxide Equivalent Intensity Index.

The calculation requires two discrete sets of data:

1. The total ~~*S*~~*sent* ~~*O*~~*out* *generation* ~~*Energy*~~ (MWh) ~~generated~~ from each relevant *generating system* ~~generator~~ and;

2. The carbon dioxide equivalent emissions per unit of electricity (t CO_2-e /MWh) generated by each relevant *generating system*~~generator (generator specific Emission Factor)~~.

The resultant Carbon Dioxide Equivalent Intensity Index for the NEM is~~will be~~ reported in tonnes of CO_2-e per megawatt hour (t CO_2-e/MWh).

The following formula is used to convert the Emissions Factor for a *generating system*~~n individual generator~~ from t CO_2-e/GJ to t CO_2-e /MWh:

Formula 1:

$$EF_i = \left(\frac{3.6}{TE_i}\right) x \frac{ef_i}{(1 - A_i)}$$

Where:

EF = Emission Factor for individual *generating system*~~generator~~ (t CO_2-e /MWh).

i = *Generating system* comprising *scheduled generating units* or *market generating units* ~~Generator~~ with available energy data & Emission Factor.

TE = Thermal Efficiency ($MWh_{(Gen)}$/$MWh_{(Fuel)}$) (%) sent out.

ef = Emission Factor for individual *generating system*~~generator~~ (t CO_2-e /GJ), derived by summing the combustion emission factor (kgCO_2-e /GJ of fuel) and fugitive emission factor (kgCO_2-e /GJ of fuel).

A = Auxiliaries (% value). Set to zero, as Thermal Efficiency in supply inputs are based on ~~*Sent Out Energy*~~*sent out generation* (i.e. auxiliaries are already accounted for).

3.6 = Conversion factor (1 MWh = 3.6 GJ)[1]

Both direct and fugitive emissions for *generating systems* ~~*units*~~ are included in the ~~e~~Emission~~s~~ Ffactor. These are "Scope 1" and "Scope 3" emissions respectively, as described in the NGA ~~ational Greenhouse Accounts (NGA)~~ Factors.

The following formula is used to calculate the carbon dioxide equivalent emissions (CDE) for an individual *generating system*~~generator~~:

Formula 2:

$$CDE_i = EF_i x\ E_i$$

Where:

CDE = Carbon Dioxide Equivalent emissions (t CO_2-e) from a *generating system*~~*unit*~~

EF = Emission Factor for individual *generating system*~~generator~~ (t CO_2-e /MWh).

E = ~~*Sent Out Energy*~~*Sent out generation* (MWh) for a *generating system*~~*unit*~~. This value is the energy measured at the ~~generator's~~ *connection point* to the *network* and consequently excludes the *intra-regional loss factor*~~Marginal Loss Factor (MLF)~~.

i = *Generating system* comprising *scheduled generating units* or *market generating units* ~~Generator~~ with available energy data & Emission Factor.

[1] Energy conversion factor – 1 MWh is the equivalent of 3.6 GJ

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The total Carbon Dioxide equivalent emission for the NEM is calculated as:

Formula 3:

$$CDE_{Total} = \sum_{i} CDE_i$$

The Carbon Dioxide Equivalent Intensity Index ~~(CDEII)~~ for the NEM is calculated by:

Formula 4:

$$CDEII = \frac{\sum_{i} CDE\_i}{\sum_{i} E_i}$$

Where:

CDEII = Carbon Dioxide Equivalent Intensity Index for the NEM (t CO_2-e /MWh).

The above equation produces a weighted average of the Carbon Dioxide Equivalent emissions of relevant *generating systems* ~~generators~~in the NEM based ~~and the~~on the volume of the ~~*Sent Out Energy*~~*sent out generation* ~~generated~~. Refer to ~~s~~Section 2.~~4~~6.4 for information regarding the energy included in the calculation.

