Greenhouse Gas Benchmark Rule (Generation) No. 2 of 2003

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1 Name and commencement

1.1 This Rule is the *Greenhouse Gas Benchmark Rule (Generation) No. 2 of 2003* and commences on 11 June.

1.2 At its commencement, this Rule amends the *Greenhouse Gas Benchmark Rule (Generation) No. 2 of 2003* that commenced on 3 October 2003 (Previous Rule), to the extent that this Rule differs from the Previous Rule.

1.3 Without limiting the circumstances in which this Rule applies, this Rule applies to:

(a) the accreditation of Abatement Certificate Providers (in respect of electricity generation activities) after the commencement of this Rule (regardless of the date of application for accreditation);

(b) the calculation and creation of New South Wales Greenhouse Abatement Certificates (NGACs) (in respect of electricity generation activities) registered after the commencement of this Rule (regardless of the date of accreditation of the Abatement Certificate Provider), subject to clauses 1.4 and 1.5; and

(c) the ongoing eligibility of a person to remain accredited as an Abatement Certificate Provider for the purpose of the Scheme Administrator exercising its powers under the Act and Regulations, after the commencement of this Rule, to vary, suspend or cancel a person's accreditation as an Abatement Certificate Provider (in respect of electricity generation activities).

1.4 A person who, on or before 31 December 2004:

(a) is accredited as an Abatement Certificate Provider (in respect of electricity generation activities); or

(b) has made an application, acceptable to the Scheme Administrator, to become an Abatement Certificate Provider (in respect of electricity generation activities), and is subsequently accredited as an Abatement Certificate Provider under this Rule pursuant to that application,

may elect (such election to be made only once) to calculate its entitlement to create NGACs in respect of electricity generation activities occurring on or before 31 December 2004 under either the Previous Rule or this Rule.

1.5 A person who, on or before 31 December 2004, is accredited as an Abatement Certificate Provider (in respect of electricity generation activities) may calculate its entitlement to create NGACs in respect of electricity generation activities occurring on or before 31 December 2007 using the 30% default factor under Equations 13 and 16 of the Previous Rule, rather than the 36% default factor under those Equations of this Rule, if the person would otherwise have been entitled to use that 30% default factor under the Previous Rule.

1.6 If a person to whom clause 1.4 or 1.5 applies is accredited as an Abatement Certificate Provider after the commencement of this Rule, the Scheme Administrator must assess the application for accreditation using the eligibility criteria under this Rule.

2 Objects of the Rule

The object of this Rule is to provide specific arrangements for the creation and calculation of NGACs through electricity generation and other calculations associated with electricity generation and greenhouse gas emissions.

3 Application of the Rule

Without limiting the persons to whom this Rule applies, this Rule applies to Accredited Abatement Certificate Providers accredited to create NGACs from electricity generation in accordance with Part 8A Division 4 of the Act, the Regulations, and this Rule.

4 Status and Operation of the Rule

This Rule is a Greenhouse Gas Benchmark Rule made under Part 8A of the Act.

5 Eligibility to be an Accredited Abatement Certificate Provider in respect of electricity generation

5.1 A person is eligible to be an Accredited Abatement Certificate Provider under this Rule if:

(a) the person is a *Generator* or *Deemed Retailer*, as those terms are defined in clauses 6.2.1 and 6.3.1 respectively; and

(b) the accreditation is in respect of an *electricity generation activity*, as that term is defined in clause 5.2.

Note: Under the Regulations, a person must also have record keeping arrangements with respect to the activity, and the Generating System must be equipped with metering equipment, approved by the Scheme Administrator. Further matters must also be satisfied under the Regulations if the accreditation is in respect of a proposed (rather than existing) electricity generation activity.

5.2 An *electricity generation activity* is the generation of electricity:

(a) after 1 January 2003;

(b) by a Generating System that exports or will export any electricity into the NSW Electricity Network or a Transmission or Distribution System interconnected with the NSW Electricity Network; and

(c) in a manner that results or will result in reduced emissions of greenhouse gases.

Note: In effect, eligible Generating Systems must export electricity into the main Transmission Systems of the National Electricity Market, or to Distribution Systems currently connected to those systems in NSW, the Australian Capital Territory, Queensland, Victoria and South Australia.

The Generating System may export electricity either directly (at a connection point between the Generating System and the NSW Electricity Network or interconnected Transmission or Distribution System), or indirectly (via other network assets).

Where part of the electricity generated from the Generating System is exported, and part is consumed by End-User Equipment within the same End-User Complex as the Generating System, only that part that is exported is eligible to create NGACs under this Rule. The remainder may be separately eligible to create NGACs under the DSA Rule.

5.3 An *electricity generation activity* as defined in clause 5.2 is:

(a) an "existing electricity generation activity" for the purposes of the Regulations if a person is accredited as an Abatement Certificate Provider in respect of that *electricity generation activity* after the Generating System commences Commercial Operation; and

(b) a "proposed electricity generation activity" for the purposes of the Regulations if a person is accredited as an Abatement Certificate Provider in respect of that *electricity generation activity* before the Generating System commences Commercial Operation.

6 Persons eligible to create NGACs under this Rule

6.1.1 Despite any other provision in this Rule only Accredited Abatement Certificate Providers accredited for the purpose set out in clause 5 may create NGACs under this Rule.

6.1.2 A person may not create NGACs in respect of greenhouse gas abatement if that person or another person has previously validly created NGACs or LUACs in respect of the same abatement, whether under this Rule, the Previous Rule or any other Benchmark Rule.

6.2 The Generator

6.2.1 The *Generator* is:

(a) the person who is registered with NEMMCO as the Generator or the Intermediary, as defined under the National Electricity Code, with respect to a Generating System at the time that the relevant electricity generation activity takes place; or

(b) if no person is registered with NEMMCO as the Generator or the Intermediary, as defined under the National Electricity Code, with respect to a Generating System at the time that the relevant electricity generation activity takes place, the owner of the Generating System at that time; or

(c) a person nominated, to the satisfaction of the Scheme Administrator, to be the Generator for the purpose of creating NGACs under this Rule (nominee) by one of the following persons (nominator):

(i) the person in (a) or (b); or

(ii) a person previously nominated to be the Generator under this Rule,

provided that:

(iii) the nominator has not previously nominated another person to be the Generator, or if the nominator has done so, that previous nomination is not still effective;

(iv) the nomination is in writing and signed by the nominator;

(v) the nominee consents to the nomination; and

(vi) the nominator (and any previous nominator) continues to meet the criteria to be the nominator for the period of the nomination; or

(d) a person whom the Scheme Administrator is satisfied will be a person in (a), (b) or (c), provided that the person will not be entitled to create NGACs unless that person satisfies that criteria at the time that the relevant electricity generation activity takes place.

6.2.2 The Scheme Administrator may assume, in the absence of evidence to the contrary and without any obligation to make further enquiries, that the person listed in Schedule B as the owner of the Generating System so listed is the owner of that Generating System at all relevant times.

6.3 The Deemed Retailer

6.3.1 The *Deemed Retailer* is:

(a) the retail supplier who is entitled to some or all of the electrical output of a Category A Generating System pursuant to the Power Purchase Agreement to which that retail supplier is a party; or

(b) a person nominated, to the satisfaction of the Scheme Administrator, to be the Deemed Retailer for the purpose of creating NGACs under this Rule (nominee) by one of the following persons (nominator):

(i) the person in (a); or

(ii) a person previously nominated to be the Deemed Retailer under this Rule,

provided that:

(iii) the nominator has not previously nominated another person to be the Deemed Retailer, or if the nominator has done so, that previous nomination is not still effective;

(iv) the nomination is in writing;

(v) the nominee consents to the nomination; and

(vi) the nominator (and any previous nominator) continues to meet the criteria to be the nominator for the period of the nomination.

6.3.2 A retail supplier listed in Schedule C is deemed to be the person described in clause 6.3.1(a) with respect to the Generating System so listed, if the Scheme Administrator is satisfied that:

(a) the Generating System retains its Category A classification; and

(b) there has been no assignment or novation of the purchaser's rights under the Power Purchase Agreement since 1 January 2003.

6.3.3 A person to whom the rights of the retail supplier listed in Schedule C under the Power Purchase Agreement are assigned or novated after 1 January 2003 (whether directly or via a series of assignments or novations) is deemed to be the Deemed Retailer with respect to the Generating System listed in Schedule C, provided that the Scheme Administrator is satisfied that the Generating System retains its Category A classification.

Note: The listing of certain persons and Generating Systems in Schedule C is intended to facilitate the process of accreditation of Deemed Retailers, without requiring an investigation of the matters in clause 6.3.1(a) in every case.

7 Classification of Generating Systems

The Scheme Administrator may determine whether individual generating units or other components constitute one or more Generating Systems, having regard to factors including:

(a) whether individual generating units:

(i) are separately metered;

(ii) share common connection infrastructure up to the point where they connect to a Transmission or Distribution System;

(iii) are registered as one or more generating systems under the National Electricity Code; and

(iv) are accredited as one or more power stations under the RE(E) Act; and

(b) whether the classification as one or more Generating Systems produces outcomes consistent with the objects of the Scheme.

7.1 Category A

7.1.1 Those Generating Systems the electricity generation of which:

(a) satisfied the criteria for Category A in the Emissions Workbook;

(b) was claimed as either Category A or Category F under the arrangements relating to greenhouse strategies in force under the Act before the commencement of Part 8A of that Act (and referred to in the Emissions Workbook); and

(c) is the subject of a Power Purchase Agreement that has not terminated at the time of classification under this Rule,

are classified as Category A.

7.1.2 The Generating Systems listed in Schedule C are deemed to satisfy clause 7.1.1 if the Scheme Administrator is satisfied that:

(a) there is a direct electricity supply agreement with respect to the Generating System that was entered into before 1 January 2003; and

(b) that direct electricity supply agreement has not terminated.

7.1.3 Once classified as such, a Category A Generating System retains a Category A classification for the life of the Power Purchase Agreement.

7.1.4 For the purposes of this clause 7, a Power Purchase Agreement will not be considered to have terminated merely because rights or obligations under it have been assigned, or it has been novated by substituting one party for another (including by contract or by operation of statute).

7.2 Category B

7.2.1 Those Generating Systems listed in Schedule B are classified as Category B.

7.2.2 For those Generating Systems against which "(a)" appears in Schedule B, the Net Sent Out Generation is deemed, for the purposes of this Rule, to be 71% of the lesser of:

(a) what the Net Sent Out Generation would be in the absence of this clause 7.2.2; and

(b) the REC Baseline.

7.2.3 For those Generating Systems against which "(b)" appears in Schedule B, the Net Sent Out Generation is deemed, for the purposes of this Rule, to be the lesser of:

(a) what the Net Sent Out Generation would be in the absence of this clause 7.2.3; and

(b) the REC Baseline.

Note: The remainder of the generation from these Generating Systems is not eligible under this Rule.

7.3 Category C

Those Generating Systems that are not classified as Category A or B that:

(a) generate electricity using Fossil Fuels (whether or not co-fired with a Renewable Energy Source):

(i) that had nameplate ratings of 30 MW or less as at 30 June 1997 and for which their first generating unit commenced Commercial Operation before 1 July 1997; or

(ii) that had nameplate ratings of greater than 30 MW as at 1 January 2002 and for which their first generating unit commenced Commercial Operation before 1 January 2002; or

(b) generate electricity using Renewable Energy Sources (only) and for which their first generating unit commenced Commercial Operation before 1 January 1997,

are classified as Category C.

7.4 Category D

Those Generating Systems that are not classified as Category A, B, or C are classified as Category D.

8 NSW Production Baseline

In this clause 8, ORER will be taken to have assigned a REC Baseline even if it has assigned a REC Baseline of nil.

8.1 Category A

For a Category A Generating System the *NSW Production Baseline* is (in MWh):

(a) for electricity generated using Fossil Fuels (whether or not co-fired with a Renewable Energy Source):

(i) the maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year under the Power Purchase Agreement; or

(ii) if no such level is specified in the Power Purchase Agreement that is less than the entire output of the Generating System, the Net Sent Out Generation in a year; or

(b) for electricity generated using Renewable Energy Sources (only):

(i) if ORER has assigned a REC Baseline and there is not in the Power Purchase Agreement a maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year that is less than the entire output of the Generating System, the REC Baseline;

(ii) if ORER has assigned a REC Baseline and there is in the Power Purchase Agreement a maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year that is less than the entire output of the Generating System, the lower of the REC Baseline and the maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year under the Power Purchase Agreement;

(iii) if ORER has not assigned a REC Baseline and there is in the Power Purchase Agreement a maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year that is less than the entire output of the Generating System, the maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year under the Power Purchase Agreement; or

(iv) if ORER has not assigned a REC Baseline and there is not in the Power Purchase Agreement a maximum amount of electricity to which the Original Deemed Retailer is contractually entitled in a calendar year that is less than the entire output of the Generating System, the Net Sent Out Generation in a year.

8.2 Category B

8.2.1 For a Category B Generating System for electricity generated using Fossil Fuels (whether or not co-fired with a Renewable Energy Source) there is no *NSW Production Baseline*.

8.2.2 For a Category B Generating System for electricity generated using Renewable Energy Sources (only) the *NSW Production Baseline* is (in MWh):

(a) for those Generating Systems against which "(a)" appears in Schedule B, 71% of the REC Baseline; and

(b) in any other case, the REC Baseline.

8.3 Category C

For a Category C Generating System the *NSW Production Baseline* is (in MWh):

(a) for electricity generated using Fossil Fuels (whether or not co-fired with a Renewable Energy Source), the average annual Net Sent Out Generation during operations over the five calendar years from 1997 to 2001, making an adjustment for periods during which, in the view of the Scheme Administrator:

(i) there was atypically low output due to rebuilds or other extended off-line periods;

(ii) not all units were commissioned; or

(iii) there was atypically high output due to testing,

in which case production data should be taken from those periods when the whole Generating System was operating typically and fully. The Scheme Administrator may extrapolate from available data or model typical output patterns based on the characteristics and location of the Generating System and its fuel type in order to set a NSW Production Baseline that, in the view of the Scheme Administrator, represents the typical annual output of that Generating System; or

(b) for electricity generated using Renewable Energy Sources (only):

(i) if ORER has assigned a REC Baseline, the REC Baseline; or

(ii) if ORER has not assigned a REC Baseline, the average annual Net Sent Out Generation during operations over the five calendar years from 1997 to 2001, making an adjustment for periods during which, in the view of the Scheme Administrator:

(A) there was atypically low output due to rebuilds or other extended off-line periods;

(B) not all units were commissioned; or

(C) there was atypically high output due to testing,

in which case production data should be taken from those periods when the whole Generating System was operating typically and fully. The Scheme Administrator may extrapolate from available data or model typical output patterns based on the characteristics and location of the Generating System and its fuel type in order to set a NSW Production Baseline that, in the view of the Scheme Administrator, represents the typical annual output of that Generating System.

8.4 Category D

For a Category D Generating System the *NSW Production Baseline* (in MWh) is zero.

8.5 Allocation of group REC Baselines

8.5.1 For a Category A, B, C or D Generating System which is part of a group of Generating Systems to which ORER has assigned a collective REC Baseline, but for which ORER has not assigned an individual REC Baseline, the Scheme Administrator must, for the purposes of determining the NSW Production Baseline, either:

(a) allocate a portion of that REC Baseline to each of the Generating Systems in the group of Generating Systems (provided that a zero portion must be allocated to any of the Generating Systems in the group that are classified as Category D); or

(b) treat the entire group as if it were a single Generating System (which may only be done if the entire group would have the same classification under clause 7).

8.5.2 If the Scheme Administrator allocates a portion of the REC Baseline to each of the Generating Systems in the group of Generating Systems, the portion so allocated has the same effect in this Rule as if it had been a REC Baseline assigned directly to that Generating System by ORER, for all purposes including the calculation of the NSW Production Baseline and the assignment to each Generating System of the number of RECs created by the group.

Note: Where a portion of the REC Baseline is allocated to each of the Generating Systems in the group, the number of RECs created by each Generating System, for the purposes of this Rule, would be deemed to be a proportion of the total number of RECs created by the group, where the relevant proportion of RECs is calculated by reference to the amount of Net Sent Out Generation in excess of that portion of the assigned REC Baseline for each Generating System.

9 Creation of NGACs

A person may only create NGACs under this Rule where the Scheme Administrator has approved the Equations and Methods under this Rule to be used (which approval may be conditional upon applying the Equation or Method in a particular manner that is permitted under this Rule).

9.1 Creation of NGACs from electricity generated by Category A Generating Systems

For electricity generated by a Category A Generating System:

(a) the Deemed Retailer that is accredited in respect of the Generating System may create the number of NGACs calculated using **Equation 1** where *Eligible Generation* is calculated in **Equation 3**;

(b) the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Equation 1** where *Eligible Generation* is calculated using **Equation 2**; and

(c) if a Category A Generating System was modified on or after 1 January 2002 to become a Cogeneration Plant, the Generator that is accredited in respect of that Generating System may, in addition to any entitlement to create NGACs under clause 9.1(b), create the number of NGACs equal to the number of tonnes of notional greenhouse gas emissions avoided, calculated using **Method 4**.

Equation 1

Number of NGACs that may be created = Eligible Generation x (NSW Pool Coefficient x Emissions Intensity Adjustment Factor – Emissions Intensity)

Where:

- *Number of NGACs that may be created* is in t CO_2-e and is in respect of the time period over which the Eligible Generation occurs
- *Eligible Generation* (in MWh) is assigned in the clause referring to this Equation
- *NSW Pool Coefficient* (in t CO_2-e/MWh) is the NSW Pool Coefficient determined by the Tribunal using clause 9.1 of the Compliance Rule for the year in which the Eligible Generation occurred
- *Emissions Intensity* (in t/MWh) is calculated using **Equation 4**
- *Emissions Intensity Adjustment Factor* is the value in Table 9 of Schedule A to this Rule appropriate to whether the Generating System is connected to a Distribution System or to a Transmission System

Note: The Emissions Intensity Adjustment Factor is intended to adjust the NSW Pool Coefficient.

Equation 2

If Net Sent Out Generation - NSW Production Baseline - RECs Created/MLF is ≤ 0, then:

Eligible Generation = 0

If Net Sent Out Generation - NSW Production Baseline - RECs Created/MLF is > 0, then:

Eligible Generation = Net Sent Out Generation – NSW Production Baseline – RECs Created/MLF

Where:

- *Eligible Generation* is in MWh and is in respect of a calendar year or part thereof
- *Net Sent Out Generation* is in MWh and is in respect of a calendar year or part thereof
- *NSW Production Baseline* is the NSW Production Baseline applicable to the Generating System, determined using clause 8
- *RECs Created* (in MWh) is the number of RECs created and registered with ORER in accordance with the RE(E) Act in respect of the same electricity generation by the Generating System in the same year as the *Net Sent Out Generation*
- *MLF* is the marginal loss factor for the Generating System, as defined in the RE(E) Regulation

Note: It is proposed that Equation 2 will be amended if and when proposed amendments are made to the *Queensland Electricity Act 1994* (Qld) as set out in *The Queensland 13% Gas Scheme: Final Position Paper*, September 2002, Office of Energy, Queensland Treasury.

Equation 3

If Net Sent Out Generation < NSW Production Baseline, then:

Eligible Generation = Net Sent Out Generation

If Net Sent Out Generation ≥ NSW Production Baseline, then:

Eligible Generation = NSW Production Baseline

Where:

- *Eligible Generation* is in MWh and is in respect of a calendar year or part thereof
- *Net Sent Out Generation* is in MWh and is in respect of a calendar year or part thereof
- *NSW Production Baseline* is the NSW Production Baseline applicable to the Generating System, determined using clause 8

Equation 4

Emissions Intensity = Total Greenhouse Gas Emissions / Sent Out Generation

Where:

- *Emissions Intensity* is in t CO_2-e/MWh
- *Total Greenhouse Gas Emissions* (in t CO_2-e) is determined using clause 10, in respect of the time period over which the Eligible Generation occurs
- *Sent Out Generation* (in MWh) is, in respect of the Generating System, Gross Generation less Auxiliary Electricity Use, both measured over the same time period as the *Total Greenhouse Gas Emissions*
- *Gross Generation* means total electricity generated by a Generating System
- *Auxiliary Electricity Use* means electricity consumed by the Generating System

9.2 Creation of NGACs from electricity generated by Category B Generating Systems

9.2.1 For electricity generated by a Category B Generating System using Fossil Fuels (only):

(a) if the Generator is a participant in the Commonwealth Generator Efficiency Standards and takes measures on or after 1 January 2002 to operate the Generating System which are, in the view of the Scheme Administrator, to the best achievable efficiency without significantly changing the design of the Generating System or its fuel mix, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 1**; or

(b) if the Generator takes measures on or after 1 January 2002 that, in the view of the Scheme Administrator, significantly change the design of the Generating System, but not the fuel mix, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 2**; or

(c) if the Generator takes measures on or after 1 January 2002 that, in the view of the Scheme Administrator, significantly change the fuel mix of the Generating System, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 3**, provided that all fuels used before and after the change in fuel mix are such that the fugitive and combustion emissions of those fuels would be included in the National Greenhouse Gas Inventory.

9.2.2 In clause 9.2.1, references to the Generator being a participant in the Commonwealth Generator Efficiency Standards and taking certain measures include references to any of the persons in clause 6.2.1 being such a participant and taking such measures or causing such measures to be taken.