~~6.2.~~2.2. Time Interval

~~Rule~~NER 3.13.14(b)(6) requires these Procedures to specify the time intervals for publishing and updating the Carbon Dioxide Equivalent Intensity Index. The Carbon Dioxide Equivalent Intensity Index is~~It will be~~ published on AEMO's website at the same time as the NEM *preliminary statements*~~Preliminary Settlement Statements~~ which are issued five *business days* after the end of each weekly *billing period*~~, as specified in Rule 3.15.14(a). The Carbon Dioxide Equivalent Intensity Index will be published on AEMO's website.~~ The Carbon Dioxide Equivalent Intensity Index is~~will be~~ calculated and shown for each day within the *billing period*~~Billing Period~~. The timing for publishing the Carbon Dioxide Equivalent Intensity Index ~~CDEII~~ is also included in the *spot market timetable*~~Spot Market Operations Timetable~~ published on the AEMO website.

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~~6.3.~~2.3. Emission Factors

Where available, Emission Factor data is~~will be~~ sourced from the latest published Planning Database~~current final *National Transmission Network Development Plan* consultation conducted by AEMO Planning~~. The current version can be found on the CDEII webpage, under the Emission Factor Data Source heading, at:

~~The currently available source (for reference purposes) is:~~ ~~http://www.aemo.com.au/planning/ntndp.html.~~

Field Code Changed

https://aemo.com.au/Electricity/National-Electricity-Market-NEM/Settlements-and-payments/Settlements/Carbon-Dioxide-Equivalent-Intensity-Index

~~The currently available source (for reference purposes) is: .~~

~~Specific Emission Factor data (consolidated file: plant technical data) is published on the AEMO website under Planning Assumptions.~~

The Emission Factors are~~will be~~ reviewed each time the ~~a new final~~ Planning Database~~National Transmission Network Development Plan consultation~~ is updated~~becomes publically available~~. This ~~will~~ ensure~~s~~ that the Carbon Dioxide Equivalent Intensity Index ~~will~~ come~~s~~ from a reliable source as per NER ~~Rule~~ 3.13.14(c)(3).

Under NER ~~Rule~~ 3.13.14(l), if AEMO is advised that an existing Emission Factor has changed for a given *generating system* ~~Generating Unit~~ based on a source that is public~~all~~y available and in AEMO's opinion, reliable, AEMO will as soon as practicable update the Emission Factor used in the calculations. Additionally, AEMO will update the reference table with these details as referenced in ~~s~~Section 3.1 ~~7.1~~ of these procedures.

~~6.3.1.~~2.3.1. Estimated Emission Factors

Where explicit Emission Factors are not available from the Planning Database~~final National Transmission Network Development Plan consultation~~, estimated data is~~will be~~ used. ~~TAEMO will use t~~he following methodology is used for the estimation:

Emission Factors are~~will be~~ based on aggregated Emission Factor data sourced from the Energy section of the ~~National Greenhouse Accounts (~~NGA~~)~~ Factors report in accordance with NER ~~Rule~~ 3.13.14(c)(4). This data is based on the type of fuel of the *generating system* ~~Generator~~ aggregated across the main greenhouse gases listed.

~~Note:~~

~~The most currently available NGA Factors report is available at: http://www.environment.gov.au~~

Since this data is captured as kg CO_2-e/GJ, this ~~will~~ need~~s~~ to be converted to t CO_2- e/MWh. This ~~will be~~is done using the average value for Thermal Efficiency for *generating systems*~~generators~~ of the same type as published in the Planning Database~~National Transmission Network Development Plan consultation~~. The conversion is~~will~~ ~~be~~ performed using Formula 1 listed in ~~s~~Section 2.1 ~~6.1~~ of this document, where the Auxiliary value (A) is set to zero.

AEMO ~~will~~ publish~~es~~ the source of the values used to determine estimated Emission Factors.

If the Planning Database does not specify an ~~a given Generator had no~~ Emission Factor for a given *generating system* ~~provided as part of the National Transmission Network Development Plan consultation~~ and no estimate is reasonably ~~were~~ possible, that energy data is~~would be~~ excluded from the calculation of the Carbon Dioxide Equivalent Intensity Index in accordance with NER ~~Rule~~ 3.13.14(c)(1).