Note: A Generator that is accredited in respect of a Category B Generating System may create NGACs by performing better than the lower bound of the Generator Efficiency Standards Greenhouse Intensity value for that type of Generating System or by undertaking a specific abatement project that significantly changes the design or fuel mix. Examples of significantly changing the design or fuel mix would include a turbine upgrade to high efficiency blades or fuel switching to a combination of coal and natural gas.

NGACs may be created by Methods 1, 2 or 3 from the later of the time that the activity which gave rise to their creation takes effect and 1 January 2003, up to the time it ceases to have effect, but the number of NGACs created must be separately calculated in each period, taking into account the actual performance of the Generating System in that period, the effects of degradation with age and any other factors changing over time.

The Greenhouse Intensity (GI) values calculated under the Generator Efficiency Standards account only for greenhouse gas emissions arising from the combustion of fuels for electricity generation, equivalent to the emissions calculated under **Equations 7, 8 and 9**, and **Equations 14 and 15**. Under Methods 1, 2 and 3, improvements to Greenhouse Intensity values are adjusted by the GES Adjustment Factor to also account for emissions associated with the production of Fossil Fuels by using **Equations 10, 11 and 12**.

Method 1 – GES Gain

Step (1) Select a measurement period, acceptable to the Scheme Administrator, to which the following calculations apply.

Step (2) From the Commonwealth Generator Efficiency Standards Methodology (GES), and applying the definitions contained therein, calculate:

- the *Reference Total Greenhouse Gas Emissions* (in tonnes of carbon dioxide equivalent) for each fuel used in the Generating System over the measurement period and based on reference plant performance, being the sum of:

  (a) the *Reference Equivalent CO_2 From Fuel Burning* ($m_{CO2\ equiv.}$) (in tonnes of carbon dioxide equivalent), calculated using GES; and

  (b) if the fuel is a Fossil Fuel, the sum of the fugitive emissions associated with the production of the Fossil Fuel (in tonnes of carbon dioxide equivalent), calculated using **Equations 10, 11 and 12**;

- the *GES Adjustment Factor* for the combined fuel used in the Generating System, calculated as follows:

  $\{\sum_{F}$ *Reference Total Greenhouse Gas Emissions* (tonnes)$\}$ / $\{\sum_{F}$ *Reference Equivalent CO_2 From Fuel Burning* (tonnes)$\}$

  where *F* is each fuel used in the Generating System over the measurement period

- *Actual GI value* (in kg CO_2-e/MWh sent out) applicable to the Generating System during that

measurement period.

- *Reference GI value* ($GI_{R,}$) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System during that measurement period.

- *Lower GI value* (GI_{LLower}) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System during that measurement period and taking into account performance degradation with age and the GES tolerance band.

Step (3) For the purposes of this Rule:

- there can only be a *GES Gain* if *Actual GI* < *Lower GI value*

- the *GES Gain* is:

(*Lower GI value – Actual GI value*) x *GES Adjustment Factor*

Note: For example, if over a given period the plant operates at an average 85% output factor, the Actual GI value is 708 kg CO_2-e/MWh and the lower GI value at 85% output factor is 721 CO_2-e/MWh, and the *GES Adjustment Factor* is 1.07, then the GES Gain is 14 kg CO_2-e/MWh.

Step (4) The number of NGACs that may be created per measurement period is:

{*GES Gain* (in kg CO_2-e/MWh) / 1000} x {Net Sent Out Generation – RECs Created / MLF}

Where:

- *Net Sent Out Generation* (in MWh) is, in respect of the Generating System, Net Sent Out Generation during the measurement period by reference to which the Generator seeks to create NGACs
- *RECs Created* (in MWh) is the number of RECs created and registered with ORER in accordance with the RE(E) Act in respect of the same electricity generation by the Generating System in the same year as the *Net Sent Out Generation*
- *MLF* is the marginal loss factor for the Generating System, as defined in the RE(E) Regulation

Note: If, in the above example, the Generating System Net Sent Out Generation is 850,000 MWh, RECs Created is 1,000 with a marginal loss factor of 0.98, the number of NGACs that could be created is 14 / 1,000 x (850,000 – 1,000 / 0.98) = 11,886 tonnes CO_2-e.

Method 2 – Redesign Gain

Step (1) Select a measurement period, acceptable to the Scheme Administrator, to which the following calculations apply.

Step (2)

From the Commonwealth Generator Efficiency Standards Methodology (GES), and applying the definitions contained therein, calculate:

- the *Reference Total Greenhouse Gas Emissions* (in tonnes of carbon dioxide equivalent) for each fuel used in the Generating System over the measurement period and based on reference plant performance, being the sum of:

  (a) the *Reference Equivalent CO_2 From Fuel Burning* ($m_{CO2\ equiv.}$) (in tonnes of carbon dioxide equivalent), calculated using GES; and

  (b) if the fuel is a Fossil Fuel, the sum of the fugitive emissions associated with the production of the Fossil Fuel (in tonnes of carbon dioxide equivalent), calculated using **Equations 10, 11 and 12**;

- the *GES Adjustment Factor* for the combined fuel used in the Generating System, calculated as follows:

  $\{\sum_{F}$ *Reference Total Greenhouse Gas Emissions* (tonnes)$\}$ / $\{\sum_{F}$ *Reference Equivalent CO_2 From Fuel Burning* (tonnes)$\}$

  where *F* is each fuel used in the Generating System over the measurement period

- *Actual GI value* (in kg CO_2-e/MWh sent out) applicable to the Generating System during that measurement period.

- *Reference GI value* (GI_R) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System during that measurement period.

- *Lower GI value* (G_{LLower}) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System during that measurement period and taking into account performance degradation with age and the GES tolerance band.

Step (3)

Conduct a heat rate test at greater than 70% electricity output prior to making the changes in the current design, following the Commonwealth Generator Efficiency Standards Methodology, or another method approved by the Scheme Administrator.

Step (4)

After completing the change in design of the Generating System, conduct a heat rate test, or another method approved by the Scheme Administrator, at the same level of electricity output used for Step (3), and determine the *Percentage Heat Rate Change* attributable to the design change.

Step (5)

Adjust the existing Reference GI (GI_R) and Lower GI ($GI_{L,Lower}$) curves, over the normal plant operating range, in a downwards direction in direct proportion to the Percentage Heat Rate Change determined in Step (4). The two new curves are designated Reference GI ($GI_{R,Redesign}$) and Lower GI ($GI_{L,Lower,Redesign}$).

Step (6)

For the output factor achieved during a given measurement period, the *Redesign Gain* in emissions intensity is the difference between the $GI_{L,Lower,Original}$ on the original curve (age adjusted) and the $GI_{L,Lower,Redesign}$ on the curve created in Step (5) (age adjusted). Hence, the *Redesign Gain* is:

$$(GI_{L,Lower,Original} - GI_{L,Lower,Redesign}) \times (GES\ Adjustment\ Factor)$$

There can only be a *Redesign Gain* if $GI_{L,Lower,Redesign} < GI_{L,Lower,Original}$

Step (7) The number of NGACs that may be created per measurement period is:

{Redesign Gain (kg CO_2-e/MWh) / 1000} x {Net Sent Out Generation – RECs created / MLF}

Where:

- *Net Sent Out Generation* (in MWh) is, in respect of the Generating System, Net Sent Out Generation during the measurement period by reference to which the Generator seeks to create NGACs
- *RECs Created* (in MWh) is the number of RECs created and registered with ORER in accordance with the RE(E) Act in respect of the same electricity generation by the Generating System in the same year as the *Net Sent Out Generation*
- *MLF* is the marginal loss factor for the Generating System, as defined in the RE(E) Regulation

Step (8)

If **Method 1** is used subsequently to calculate *GES Gain*, then the redesign *Lower GI* value ($GI_{L,Lower,Redesign}$) will be substituted for the original *Lower GI* value ($GI_{L,Lower,Original}$), so as to avoid double-counting of *GES Gain* after the redesign. Hence, the *GES Gain* at a specified generating plant output factor is:

$$(GI_{L,Lower,Redesign} - Actual\ GI\ value) \times GES\ Adjustment\ Factor$$

Note: For example, a Generating System has upgraded its Low Pressure (LP) turbines to high efficiency blading. Before the unit was taken out of service for the upgrade, a test was carried out at 90% output factor which resulted in an actual GI of 1020 kg CO_2-e/MWh sent out. A second test was done when the unit was returned to service, again at 90% output factor, resulting in an actual GI of 1000 kg CO_2-e/MWh sent out. The before and after tests showed that the upgrade resulted in a GI improvement of 20 kg CO_2-e/MWh sent out at 90% output factor.

From the before and after redesign test results, the Percentage Heat Rate Change is:

(1020 – 1000) / 1020 = 2.0% (round to one decimal place)

The Percentage Heat Rate Change could also be determined by conducting a Valve Full Open Test using equivalent steam conditions for the before and after redesign tests. The difference in generator electrical output between tests will yield the Percentage Heat Rate Change.

Using the results of the before and after upgrade tests, two new GI curves ($GI_{R,Redesign}$ and $GI_{L,LowerRedesign}$) are developed over the operating range of the Generating System, using the shape of the original GES GI reference curve (GI_R) which is itself derived from original plant

design or test data.

The before and after upgrade GI curves are used to calculate the GI improvement due to the turbine upgrade at different output factors. This will set the GI improvement attributable to the turbine upgrade, irrespective of other factors relating to the Commonwealth GES methodology.

Say, in the year following the upgrade, the plant generates 900,000 MWh at an output factor of 70%, and creates no RECs in the year. The original $GI_{LLowerOriginal}$ value (before redesign) was 1077 kg CO_2-e/MWh sent out and the $GI_{LLowerRedesign}$ value (after redesign) is 1077 x (1-0.020) = 1055 kg CO_2-e/MWh sent out. The GES Adjustment Factor for the year is 1.025. From this data, the Redesign Gain is:

(1077 – 1055) x 1.025 = 23 kg CO_2-e/MWh sent out.

The number of NGACs that may be created due to the turbine upgrade is:

23 / 1000 x 900,000 = 20,700 tonnes CO_2-e

During the same year, refurbishment work has been carried out on the boiler airheaters as part of the GES commitment. The Generating System generates 900,000 MWh at an output factor of 70%, and the Actual GI is 1050 kg CO_2-e/MWh. This is lower than the $GI_{L,Lower,Redesign}$ value of 1055 kg CO_2-e/MWh. Hence the *GES Gain* is:

(1055 – 1050) x 1.025 = 5.1 kg CO_2-e/MWh sent out

The number of NGACs that may be created due to the *GES Gain* is:

5.1 / 1000 x (900,000 – 0) = 4,590 tonnes CO_2-e

This is in addition to the number of NGACs that may be created due to the previous design change, the effects of which have not been reversed.

For Redesign Gains, the heat rate test in Step 4 must be repeated at intervals of no more than 5 years unless otherwise required by the Scheme Administrator, and the latest test results must be used to calculate the Percentage Heat Rate Change that is used in subsequent calculations.

Method 3 – Fuel Switch Gain

Step (1) Select a measurement period, acceptable to the Scheme Administrator, to which the following calculations apply.

Step (2)

From the Commonwealth Generator Efficiency Standards Methodology (GES), and applying the definitions contained therein, calculate:

- the emission factors for carbon dioxide (F_{CO2}), methane (F_{CH4}), nitrous oxide (F_{N2O}) for each fuel used in the Generating System and *Equivalent Carbon Dioxide Emission Factor* ($F_{CO2\text{-}e}$).
- the *Reference Boiler Efficiency* (η_B), *Turbine Efficiency* (η_T), Auxiliaries Percentage and *Sent Out Thermal Efficiency* (η_{SO}) for each fuel used in the Generating System applicable to the

output factor during that measurement period.

- the *Gross Calorific Value* ($Q_{gr,p,as}$) for each fuel used in the Generating System.
- the *Reference Total Greenhouse Gas Emissions* (in tonnes of carbon dioxide equivalent) for each fuel used in the Generating System over the measurement period and based on reference plant performance, being the sum of:

  (a) the *Reference Equivalent CO_2 From Fuel Burning* ($m_{CO2\ equiv.,\ Fuel\ Switch}$) (in tonnes of carbon dioxide equivalent), calculated using GES; and

  (b) if the fuel is a Fossil Fuel, the sum of the fugitive emissions associated with the production of the Fossil Fuel (in tonnes of carbon dioxide equivalent), calculated using **Equations 10, 11 and 12**;

- the *GES Adjustment Factor* for the combined fuel used in the Generating System, calculated as follows:

  $\{\sum_{F}$ *Reference Total Greenhouse Gas Emissions* (tonnes)$\}$ / $\{\sum_{F}$ *Reference Equivalent CO_2 From Fuel Burning* (tonnes)$\}$

  where *F* is each fuel used in the Generating System over the measurement period

- the weighted average *Equivalent Carbon Dioxide Emission Factor* ($F_{CO2\text{-}e,av}$) and Fuel *Gross Calorific Value* ($Q_{g,p,as,av}$), weighted according to the tonnage of each fuel consumed in the Generating System and the weighted average *Reference Sent Out Thermal Efficiency* ($\eta_{SO,av}$) weighted according to the energy of each fuel consumed in the Generating System.
- *Actual GI value* (in kg CO_2-e/MWh sent out) applicable to the Generating System in that measurement period.
- *Reference GI* ($GI_{R,Fuel\ Switch}$) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System during that measurement period.
- *Adjusted Reference GI* ($GI_{R,Fuel\ Switch,Adj}$) (in kg CO_2-e/MWh), calculated as follows:

  Reference GI (kg CO_2-e/MWh) x *GES Adjustment Factor*

- *Adjusted Lower GI value* ($GI_{L,Lower,Fuel\ Switch,Adj}$) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System during that measurement period and taking into account performance degradation with age and the GES tolerance band.

Step (3)

For the original fuel(s) applying before the change in fuel mix, and including any fuel(s) used to create RECs, calculate using the methodology in Step(2):

- *Reference Total Greenhouse Gas Emissions* (in tonnes of CO_2 equivalent)
- *GES Adjustment Factor* for original fuel(s)
- *Reference GI* ($GI_{R,Original}$) (in kg CO_2-e/MWh) applying at the output factor achieved by

the Generating System during that measurement period.

- *Adjusted Reference GI* ($GI_{R,Original,Adj}$) (in kg CO_2-e/MWh)
- *Adjusted Lower GI value* ($GI_{L,Lower,Original,Adj}$) (in kg CO_2-e/MWh) applying at the output factor achieved by the Generating System and taking into account performance degradation with age and the GES tolerance band.

Step (4)

For the output factor achieved during that measurement period, the *Fuel Switch Gain* in emissions intensity is:

$$GI_{L,Lower,Original,\ Adj} - GI_{L,Lower,Fuel\ Switch,\ Adj}$$

There can only be a *Fuel Switch Gain* if the $GI_{L,Lower,Fuel\ Switch,\ Adj} < GI_{L,Lower,Original,\ Adj}$

Step (5)

The number of NGACs that may be created per measurement period is:

{Fuel Switch Gain (kg CO_2-e/MWh) / 1000} x {Net Sent Out Generation – RECs Created / MLF}

Where:

- *Net Sent Out Generation* (in MWh) is, in respect of the Generating System, Net Sent Out Generation during the measurement period by reference to which the Generator seeks to create NGACs
- *RECs Created* (in MWh) is the number of RECs created and registered with ORER in accordance with the RE(E) Act in respect of the same electricity generation by the Generating System in the same year as the *Net Sent Out Generation*
- *MLF* is the marginal loss factor for the Generating System, as defined in the RE(E) Regulation

Step (6)

If the fuel switch involves the introduction of Waste Coal Mine Gas, , then the Waste Coal Mine Gas attracts an additional abatement benefit. The number of additional NGACs that may be created is calculated using **Equation 13**.

Step (7)

If **Method 1** is used subsequently to calculate *GES Gain*, then the fuel switch Lower GI value ($GI_{L,Lower,Fuel\ Switch,Adj}$) will be substituted for the original Lower GI value ($GI_{L,Lower,Original,\ Adj}$), so as to avoid double counting of *GES Gain* after the fuel switch. The *GES Gain* at a specified plant output factor is:

$$GI_{L,Lower,Fuel\ Switch,Adj} - Adjusted\ Actual\ GI\ value$$

where:

Adjusted Actual GI value = *Actual GI* (kg CO_2-e/MWh) x *GES Adjustment Factor*

Note:

For example, a coal fired power station installs supplementary gas burners on its boilers and, in the following year, the plant generates 1,000,000 MWh at an output factor of 60% with 5% of the total fuel (by weight) being supplied from natural gas. No RECs are created from the plant in that period. The Actual GI is 950 kg CO_2-e/MWh.

The emission factors for carbon dioxide, methane and nitrous oxide for coal and natural gas are calculated yielding a $F_{CO2\text{-}e}$ of 1.85 and 2.58 kg $CO_{2\text{-}e}$/kg $_{fuel}$ for coal and natural gas respectively and hence a weighted average $F_{CO2\text{-}e,av}$ of 1.885 kg $CO_{2\text{-}e}$/kg $_{fuel}$. Since coal and natural gas impact boiler efficiency and auxiliary load differently, the Reference Sent Out Thermal Efficiency (η_{SO}) is calculated for each fuel at 60% output factor, yielding 32.03% and 31.64% respectively and a weighted average $\eta_{SO,av}$ of 31.99%. The Gross Calorific Value for coal and natural gas is 22.0 and 50.0 MJ/kg respectively, yielding a weighted average $Q_{gr,p,as,av}$ of 23.3 MJ/kg. For the new fuel mix, the Reference GI ($GI_{R,Fuel\ Switch}$) is calculated to be 909 kg CO_2-e/MWh. The emissions associated with the production of coal and natural gas were calculated using Equations 10, 11 and 12 to yield a GES Adjustment Factor of 1.026. The *Adjusted Reference GI* ($GI_{R,Fuel\ Switch,Adj}$) is calculated to be 933 kg CO_2-e/MWh and the Adjusted Lower GI value ($GI_{L,Lower,Fuel\ Switch,Adj}$) is 970 kg CO_2-e/MWh. For the original coal only, the GES Adjustment Factor is 1.025 and the Adjusted Reference GI and Adjusted Lower GI value are calculated yielding a $GI_{R,Original,Adj}$ and $GI_{L,Lower,Original,\ Adj}$ of 968 and 1,007 kg CO_2-e/MWh respectively.

From this data, the Fuel Switch Gain is:

1,007 –970 = 37 kg CO_2-e/MWh sent out

The number of NGACs that may be created due to the fuel switch is:

37/ 1000 x (1,000,000 – 0) = 37,000 tonnes CO_2-e

Under the GES commitment, work is also carried out to improve the performance of the soot-blowing system. The plant is 12 years old. The work on the sootblowing system also improves the plant's efficiency and the Adjusted Actual GI is 970 kg CO_2-e/MWh which is less than the Adjusted Lower GI Value ($GI_{L,Lower,Original}$ = 1,007 kgCO_2-e/MWh). Under Method 1, it may be possible to create NGACs from the efficiency improvement. Under Method 3, however, the Adjusted Lower GI value is changed down to the $GI_{L,Lower,Fuel\ Switch,\ Adj}$ value so as to avoid double counting. The Adjusted Actual GI of 975 kg CO_2-e/MWh is not less than the $GI_{L,Lower,\ Fuel\ Switch}$ value of 970 kg CO_2-e/MWh, so the GES Gain is zero and no NGACs may be created due to *GES Gain*.

If, in the above example, the gas was not natural gas but Waste Coal Mine Gas sourced from a working coal mine, the additional NGACs that could be created are calculated (using **Equation 13**) as:

1.32 (Energy content of waste coal mine gas in PJ) x 18 (kt CH_4/PJ default CH_4 conversion factor) x 21 x 1000 =499,000 tonnes CO_2-e

9.2.3 For electricity generated by a Category B Generating System using Renewable Energy Sources (only), the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Equation 1** where the *Eligible Generation* is calculated using **Equation 2**.

9.2.4 For electricity generated in a year by a Category B Generating System using Fossil Fuels co-fired with Renewable Energy Sources, the Generator that is accredited in respect of the Generating System may, in addition to any entitlement to create NGACs under clause 9.2.1, create using this Rule the number of NGACs calculated using **Equation 5**.

Equation 5

Number of NGACs that may be created = {Net Sent Out Generation x NSW Pool Coefficient x Energy Content of Renewable Energy Source x $\eta_{SO,RE}$ / (Energy Content of Renewable Energy Source x $\eta_{SO,RE}$ + Energy Content of Fossil Fuel x $\eta_{SO,FF}$)} - (RECs Created/MLF)

If this amount is less than or equal to zero, then the Number of NGACs that may be created = 0.