Estimated Emission Factors ~~will be~~are updated when AEMO publishes an updated Planning Database, ~~is updated~~ containing revised emission factor data, ~~as each new final National Transmission Network Development Plan consultation is made publically available~~ or when new NGA Factors are published.

~~6.4.~~2.4. Energy Data

AEMO ~~will~~ calculate~~s~~ the Carbon Dioxide Equivalent Intensity Index using ~~Sent Out Energy~~*sent out generation* data (in MWh). This is the same energy data used for market settlement. ~~Sent Out Energy~~*Ssent out generation* is consistently available across all relevant ~~valid~~ *generating systems*~~generators~~ and ~~will~~ provide~~s~~ a more accurate measure of the Carbon Dioxide Equivalent

Intensity Index than Gross Energy, noting that Gross Energy is not always available for every *generating system*~~generator~~.

~~6.5.~~2.5. Assumptions

In calculating the Carbon Dioxide Equivalent Intensity Index, AEMO ~~will~~ relies~~y~~ on the following assumptions:

- The public~~al~~ly available data used as Emission Factors is accurate for each *generating system*~~Generating Unit~~.
- The mechanism used to estimate Emission Factors for *generating systems*~~Generating Units~~ where reliable public~~al~~ly available data is not available is accurate.
- All assumptions used in the development of the Planning Database~~production of the National Transmission Network Development Plan consultation~~ values concerning CO_2 emissions are carried over to the production of the Carbon Dioxide Equivalent Intensity Index.

~~7.~~3. CARBON DIOXIDE EQUIVALENT INTENSITY INDEX

~~7.1.~~3.1. Published Emission Factor Data

AEMO ~~will~~ publishes the Emission Factors used to generate the Carbon Dioxide Equivalent Intensity Index for each *generating system* ~~*scheduled generating unit* and *market generating unit*~~ used to calculate the Index ~~(in accordance with Rule 3.13.14(a1), a '*market generating unit*' does not include a '*small generating unit*')~~.

This ~~will~~ lists the ~~generator~~ identifier used for the *generating system*, the ~~e~~Emission ~~f~~Factor, the NEM ~~r~~*Region* to which the *generating system* ~~that the generator~~ is assigned, and the source of the Eemission Ffactor, in accordance with NER~~Rule~~ 3.13.14(~~i~~l)(1) and ~~-~~ (2). Estimated values are~~would be clearly~~ marked as such. Any factors used to convert GJ based emission factors to MWh emission factors which have not been estimated can be sourced from the Planning Database~~NTNDP~~. This ~~would~~ includes the GJ based emission factors, thermal efficiencies and auxiliary values.

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~~7.2.~~3.2. Updates to Emission Factors used in the Carbon Dioxide Equivalent Intensity Index

Following a review of the Emission Factors used in the Carbon Dioxide Equivalent Intensity Index, the new Emission Factors (including estimated values) are~~should be~~ applied to the calculation of the Carbon Dioxide Equivalent Intensity Index as soon as practicable in accordance with NER ~~Rule~~ 3.13.14(k). These updates are~~will~~ not ~~be~~ applied retrospectively, hence once the Carbon Dioxide Equivalent Intensity Index is published for a given day it will not be changed, except as noted in section ~~75.7~~3.6 (Manifest Errors).

Any updates to the Emission Factor data (including estimated values) used in the calculation of the Carbon Dioxide Equivalent Intensity Index will result in an update to the Emission Factor table in accordance with NER~~Rule~~ 3.13.14(o) and published as soon as practicable.

~~7.3.~~3.3. New Generating Systems~~Units~~

When ~~From time to time~~ new *generating systems* comprising *scheduled generating units* or *market generating units* are *connected* to the NEM *power system*, ~~will be introduced into the NEM. I~~in accordance with ~~Rule~~ NER 3.13.14(m)(1) and (~~-~~2), AEMO ~~will as soon as practicable~~

updates the Carbon Dioxide Equivalent Intensity Index to include the CDEII data for thea new *generating system* as soon as practicableGenerating Unit.