Where:

- *Number of NGACs that may be created* is in t CO_2-e and is in respect of the time period over which the Net Sent Out Generation occurs
- *Net Sent Out Generation* is in MWh and is in respect of a calendar year or part thereof
- *NSW Pool Coefficient* (in t CO_2-e/MWh) is the NSW Pool Coefficient determined by the Tribunal using clause 9.1 of the Compliance Rule for the year in which the Net Sent Out Generation was generated
- *Energy Content of Renewable Energy Source* is in PJ
- $\eta_{SO,RE}$ is the thermal efficiency of the Generating System attributed to the Renewable Energy Source only
- *Energy Content of Fossil Fuel* is in PJ
- $\eta_{SO,FF}$ is the thermal efficiency of the Generating System attributed to the Fossil Fuel only
- *RECs Created* (in MWh) is the number of RECs created and registered with ORER in accordance with the RE(E) Act in respect of the same electricity generation by the Generating System in the same year as the *Net Sent Out Generation*
- *MLF* is the marginal loss factor for the Generating System, as defined in the RE(E) Regulation

9.3 Creation of NGACs from electricity generated by Category C Generating Systems

9.3.1 For electricity generated by a Category C Generating System using Fossil Fuels (whether or not co-fired with a Renewable Energy Source), the Generator that is accredited in respect of the Generating System may in each year select to either:

(a) create the number of NGACs calculated using **Equation 1** where *Eligible Generation* is calculated using **Equation 2**; or

(b) create the number of NGACs according to the following (as applicable):

(i) if the Generator is a participant in the Commonwealth Generator Efficiency Standards and measures are taken on or after 1 January 2002 to operate the Generating System which are, in the view of the Scheme Administrator, to the best achievable efficiency without significantly changing the design of the Generating System or its fuel mix, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 1**; or

(ii) if the Generator takes measures on or after 1 January 2002 that, in the view of the Scheme Administrator, significantly change the design of the Generating System but not its fuel mix, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 2**; or

(iii) if the Generator takes measures on or after 1 January 2002 that, in the view of the Scheme Administrator, significantly change the fuel mix of the Generating System, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using Method 3, provided that all fuels used before and after the change in fuel mix are such that the fugitive and combustion emissions of those fuels would be included in the National Greenhouse Gas Inventory; or

(c) if the Generator that is accredited in respect of the Generating System is otherwise entitled to create NGACs under (b), create the number of NGACs under (b) in relation to any output below its NSW Production Baseline only, plus the number of NGACs using **Equation 1** for output above its NSW Production Baseline.

9.3.2 In clause 9.3.1, references to the Generator being a participant in the Commonwealth Generator Efficiency Standards and taking certain measures include references to any of the persons in clause 6.2.1 being such a participant and taking such measures or causing such measures to be taken.

9.3.3 For electricity generated by a Category C Generating System using Renewable Energy Sources (only), the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Equation 1** where *Eligible Generation* is calculated using **Equation 2**.

9.4 Creation of NGACs from electricity generated by Category D Generating Systems

9.4.1 For electricity generated by a Category D Generating System using Fossil Fuels (whether or not co-fired with a Renewable Energy Source), the Generator that is accredited in respect of the Generating System may in each year select to either:

(a) create the number of NGACs calculated using **Equation 1** where *Eligible Generation* is calculated using **Equation 2**; or

(b) create the number of NGACs according to the following (as applicable):

(i) if the Generator is a participant in the Commonwealth Generator Efficiency Standards and measures are taken to operate the Generating System which are, in the view of the Scheme Administrator, to the best achievable efficiency without significantly changing the design of the Generating System or its fuel mix, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 1**; or

(ii) if the Generator takes measures that, in the view of the Scheme Administrator, significantly change the design of the Generating System but not the fuel mix, the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 2**; or

(iii) if the Generator takes measures that, in the view of the Scheme Administrator, significantly change the fuel mix of the Generating System,

the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Method 3**, provided that all fuels used before and after the change in fuel mix are such that the fugitive and combustion emissions of those fuels would be included in the National Greenhouse Gas Inventory.

9.4.2 In clause 9.4.1, references to the Generator being a participant in the Commonwealth Generator Efficiency Standards and taking certain measures include references to any of the persons in clause 6.2.1 being such a participant and taking such measures or causing such measures to be taken.

9.4.3 For electricity generated by a Category D Generating System using Renewable Energy Sources (only), the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Equation 1** where *Eligible Generation* is calculated using **Equation 2**.

9.5 Creation of additional NGACs from electricity generated using landfill gas and sewage gas, manufactured methane or cogeneration from Renewable Energy Sources

In respect of electricity generated by a Generating System that is entitled to create RECs:

(a) using landfill gas, sewage gas, or fugitive methane from other Renewable Energy Sources;

(b) using methane manufactured from Qualifying Putrescible Waste (other than landfill gas, sewage gas or fugitive methane from other Renewable Energy Sources); or

(c) that is a Cogeneration Plant for which the appropriate fuel identified in Step (2) of Method 4 is a Fossil Fuel,

the Generator that is accredited in respect of the Generating System may create the number of NGACs calculated using **Equation 6** in addition to any NGACs that it is entitled to create according to clauses 9.1 to 9.3.1.

Note: Clause 9.5(a) relates to fugitive methane that would otherwise by vented as a byproduct of a waste disposal or treatment process. Clause 9.5(b) applies to methane manufactured from material that would otherwise have been disposed of in a landfill, anaerobic pond, windrow or by other means which would lead to the venting of methane as a byproduct.

The Scheme recognises the double greenhouse benefit of using these energy sources to generate electricity. Clause 9.5 allows NGACs to be created in recognition of the greenhouse benefits of avoiding the emission of methane to the atmosphere and using heat in cogeneration that would otherwise be wasted, which is in addition to the greenhouse benefit of electricity generation from fuel sources with lower emissions.

Note, however, that NGACs may not be created under both clauses 9.1 to 9.4 and clause 9.5:

- If no RECs are created, there will not be an entitlement to create NGACs under both clauses 9.1 to 9.4 and clause 9.5. This is because NGACs created under clause 9.5 are by reference to the number of RECs created. However, in this case both greenhouse benefits will be taken into account in the calculations under clauses 9.1 to 9.4.

- If, on the other hand, all of the electricity generated is used to create RECs (thus disallowing the creation of NGACs under clauses 9.1 to 9.4), NGACs may be created under clause 9.5 in addition to those RECs. Although both RECs and NGACs may be

created in this case, they are created in respect of different abatement and therefore it is consistent with any accreditation conditions or undertakings that disallow the creation of RECs or NGACs in respect of the same greenhouse gas abatement.

Equation 6

Number of additional NGACs that may be created = Number of RECs Created/MLF x (NSW Pool Coefficient x Emissions Intensity Adjustment Factor – NSW Pool Coefficient - Emissions Intensity)

Where:

- *Number of additional NGACs that may be created* is in t CO_2-e and is in respect of the time period over which the *Number of RECs Created* are calculated
- *NSW Pool Coefficient* (in t CO_2-e/MWh) is the NSW Pool Coefficient determined by the Tribunal using clause 9.1 of the Compliance Rule for the year in which the electricity generated occurred
- *Number of RECs Created* (in MWh) is the number of RECs created and registered with ORER in accordance with the RE(E) Act in respect of electricity generated over the same time period as (but not in respect of the same electricity generated as) NGACs created according to clauses 9.1 to 9.4
- *Emissions Intensity* (in t CO_2-e/MWh) is calculated using **Equation 4**
- *Emissions Intensity Adjustment Factor* is the value in Table 9 of Schedule A to this Rule appropriate to whether the Generating System is connected to a Distribution System or to a Transmission System
- *MLF* is the marginal loss factor for the Generating System, as defined in the RE(E) Regulation

9.6 Creation of NGACs from electricity generated using Native Forest Bio-Material

Despite any other provision in this Rule, an Accredited Abatement Certificate Provider must not create NGACs in respect of the whole or any part of the electricity generated by any Generating System in a particular year if it generated any electricity in that year in violation of the provisions of the *Protection of the Environment Operations (General) Amendment (Burning of Bio-Material) Regulation 2003*.

Note: Clause 9.6. refers to limits and conditions relating to the implementation of the NSW Government policy on the use of forest biomass for electricity generation.

9.7 Adjustment of number of NGACs that may be created for GGAP funded projects

9.7.1 Despite any other provision in this Rule, if on or after 1 January 2003 approval for GGAP funding has been granted for a project, the maximum number of NGACs that an Accredited Abatement Certificate Provider can create under this Rule from the number of tonnes of carbon dioxide equivalent of greenhouse gas emissions abated by the project equals the percentage of the total number of NGACs that it is otherwise entitled to create under this Rule from that project corresponding to the percentage of project funding that is not provided by GGAP.

Note: For example, if GGAP funding represents 20% of total project funding, then the Accredited Abatement Certificate Provider can only create NGACs for 80% of the eligible abatement achieved.

10 Emissions Calculations

10.1 Total Greenhouse Gas Emissions

Subject to clauses 10.2 and 10.3, the *Total Greenhouse Gas Emissions* in tonnes of carbon dioxide equivalent from a Generating System is the total of:

(a) for each Fossil Fuel used, the sum of:

(i) CO_2 emissions at the point of combustion (in tonnes), calculated using **Equation 7**; and

(ii) CH_4 emissions at the point of combustion (in tonnes of carbon dioxide equivalent), calculated using **Equation 8**; and

(iii) N_2O emissions at the point of combustion (in tonnes of carbon dioxide equivalent), calculated using **Equation 9**; and

(iv) if the Fossil Fuel is natural gas, fugitive CO_2 emissions associated with the production of the Fossil Fuel (in tonnes of carbon dioxide equivalent) calculated using **Equation 10**; and

(v) if the Fossil Fuel is natural gas, fugitive CH_4 emissions associated with the production of the Fossil Fuel (in tonnes of carbon dioxide equivalent), calculated using **Equation 11**;

(vi) if the Fossil Fuel is black coal, the total of fugitive CH_4 emissions associated with the production of the Fossil Fuel for mines from which coal is sourced (in tonnes of carbon dioxide equivalent), where the fugitive CH_4 emissions associated with the production of the Fossil Fuel for each mine are calculated using **Equation 12**,

less:

(vii) if the Fossil Fuel is Waste Coal Mine Gas (whether Waste Coal Mine Gas from the same mining operations was flared or vented prior to its use in the Generating System), fugitive CH_4 emissions avoided directly through the use of Waste Coal Mine Gas (in tonnes of carbon dioxide equivalent), using **Equation 13**; and

(b) for each Renewable Energy Source used, the sum of:

(i) CH_4 emissions at the point of combustion (tonnes of carbon dioxide equivalent), calculated using **Equation 14**; and

(ii) N_2O emissions at the point of combustion (tonnes of carbon dioxide equivalent), calculated using **Equation 15**,

less:

(iii) if the fuel is landfill gas, sewage gas, or fugitive methane from other Renewable Energy Sources, fugitive CH_4 emissions avoided through the use of the fuel (in tonnes of carbon dioxide equivalent), calculated using **Equation 16**; and

(iv) if the fuel is methane manufactured from Qualifying Putrescible Waste, nominal fugitive CH_4 emissions avoided through the use of the fuel (in tonnes of carbon dioxide equivalent), calculated using Method 5.

Equation 7

CO_2 emissions at the point of combustion = Energy Content of Fossil Fuel x CO_2 emission factor x combustion factor x 1000

Where

- *CO_2 emissions at the point of combustion* is in t CO_2-e
- *Energy Content of Fossil Fuel* (in PJ) is the actual Energy Content of the Fossil Fuel or, if this is not known, the Scheme Administrator may approve an estimated value
- *CO_2 emission factor* (in kt CO_2/PJ) is the factor nominated by the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) and approved by the Scheme Administrator, or, in the absence of such nomination and approval, the value for that Fossil Fuel and equipment type in Table 3 of Schedule A to this Rule.
- *Combustion factor* is the factor nominated by the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) and approved by the Scheme Administrator, or, in the absence of such nomination and approval, the value for that Fossil Fuel in Table 4 of Schedule A to this Rule.

Equation 8

CH_4 emissions at the point of combustion = Energy Content of Fossil Fuel x CH_4 emission factor x 1000 x 21

Where

- *CH_4 emissions at the point of combustion* is in t CO_2-e
- *Energy Content of Fossil Fuel* (in PJ) is the actual Energy Content of the Fossil Fuel or, if this is not known, the Scheme Administrator may approve an estimated value
- *CH_4 emission factor* (in kt CH_4/PJ) is the factor for that Fossil Fuel and equipment type in Table 5 of Schedule A to this Rule or another CH_4 emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 9

N_2O emissions at the point of combustion = Energy Content of Fossil Fuel x N_2O emission factor x 1000 x 310

Where

- N_2O *emissions at the point of combustion* is in t CO_2-e
- *Energy Content of Fossil Fuel* (in PJ) is the actual Energy Content of the Fossil Fuel or, if this is not known, the Scheme Administrator may approve an estimated value
- N_2O *emission factor* (in kt N_2O /PJ) is the factor for that Fossil Fuel and equipment type in Table 5 of Schedule A to this Rule or another N_2O emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 10

Fugitive CO_2 emissions associated with the production of the Fossil Fuel = Energy Content of gas x CO_2 emission factor x 1000

Where

- *Fugitive CO_2 emissions associated with the production of the Fossil Fuel* is in t CO_2-e
- *Energy Content of gas* (in PJ) is the actual Energy Content of the Fossil Fuel or, if this is not known, the Scheme Administrator may approve an estimated value
- *CO_2 emission factor* (in kt CO_2/PJ) is the factor for that Fossil Fuel in Table 2 of Schedule A to this Rule or another CO_2 emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 11

Fugitive CH_4 emissions associated with the production of the Fossil Fuel = Energy Content of Fossil Fuel x CH_4 emission factor x 1000 x 21

Where

- *Fugitive CH_4 emissions associated with the production of the Fossil Fuel* is in t CO_2-e
- *Energy Content of Fossil Fuel* (in PJ) is the actual Energy Content of the Fossil Fuel or, if this is not known, the Scheme Administrator may approve an estimated value
- *CH_4 emission factor* (in kt CH_4/PJ) is the factor for that Fossil Fuel in Table 2 of Schedule A to this Rule or another CH_4 emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 12

Fugitive CH_4 emissions associated with the production of the Fossil Fuel for each mine = (Mass of coal sourced from mine x CH_4 emission factor / 1000) x 21

Where

- *Fugitive CH_4 emissions associated with the production of the Fossil Fuel* is in t CO_2-e
- *Mass of coal sourced from mine* is in t
- *CH_4 emission factor* (in kg CH_4/ t) is the weighted average for the State from which the coal was sourced in Table 1 of Schedule A to this Rule or another CH_4 emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 13

Fugitive CH_4 emissions avoided directly through the use of Waste Coal Mine Gas = Energy Content of waste methane used as Fossil Fuel x CH_4 conversion factor x 1000 x 21

Where

- *Fugitive CH_4 emissions avoided through the use of waste coal mine gas* is in t CO_2-e
- *Energy Content of waste methane used as Fossil Fuel* (in PJ) is the actual Energy Content of the waste methane used as Fossil Fuel or, if this is not known, the Scheme Administrator may approve an estimated value, or a value to be determined on the assumption that, for electricity converted to Net Sent Out Generation, Sent Out Generation represents 36% of the total

Energy Content of all Fossil Fuels used (waste methane used as Fossil Fuel and any supplementary fuel used).

- *CH_4 conversion factor* (in kt CH_4/PJ) is 18 or another conversion factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 14

CH_4 emissions at the point of combustion = Energy Content of Renewable Energy Source x CH_4 emission factor x 1000 x 21

Where

- *CH_4 emissions at the point of combustion* is in t CO_2-e
- *Energy Content of Renewable Energy Source* (in PJ) is the actual Energy Content of the Renewable Energy Source or, if this is not known, the Scheme Administrator may approve an estimated value
- *CH_4 emission factor* (in kt CH_4/PJ) is the factor for that Renewable Energy Source and equipment type in Table 5 of Schedule A to this Rule or another CH_4 emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 15

N_2O emissions at the point of combustion = Energy Content of Renewable Energy Source x N_2O emission factor x 1000 x 310

Where

- *N_2O emissions at the point of combustion* is in t CO_2-e
- *Energy Content of Renewable Energy Source* (in PJ) is the actual Energy Content of the Renewable Energy Source or, if this is not known, the Scheme Administrator may approve an estimated value
- *N_2O emission factor* (in kt N_2O /PJ) is the factor for that Renewable Energy Source and equipment type in Table 5 of Schedule A to this Rule or another N_2O emission factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

Equation 16

Fugitive CH_4 emissions directly avoided through the use of the fuel = Energy Content of waste methane used as Renewable Energy Source x CH_4 conversion factor x 1000 x 21

Where

- *Fugitive CH_4 emissions directly avoided through the use of the fuel* is in t CO_2-e
- *Energy Content of waste methane used as Renewable Energy Source* (in PJ) is the actual Energy Content of the waste methane used as a Renewable Energy Source or, if this is not known, the Scheme Administrator may approve an estimated value, or a value to be determined on the assumption that, for electricity converted to Net Sent Out Generation, Sent Out Generation represents 36% of the total Energy Content of all energy sources used (waste methane used as a Renewable Energy Source and any supplementary energy sources used).
- *CH_4 conversion factor* (in kt CH_4/PJ) is 18 or another conversion factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider (or the Category B

Generator providing information for the calculation of the NSW Pool Coefficient) can justify its adoption and document its application

10.2 Adjustment of Total Greenhouse Gas Emissions for Cogeneration Plant

(a) For a Cogeneration Plant, the Total Greenhouse Gas Emissions calculated in clause 10.1 may be reduced by the amount of notional greenhouse gas emissions avoided (in tonnes of carbon dioxide equivalent) through use of the heat that would otherwise be wasted, calculated using **Method 4**.

(b) If a Category A Generating System was modified on or after 1 January 2002 to become a Cogeneration Plant, then any calculations by a Deemed Retailer under clause 10.2(a) in respect of that Generating System must be adjusted so as not to include the notional greenhouse gas emissions which may be calculated under clause 9.1(c).

Note: The Generator who is entitled to create NGACs under clause 9.1(c) may nonetheless grant the Deemed Retailer this right by a nomination under clause 6.2.1(c).

Method 4

Step (1) Determine the amount of heat used from the Cogeneration Plant:

- by identifying the amount of heat used from the Cogeneration Plant; or
- if not known, 70% of the Energy Content of the fuel, less the Energy Content of the Gross Generation.

Step (2) Identify the appropriate fuel for the notional greenhouse gas emissions avoided as follows:

- If the Cogeneration Plant uses Fossil Fuel, the fuel for the notional greenhouse gas emissions avoided is:

  (i) if the Cogeneration Plant replaces an existing boiler or there is another boiler also supplying heat to the user of the cogenerated heat, the actual fuel for that boiler; or

  (ii) in other cases, the main fuel used in the Cogeneration Plant

- If the Cogeneration Plant uses a Renewable Energy Source, the fuel for the notional greenhouse gas avoided is

  (iii) if there was a pre-existing boiler using Fossil Fuel or Fuels, the pre-existing fuel or a combination of fuels similar to the combination of the fuels displaced; or

  (iv) if there was no pre-existing boiler using Fossil Fuel but natural gas is available at the site, natural gas; or

  (v) in other cases, the Renewable Energy Source.

Step (3) Calculate the amount of notional fuel avoided:

a) if the notional fuel is a Fossil Fuel, by dividing the amount of heat used from the Cogeneration Plant by:

  (vi) if the fuel for the notional greenhouse gas emissions avoided is natural gas, 0.80;

  (vii) if the fuel for the notional greenhouse gas emissions avoided is coal, 0.70;

  (viii) or otherwise, 0.75; or

b) if the fuel for the notional greenhouse gas emissions avoided is a Renewable Energy Source, zero

Step (4) For the appropriate fuel identified using Step (2) and the amount of notional fuel avoided calculated in Step (3), the notional emissions avoided are calculated in accordance with the equations appropriate to that fuel in clause 10.1.

Method 5

Step (1) Identify the Alternative Disposal Method for the putrescible waste, as:

- windrows only (ie 100% of the putrescible waste used in the methane manufacturing process would have been disposed of in windrows);
- landfills only (ie 100% of the putrescible waste used in the methane manufacturing process would have been disposed of in landfills);
- anaerobic lagoons only (ie 100% of the putrescible waste used in the methane manufacturing process would have been disposed of in anaerobic lagoons);
- a combination of two or more of windrows, landfills or anaerobic lagoons (with the percentage of each to be specified);
- another method approved by the Scheme Administrator;
- a combination of another method approved by the Scheme Administrator and one or more of windrows, landfills or anaerobic lagoons (with the percentage of each to be specified).

If the Scheme Administrator does not approve the identification of any of the above Alternative Disposal Methods the default Alternative Disposal Method is windrows only.

Step (2) Calculate the Alternative Disposal Method CH_4 Production Factor.

- If the Alternative Disposal Method is windrows only, landfill only or anaerobic lagoons only, the Alternative Disposal Method CH_4 Production Factor is either a value calculated by a method approved by the Scheme Administrator, or the value corresponding to that Alternative Disposal Method in Table 10.
- If the Alternative Disposal Method is another method approved by the Scheme Administrator, the Alternative Disposal Method CH_4 Production Factor is either a value calculated by a method approved by the Scheme Administrator, or the value corresponding to the value for windrows only in Table 10.
- If the Alternative Disposal Method is a combination, the Alternative Disposal Method CH_4 Production Factor is either a value calculated by a method approved by the Scheme Administrator, or the value corresponding to the value for windrows only in Table 10.

Step (3) Calculate an average Qualifying Putrescible Waste Factor over the period for which NGACs are being calculated, by a method approved by the Scheme Administrator.