In the event thatIf there is no reliable published Emission Factor for the new *generating systemscheduled generating unit or market generating unit*, an estimated Emission Factor is will be used as outlined in sSection 2.3.16.3.1, according with NERRule 3.13.14(n).

As referenced in Ssection 3.2 7.2 of this document, any updates to the *generating systems*Generating Units or Emission Factors used in the calculation of the Carbon Dioxide Equivalent Intensity Index will beare updated in the published table as soon as practicable.

Note: under Rule 3.13.14(a1), a *'market generating unit'* does not include a *'small generating unit'*.

7.4.3.4. Carbon Dioxide Equivalent Intensity Index Format

AEMO will publishes the following data on the AEMO website for Carbon Dioxide Equivalent Intensity Index:

Date – . of the given day to which the Carbon Dioxide Equivalent Intensity Index applies to

Carbon Dioxide Equivalent Intensity Index – for the given date (mMeasured as t (CO_2-e)/MWh)

Total Sent Out Energy*sent out generation* – the total *Sent Out Energysent out generation* from the NEM on the given date. (mMeasured as MWh)

Daily Total Emissions – sSummed across the NEM of all scheduled and market *generating systems* Scheduled Generator Units and used in the IndexMarket Generator Units (mMeasured in t (CO_2-e))

The data iswill be provided in comma separated value format (.csv), sorted by date, including all Carbon Dioxide Equivalent Intensity Indexes from the commencement of Carbon Dioxide Equivalent Intensity Index reporting in 2011 (refer section 57.6).

The NEM Region supplementary intensity indices arewill be included within this file with the addition of the field:

RegionID – tThis has a value of QLD1, NSW1, VIC1, SA1, TAS1, or NEM (representing the NEM-wide value).

Refer to Ssection 4.5 8.5 for more details.

7.5.3.5. Energy Metering Updates

Metering data from a *generating system*generator for any given day can change at any time through all of the *billing periods* up until the 30-week revision ((30 weeks after the *billing period* billing week for of the given day). However, the Carbon Dioxide Equivalent Intensity Index will not be updated to account for these variations. The value published for a given day will not be changed, except as noted in section 3.6 7.7 (Manifest Errors).

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7.6. Data Reporting Commencement

Data will be reported from 1 July 2011, where the current publically available National Transmission Network Development Plan consultation (refer section 46.3 Emission Factors) will be used to determine the Carbon Dioxide Equivalent Intensity Index.

~~7.7.~~3.6. Manifest Errors

The republishing of data will be at AEMO's discretion. If manifest errors are detected within the published values of the NEM-wide intensity index AEMO may republish the index values within five business days. If manifest errors are detected and new intensity indices are published a notification will be posted to the AEMO website.

~~8.~~4. NEM REGION SUPPLEMENTARY CARBON DIOXIDE EQUIVALENT INTENSITY INDEX CALCULATION METHODOLOGY

AEMO ~~will~~ publishes supplementary Carbon Dioxide Equivalent Intensity Indices in the form of *region*-based factors. The *region*-based factors are~~will be~~ determined according to NEM *region*~~Region~~ and labelled accordingly. That is QLD1, NSW1, VIC1, SA1 and TAS1.

The NEM *regions*~~Regions~~ approximately equate to State boundaries (with the ACT being part of NSW) ~~although not exactly~~. The full definition for NEM Regions may be found ~~in the Regional Boundaries and Marginal Loss Factors. The current version may be found~~ on the CDEII webpage, under the Regional Boundaries and Margin Loss Factors heading, at:

https://aemo.com.au/Electricity/National-Electricity-Market-NEM/Settlements-and-payments/Settlements/Carbon-Dioxide-Equivalent-Intensity-Index

~~here: http://www.aemo.com.au/Electricity/Market-Operations/Loss-Factors-and-Regional-Boundaries~~