- If the Scheme Administrator does not approve the calculation of the Qualifying Putrescible Waste Factor, the default Qualifying Putrescible Waste Factor is 0.8.

Note: The RE(E) Act and RE(E) Regulation prevent the creation of RECs from any waste products derived from fossil fuels (eg plastics), so where clause 9.5(b) is being used to calculate a number of NGACs from a number of RECs, the Qualifying Putrescible Waste Factor in Step (3) of this Method should NOT be adjusted to net out waste products derived from Fossil Fuels.

Step (4) Calculate an average Process CH_4 Production Factor over the period for which NGACs are being calculated, by a method approved by the Scheme Administrator.

- If the Scheme Administrator does not approve the calculation of the Process CH_4 Production Factor, the default Process CH_4 Production Factor is 70%.

Step (5) Calculate the Nominal fugitive CH_4 emissions avoided through the use of the fuel:

Nominal fugitive CH_4 emissions avoided through the use of the fuel = Energy Content of manufactured methane used as a Renewable Energy Source x CH_4 conversion factor x 1000 x 21 x Qualifying Putrescible Waste Factor x (Alternative Disposal Method CH_4 Production Factor/Process CH_4 Production Factor)

Where

- *Nominal Fugitive CH_4 emissions avoided through the use of the fuel* is in t CO_2-e
- *Energy Content of manufactured methane used as a Renewable Energy Source* (in PJ) is the actual Energy Content of the manufactured methane used as a Renewable Energy Source or, if this is not known, the Scheme Administrator may approve an estimated value, or a value to be determined on the assumption that, for electricity converted to Net Sent Out Generation, Sent Out Generation represents 36% of the total Energy Content of all energy sources used (manufactured methane used as a Renewable Energy Source and any supplementary energy sources used)
- *CH_4 conversion factor (in kt CH_4/PJ)* is 18 or another conversion factor accepted by the Scheme Administrator, if the Accredited Abatement Certificate Provider can justify its adoption and document its application
- *Qualifying Putrescible Waste Factor* is calculated under Step (3)
- *Alternative Disposal Method CH_4 Production Factor* is calculated under Step (2)
- *Process CH_4 Production Factor* is calculated under Step (4)

10.3 Other waste fuel, waste heat, waste materials, and other waste outputs

10.3.1 This clause 10.3 applies to electricity that is generated from:

(a) a waste fuel that is otherwise vented or flared, other than those that are dealt with elsewhere in this Rule;

(b) heat that is otherwise wasted but that is not heat produced by a Cogeneration Plant;

(c) outputs of industrial processes that would otherwise be wasted, including but not limited to industrial waste steam; or

(d) waste materials that would otherwise be burned, incorporated in durable products, or landfilled.

Note: Naturally occurring heat sources are dealt with as Renewable Energy. Landfill, sewage and Waste Coal Mine Gas are dealt with under clause 10.1.

10.3.2 Heat that would otherwise be wasted or waste fuel that would otherwise be flared or vented

If electricity is generated from the burning of a waste fuel that would otherwise be flared or heat that would otherwise be wasted, the *Total Greenhouse Gas Emissions* from that electricity generation are zero.

10.3.3 Useful organic material

If organic material that could otherwise be incorporated in durable products is used for electricity generation, the *Total Greenhouse Gas Emissions* from its combustion are to be calculated as if the material were a Fossil Fuel using clause 10.1.

10.3.4 Organic material otherwise placed in landfill

If organic material that would otherwise be landfilled is used for electricity generation, the *Total Greenhouse Gas Emissions* from its combustion are to be calculated as if the material were a Renewable Energy Source using clause 10.1.

10.3.5 Methane from industrial processes

If methane from an industrial process, that would otherwise be vented, is used for electricity generation, the *Total Greenhouse Gas Emissions* from its combustion are to be calculated as if the material were Waste Coal Mine Gas using clause 10.1.

10.3.6 Fuel other than methane from industrial processes

If waste fuel other than methane from an industrial process, that would otherwise be vented, is used for electricity generation, the *Total Greenhouse Gas Emissions* from its combustion are to be calculated as if the material were a Fossil Fuel using clause 10.1.

10.3.7 Other waste fuel, waste heat, waste materials, or waste outputs

For an energy source from which electricity is generated and to which this clause 10.3 applies, the Scheme Administrator may determine the means by which *Total Greenhouse Gas Emissions* are to be calculated using the following principles:

(a) The calculation of the *Total Greenhouse Gas Emissions* must be consistent with the National Greenhouse Gas Inventory Methodology. Categories of emissions not covered by the National Greenhouse Gas Inventory Methodology cannot be taken into account;

Note: An example of a category of emissions not covered by the National Greenhouse Gas Inventory Methodology is emissions from the spontaneous combustion of waste coal.

(b) The combustion emissions produced by the Generating System from any energy sources to which this clause 10.3 does not apply must also be taken into account; and

(c) For a Cogeneration Plant, the *Total Greenhouse Gas Emissions* calculated may be reduced by the amount of notional greenhouse gas emissions avoided through use of the waste heat, on the same principles as for Cogeneration Plant using Fossil Fuel or Renewable Energy Sources in clause 10.2.

10.3.8 For the purpose of this clause 10.3, the Scheme Administrator will determine whether a material, heat, a fuel, or another waste output to which this clause applies would or could be otherwise used or utilised.

11 Definitions and Interpretation

11.1 In this Rule:

"Act" means the *Electricity Supply Act 1995*.

"Alternative Disposal Method" is the waste disposal method approved by the Scheme Administrator as the most likely alternative waste disposal method for the Qualifying Putrescible Waste used in a methane manufacturing process.

"Benchmark Rules" means the rules under Part 8A, Division 11 of the Act.

"**Cogeneration Plant**" means a Generating System that produces useful heat as well as electricity.

"Commercial Operation" means receiving any payment for electricity generated by a Generating System, after completion of testing to meet conditions of any licences or authorisations prior to those licences or authorisations being granted or becoming effective.

"Commonwealth Generator Efficiency Standards Methodology" means the calculation methodology as set out in:

(a) the most recent published versions (from time to time) of

(i) *Program Guidelines: Generator Efficiency Standards, Australian Greenhouse Office*;

(ii) *Technical Guidelines: Generator Efficiency Standards, Australian Greenhouse Office*; and

(b) other Generator Efficiency Standards guidelines as published and amended from time to time by the Australian Greenhouse Office.

"Compliance Rule" means *Greenhouse Gas Benchmark Rule (Compliance) No. 1 of 2003*.

"Deemed Retailer" is defined in clause 6.3.1.

"Distribution System" is a "distribution system" (as that term is defined in the National Electricity Code) which is registered under the National Electricity Code.

"DSA Rule" means *Greenhouse Gas Benchmark Rule (Demand Side Abatement) No. 3 of 2003*.

"Emissions Workbook" means the methodology described in the document entitled *Greenhouse Gas Emissions from Electricity Supplied in NSW: Emissions Workbook* published by the Ministry of Energy and Utilities in October 2000.

"End-User Complex" is as defined in the DSA Rule.

"End-User Equipment" means electricity consuming equipment that is not associated with the generation of electricity or generated ancillary loads.

"Energy Content" of a fuel source is to be considered as its higher heating value (HHV).

"Fossil Fuel" means black coal, brown coal, natural gas, fuels derived from petroleum, coal seam methane, or Waste Coal Mine Gas.

"Generating System" means a system comprising one or more of the physical generators of electricity and all the related equipment capable of functioning as a single entity.

"Generator" is defined in clause 6.2.1.

"GES" means the Commonwealth Generator Efficiency Standards Methodology.

"GGAP" means the Greenhouse Gas Abatement Program administered by the Australian Greenhouse Office of the Commonwealth.

"Gross Generation" is defined in Equation 4.

"Intermediary" means a person who is registered by NEMMCO as a Generator instead of another person who would be registered as such under the National Electricity Code.

"Native Forest Bio-Material" has the same meaning as in the *Protection of the Environment Operations (General) Amendment (Burning of Bio-Material) Regulation 2003.*

"Net Sent Out Generation" means the amount of electricity supplied to a Transmission or Distribution System less the amount of electricity supplied to the Generating System from the Transmission or Distribution System.

"NGAC" (New South Wales Greenhouse Abatement Certificate) is a transferable abatement certificate under section 97F of the Act, which is created in accordance with this Rule, the DSA Rule or the Sequestration Rule.

"NSW Electricity Network" means all electricity Transmission Systems and Distribution Systems located in New South Wales.

"NSW Pool Coefficient" is defined in section 97AB of the Act and determined by the Tribunal under section 97BF of the Act, in accordance with clause 9.1 of the Compliance Rule. The relevant NSW Pool Coefficient for the purposes of this Rule is that for the year in which the abatement occurred.

"NSW Production Baseline" is determined in accordance with clause 8 of this Rule.

"ORER" means the Commonwealth Office of the Renewable Energy Regulator established under the RE(E) Act.

"Original Deemed Retailer" has the same meaning as the Deemed Retailer in clause 6.3.1(a).

"Power Purchase Agreement" means the direct electricity supply agreement that gave rise to the eligibility of the electricity generation of a Generating System to be classified as Category A under the Emissions Workbook, and includes (with respect to a Generating System listed in Schedule C) a direct electricity supply agreement which satisfies clause 7.1.2.

"Previous Rule" is defined in clause 1.2.

"Process CH_4 Production Factor" means the percentage of carbon in the Qualifying Putrescible Waste that is converted to CH_4 in the process by which the CH_4 used in the Generating System is manufactured from putrescible waste.

"Qualifying Putrescible Waste" means the putrescible waste, used in a process which manufactures methane from putrescible waste, that is other than paper, cardboard or other materials that the Scheme Administrator disqualifies on the grounds that they are of non-renewable origin or that their inclusion encourages unsustainable use of materials.

"Qualifying Putrescible Waste Factor" means the mass of Qualifying Putrescible Waste divided by the total mass of putrescible waste used in a process which manufactures methane from putrescible waste.

"REC" means a renewable energy certificate as defined in section 97AB of the Act.

"REC Baseline" is the electricity production baseline assigned to a Generating System by the ORER for the purpose of calculating the number of RECs that may be created under the RE(E) Act or, if the REC Baseline assigned to a Generating System is not provided to the Scheme Administrator, an estimate of the baseline made by the Scheme Administrator from published data using the method prescribed in the RE(E) Act or RE(E) Regulation.

"**RE(E) Act**" means the *Renewable Energy (Electricity) Act 2000* (Cth).

"**RE(E) Regulation**" means the *Renewable Energy (Electricity) Regulations 2001* (Cth).

"Regulations" means regulations made pursuant to Part 8A of the Act.

"Renewable Energy Source" means an *eligible renewable energy source* under the RE(E) Act.

"Scheme" means the arrangements under Part 8A of the Act, Parts 8A and 8B of the Regulation and the Benchmark Rules.

"Scheme Administrator" is defined in section 97AB of the Act.

"Sent Out Generation" is defined in Equation 4.

"Sequestration Rule" means *Greenhouse Gas Benchmark Rule (Carbon Sequestration) No. 5 of 2003.*

"Transmission System" is a "transmission system" (as that term is defined in the National Electricity Code) which is registered under the National Electricity Code.

"Tribunal" has the meaning given to it under the Act.

"Waste Coal Mine Gas" means coal seam gas drained from mines for the purpose of coal mining operations (regardless of the period of time between draining the gas from the coal mine and use of the mine for coal mining operations).

11.2 Notes in this Rule do not form part of the Rule.

11.3 A reference in this Rule to an entitlement to create a number of NGACs is to be taken as an entitlement to create a lesser number of NGACs.

11.4 For the purpose of this Rule the terms and expressions used in this Rule have the same meaning as in the Act or as defined in Part 8A of the Act, except the terms that are expressly defined in this Rule.

11.5 A reference to accreditation in respect of a Generating System means accreditation in respect of electricity generation activities from the Generating System.

Schedule A - Tables

Table 1: Fugitive Emissions from Coal

State	Class of mine	kg CH_4/t mined	kg CH_4/t post-mine	kg CH_4/t combined
NSW	Underground Class A	10.40	0.77	11.17
	Underground Class B	0.54	0	0.54
	Open Cut	2.17	0	2.17
	Weighted average	3.67	0	3.67
	Coal tailings	0	0	0
Qld	Underground Class B	0.54	0	0.54
	Open Cut	0.81	0	0.81
	Weighted average	0.76	0	0.76
	Coal tailings	0	0	0
Vic	Open Cut	0	0	0

Table 2: Fugitive Emissions from Natural Gas

State	kt CO_2/ PJ	kt CH_4/ PJ
All States	2.60	0.089

Table 3: Carbon Dioxide Emission Factors

Fuel Type	Fuel	kt CO_2/ PJ
Coal	Coal used in public electricity generation (ASIC 3611)	92.0
	Coals used in steel industry	93.0
	Black coal used by other industry	90.0
	Brown coal used by industry	88.3
	Coke	119.5
	Coal by-products (gaseous)	37.0
	Coal by-products (coal tar and BTX)	81.0
	Brown coal briquettes	105.0
Petroleum	Liquefied petroleum gas	59.4
	Naphtha	66.0
	Lighting kerosene	69.7
	Power kerosene	69.7
	Aviation gasoline	68.0
	Aviation turbine fuel	69.7
	Heating oil	69.7
	Fuel oil	73.6
	Automotive diesel oil (ADO)	69.7
	Industrial diesel fuel (IDF)	69.7
	Refinery fuel	68.1
	Other petroleum products	68.6
	Solvents	66.0
	Lubricants and greases	73.7
	Bitumen	80.7
Gaseous	Natural gas - NSW	50.8
	Natural gas - Victoria	51.0
	Natural gas - SA	50.8
	Natural gas - Queensland	51.1
	Natural gas - ACT	50.8
	Town gas (tempered LPG)	59.0
Biomass	Wood and wood waste (dry)	94.0
	Bagasse	96.8

Table 4: Carbon Dioxide Combustion Factors

Fossil Fuel	Carbon Dioxide Combustion Factor
black coal	0.990
brown coal	0.990
natural gas	0.995
coal seam methane	0.995
waste coal mine gas	0.995
fuels derived from petroleum	0.990

Table 5: Methane and Nitrous Oxide Default Emission Factors

Sector	Fuel	Equipment	kt CH_4/ PJ	kt N_2O/ PJ
Electricity	Black coal	Tangentially fired	0.0009	0.0008
		Pulverised wall	0.0009	0.0008
	Brown coal	Tangentially fired	0.0009	0.0014
	Natural gas[a]	Boiler	0.0001	0.0001
		Internal combustion	0.2400	0.0001
		Turbine	0.0080	0.0001
	Fuel oil/residual oil	Boiler	0.0008	0.0006
		Internal combustion	0.0040	0.0006
	Distillate/diesel	Boiler	0.0000	0.0006
		Internal combustion	0.0040	0.0006
		Turbine	0.0040	0.0006
Industrial	Black coal	Boiler	0.0013	0.0008
	Natural gas[a]	Boiler	0.0012	0.0001
	Fuel oil	Boiler	0.0008	0.0006
	Residual oil	Boiler	0.0028	0.0006
	Distillate	Boiler	0.0001	0.0006
	Wood	Boiler	0.0042	0.0041
	Bagasse	Boiler	0.0100	0.0041
Commercial	Black coal	Boiler	0.0013	0.0008
	Natural gas[a]	Boiler	0.0011	0.0001
	Residual oil	Boiler	0.0013	0.0006
	Distillate oil	Boiler	0.0006	0.0006
	Wood	Boiler	0.0034	0.0041
Household	Wood	Open fireplace	2.6860	0.0041
	Wood	Closed heater	0.1480	0.0041

a These factors may also apply to waste coal mine gas, landfill gas and sewage gas.

Table 6: Default Distribution Loss Factors to be used by retail suppliers

	Distribution Loss Factor
ACTEWAGL	1.059
Country Energy	1.072
AGLE	1.054
Australian Inland	1.078
CitiPower	1.055
TXU	1.059
Energex	1.057
EnergyAustralia	1.053
Ergon	1.057
Ferrier Hodgson	1.053
Integral	1.055
Origin	1.053
Pulse	1.056
Auspower	1.054
For any other retail suppliers that are not listed here	1.053

Table 7: Default Distribution Loss Factors

	Distribution Loss Factor
Australian Inland (a)	1.087
EnergyAustralia (a)	1.053
Integral (a)	1.055
Country Energy (a)	1.078
NSW (weighted) (b)	1.058
Victoria (b)	1.060
SA (b)	1.068
Queensland (b)	1.058

Table 8: Default Transmission Loss and Scaling Factors

State	Transmission Loss Factor	Transmission Scaling Factors
New South Wales	1.026	0.975
Victoria or South Australia	1.026	0.975
Queensland	1.046	0.956

Table 9: Emissions Intensity Adjustment Factors

Connection	**Emissions Intensity Adjustment Factor**
At End-User Complex	the Distribution Loss Factor applying at the site **or** the default Distribution Loss Factor for that Distribution System from Table 7 in this Schedule
To Distribution System	1.0
To Transmission System	Transmission Scaling Factor for the State where the Generating System is located from Table 8 in this Schedule

Table 10: Methane manufacture factors

Alternative Disposal Method	**Alternative Disposal Method CH_4 production factor**
Windrows only	0.15
Landfills only	0.50
Anaerobic Ponds only	0.30

Schedule B - Category B Generators

Name	Owner	Type
Vales Point	Delta Electricity	Steam/Coal
Mt Piper	Delta Electricity	Steam/Coal
Wallerawang	Delta Electricity	Steam/Coal
Munmorah	Delta Electricity	Steam/Coal
Eraring	Eraring Energy	Steam/Coal
Brown Mountain (b)	Eraring Energy	Hydro
Burrinjuck (b)	Eraring Energy	Hydro
Hume (b)	Eraring Energy	Hydro
Keepit (b)	Eraring Energy	Hydro
Shoalhaven (b)	Eraring Energy	Hydro/pump storage
Warragamba (b)	Eraring Energy	Hydro
Broken Hill GT	Eraring Energy	Gas turbine
Bayswater	Macquarie Generation	Steam/Coal
Liddell	Macquarie Generation	Steam/Coal
Guthega (a)	Snowy Hydro Trading	Hydro
Tumut 1 (a)	Snowy Hydro Trading	Hydro
Tumut 2 (a)	Snowy Hydro Trading	Hydro
Tumut 3(a)	Snowy Hydro Trading	Hydro
Blowering (a)	Snowy Hydro Trading	Hydro
Murray 1 (a)	Snowy Hydro Trading	Hydro
Murray 2 (a)	Snowy Hydro Trading	Hydro
Redbank	Redbank Power	Steam/Coal

(a) refer to clause 7.2.2.

(b) refer to clause 7.2.3.

Schedule C - Category A Generating Systems

Name	Type	Deemed Retailer
Smithfield, NSW	Gas-fired cogeneration	Integral Energy
Tower, NSW	Waste mine gas	Integral Energy
Appin, NSW	Waste mine gas	Integral Energy
Kembla Grange	Hydro	Integral Energy
Belrose, NSW	Landfill gas	Energy Australia
Foreshore Park, NSW	Photovoltaic cell	Energy Australia
National Innovation Centre, NSW	Photovoltaic cell	Energy Australia
Lucas Heights 1, NSW	Landfill gas	Energy Australia
Corio, Vic	Landfill gas	Origin Energy
Yarrawonga Hydro, Vic	Hydro	Origin Energy
Alfred Hospital, Vic	Gas-fired cogeneration	Origin Energy
Royal Melbourne Hospital, Vic	Gas-fired cogeneration	Origin Energy
St Vincents Hospital, Vic	Gas-fired cogeneration	Origin Energy
Austin Hospital, Vic	Gas-fired cogeneration	Origin Energy
Vansdorf, Vic	Gas-fired cogeneration	AGL
Broadmeadows, Vic	Landfill gas	AGL Electricity Ltd
Clayton, Vic	Landfill gas	AGL Victoria Pty Ltd
Springvale, Vic	Landfill gas	AGL Victoria Pty Ltd
Pedler Creek, SA	Landfill gas	AGL South Australia Pty Ltd
Tea Tree Gully, SA	Landfill gas	AGL South Australia Pty Ltd
Wingfield 1, SA	Landfill gas	AGL South Australia Pty Ltd
Wingfield 2, SA	Landfill gas	AGL South Australia Pty Ltd
Highbury, SA	Landfill gas	AGL South Australia Pty Ltd
Browns Plains, Qld	Landfill gas	Energex
Burrendong, NSW	Hydro	Country Energy
Wyangala, NSW	Hydro	Country Energy
Nymboida, NSW	Hydro	Country Energy
Copeton, NSW	Hydro	Country Energy
Oakey, NSW	Hydro	Country Energy
Harwood , NSW	Bagasse	Country Energy
Glenbaun, NSW	Hydro	Energy Australia
Blue Rock Dam, Vic	Hydro	TXU Electricity Ltd
Cardinia Dam, Vic	Hydro	TXU Electricity Ltd
Eildon Dam, Vic	Hydro	TXU Electricity Ltd
Glenmaggie Dam, Vic	Hydro	TXU Electricity Ltd
William Hovell Dam, Vic	Hydro	TXU Electricity Ltd
Thompson Dam, Vic	Hydro	TXU Electricity Ltd
Berwick Power Station, Vic	Landfill gas	TXU Electricity Ltd