~~8.1.~~4.1. NEM Region Supplementary Intensity Indices Calculation Methodology

In the calculation of NEM Region Carbon Dioxide Equivalent Intensity Indices, the E~~e~~mission F~~f~~actors are those used for the NEM-wide Carbon Dioxide Equivalent Intensity Index, however each index is calculated based on an aggregate at the NEM *region*~~Region~~ level rather than across the entire NEM. Therefore, ~~in order to~~to calculate the NEM Region Intensity Indices, Formulas 1 and 2 as described in section 2.1 ~~6.1~~ remain the same, however the aggregation Formulas would be described as follows:

The total Carbon Dioxide equivalent emission for the NEM *region*~~Region~~ (**CDE_{NR}**) is calculated as:

Formula 5:

$$CDE_{NR} = \sum_{iNR} CDE_{iNR}$$

Where:

CDE_{iNR} = Carbon Dioxide Equivalent emissions (t CO_2-e) from a relevant *generating system*~~*unit*~~ assigned to the *region* ~~NEM Region~~ (QLD1, NSW1, VIC1, SA1 or TAS1)

iNR = *Generating system* comprising *scheduled generating units* or *market generating units* ~~Generator~~ with available energy data and E~~e~~mission F~~f~~actor assigned to the *region*~~NEM Region~~.

The Carbon Dioxide Equivalent Intensity Index (CDEII) for the NEM *region* ~~Region~~ ($CDEII_{NR}$) is calculated by:

Formula 6:

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$$CDEII_{NR} = \frac{\sum_{iNR} CDE_{iNR}}{\sum_{iNR} E_{iNR}}$$

Where:

CDE$_{iNR}$ = Carbon Dioxide Equivalent emissions (t CO_2-e) from a relevant ~~*generating system unit*~~ assigned to the *region*~~NEM Region~~ (QLD1, NSW1, VIC1, SA1 or TAS1)

E $_{iNR}$ = ~~*Sent Out Energy*~~*sent out generation* (MWh) for a relevant *generating system*~~*unit*~~ assigned to the ~~NEM~~ *region*. This value is the energy measured at the ~~generator's~~ *connection point* to the *network* and consequently excludes the *intra-regional loss factor*~~Marginal Loss Factor (MLF)~~.

The above equation produces a weighted average of the Carbon Dioxide Equivalent emissions of scheduled and market generation in a *region* ~~generators~~ based on ~~and~~ the volume of the ~~*Sent Out Energy*~~*sent out generation* generated.

~~8.2.~~4.2. NEM Region Supplementary Intensity Indices Energy Data

The energy data is~~will be~~ calculated based on the location of production (i.e. at the *generating system's* ~~Generator's~~ location based on its assigned *region*~~which NEM Region it is assigned~~) rather than the location of consumption (that is, ignoring *interconnector* flows).

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~~8.3.~~4.3. NEM Region Supplementary Intensity Indices Emission Factors

The emission factors used in the supplementary intensity indices are~~will be~~ the same as those used in the NEM-wide intensity index. Updates to the emission factors ~~will~~ apply at the same time as they do for the NEM-wide intensity index.

~~8.4.~~4.4. NEM Region Supplementary Intensity Indices Publishing Timeframe

The supplementary intensity indices are~~will be~~ published according to the existing timetable as the NEM-wide intensity index as described in section 2.2 ~~6.2~~. ~~The supplementary intensity indices will commence reporting as the same time as the NEM-wide index as referenced in section 5~~7.6.

~~8.5.~~4.5. NEM Region Supplementary Intensity Indices Format

The supplementary intensity indices are~~will be~~ published in the same csv file as the NEM-~~-~~wide index as described in section 3.4 ~~7.4~~. For each NEM *region*~~Region~~, for each day, a value is~~will be~~ published for the intensity index for that *region*~~NEM Region~~, the total energy, and the total emissions used to determine the intensity index for that *region*~~NEM Region~~ on the given day.

~~8.6.~~4.6. NEM Region Supplementary Intensity Indices Published Emission Factor Data

The published list of *generating systems* ~~Generators~~ and Emission Factors ~~that are published will~~ also include~~s~~ the *region*~~NEM Region~~ to which each *generating system*~~Generator~~ is assigned, as described in section 3.1 ~~7.1~~.