Carbon Credits (Carbon Farming Initiative) (Human-Induced Regeneration of a Permanent Even-Aged Native Forest—1.1) Methodology Determination 2013[1]

Carbon Credits (Carbon Farming Initiative) Act 2011

I, Yvette D'Ath, Parliamentary Secretary for Climate Change, Industry and Innovation, make this Methodology Determination under subsection 106(1) of the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

Dated 17 June 2013

YVETTE D'ATH

Parliamentary Secretary for Climate Change, Industry and Innovation

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Part 1 Preliminary

1.1 Name of Determination

This Determination is the *Carbon Credits (Carbon Farming Initiative) (Human-Induced Regeneration of a Permanent Even-Aged Native Forest—1.1) Methodology Determination 2013*.

1.2 Commencement

This Determination is taken to have come into force on 1 July 2010.

1.3 Definitions

In this Determination:

Act means the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

baseline period means the 10 year period prior to project commencement.

carbon dioxide equivalent (CO_2-e) means the carbon dioxide mass equivalent of the biomass or greenhouse gas.

carbon estimation area has the meaning given by section 3.3.

carbon pools means a biomass category included in the greenhouse gas assessment boundary specified in section 4.3.

carbon stock, of an area of land, at a specified time, means the quantity of carbon held within the area at that time as:

(a) above ground tree biomass;

(b) below ground tree biomass;

(c) tree debris;

(d) tree litter.

Note The baseline assessment of carbon stock considers the tree biomass only.

CFI Mapping Guidelines means the guidelines of that name, as published from time to time, to be used for mapping project areas and carbon estimation areas within project areas. Available at: www.climatechange.gov.au

CFI Mapping Tool means the online mapping tool of that name, as published from time to time, that is used to define the boundaries of a project area or of a carbon estimation or exclusion area in a project area. Available at: www.climatechange.gov.au

declaration date, for an eligible project, means the date on which the declaration of eligibility under section 27 of the Act takes effect.

disturbance event means an event, whether natural or caused by humans, that damages trees or slows their growth, including fire, pest, disease and storm events.

even-aged means tree stems that have regenerated as a result of a change to a land management activity at an identified point in time.

Note The change to a land management activity is likely to occur at the start of a growth season.

exclusion area has the meaning given by section 3.5.

forest has the meaning given in the Regulations.

forest cover—land has ***forest cover*** if:

(a) the land has an area of at least 0.2 of a hectare; and

(a) the vegetation on the land includes trees that:

(i) are 2 metres or more in height; and

(ii) provide crown cover of at least 20% of the land.

forest potential—land has ***forest potential*** if:

(a) the land has an area of at least 0.2 of a hectare; and

(a) the vegetation on the land includes trees that have the potential to:

(i) reach 2 metres or more in height; and

(ii) provide crown cover of at least 20% of the land.

fuel emissions means emissions of carbon dioxide (CO_2), nitrous oxide (N_2O), or methane (CH_4) arising from fossil fuel use in relation to the delivery of project activities for the project area.

human-assisted regeneration activity means one or more of the following activities undertaken to induce the establishment of a native forest from in situ seed, lignotubers or root stock (coppice) sources:

(a) exclusion of livestock;

(b) management of the timing, and the extent, of grazing;

(c) management, in a humane manner, of feral animals;

(d) management of plants that are not native to the project area;

(e) cessation of mechanical or chemical destruction, or suppression, of regrowth.

initial carbon stock means the carbon stock of the project area as determined in accordance with section 4.8.

maximum carbon stock means the maximum carbon stock of the project area, as modelled by the Reforestation Modelling Tool for the period of 100 years from the time of project commencement.

modelling commencement means the date from which modelling of forest establishment begins using the Reforestation Modelling Tool.

model point location means the location of a model point, identified by latitude and longitude, for use by the Reforestation Modelling Tool.

native vegetation means vegetation:

(a) consisting of species native to the local area; and

(b) with a mix of trees, shrubs, and understorey species that reflects the structure and composition of the local native vegetation community.

Note A monoculture may constitute native vegetation where it can naturally occur within the local vegetation community.

NGER Measurement Determination means the applicable determination made under subsection 10(3) of the *National Greenhouse and Energy Reporting Act 2007*.

NGER Regulations means the *National Greenhouse and Energy Reporting Regulations 2008*.

pre-existing project means a project:

(a) in which the project proponent began to apply project mechanisms to land within the project area before 1 July 2010; and

(b) the declaration date of which is 1 July 2010.

prescribed weed means any plant that is required by law to be removed.

project commencement means a date, occurring on or after 1 July 2007, for which there is documentary evidence of a kind specified in subsection 2.3(3), that suppression activities in the project area have ceased or will cease and a human assisted regeneration activity will commence.

Note Under the Act a project declaration date cannot be earlier than 1 July 2010. Projects that commence before 1 July 2010 will have a project declaration date of 1 July 2010. Projects that commence after 1 July 2010 cannot have a project declaration date that is earlier than the date of project commencement. The project commencement is not the same as the modelling commencement date.

Reforestation Modelling Tool or ***RMT*** means the online tool of that name, as published from time to time, that estimates the carbon stock in an area. Available at www.climatechange.gov.au

regeneration means trees originating from the germination or growth of in situ seed, rootstock or lignotuber.

Regulations means the *Carbon Credits (Carbon Farming Initiative) Regulations 2011*.

suppression activity means a combination of land use and land management practices that prevents the regeneration of native vegetation on land due to the effects of one or more of the following:

(a) livestock;

(b) feral animals;

(c) plants not native to the project area;

(d) mechanical or chemical destruction, or suppression, of regrowth.

thinning means the selective removal of plants, primarily undertaken to improve the growth rate or health of the remaining vegetation.

tree has the meaning given in the Regulations.

woody plants means trees and shrubs.

Note Other words and expressions used in this Determination have the meaning given by the Act. These include:

Australian carbon credit unit

baseline

CFI Mapping Guidelines

conservation land

eligible offsets project

emission

greenhouse gas

offsets project

offsets report

project

project area

project proponent

Regulator

reporting period

1.4 Type of project to which this Determination applies

Note See paragraphs 27(4)(b) and 106(1)(a) of the Act.

This Determination applies to a project if:

(a) the project area was subject to suppression activity during the baseline period;

(b) the baseline carbon stock is taken to be zero for the baseline period, as determined in accordance with section 2.4;

(c) there is a documented commencement of a human-assisted regeneration activity; and

(d) there is regeneration which is a direct result of a human-assisted regeneration activity.

Part 2 Requirements for declaration as eligible project

Note See paragraphs 27(4)(c) and 106(1)(b) of the Act.

2.1 Eligible projects

To be declared an eligible offsets project, a project to which this Determination applies must meet the requirements in this Part.

Note In addition, a project must meet the requirements in section 27 of the Act and in the Regulations, including a requirement that the project is not an excluded offsets project (see regulations 3.36 and 3.37).

2.2 Location

The project area must be within Australia, excluding the external territories.

2.3 Project land characteristics

(1) The project area must include land that has been subject to suppression activity such that:

(a) the land did not achieve forest cover in the baseline period; and

(b) the baseline carbon stock is taken to be zero for the baseline period in accordance with section 2.4;

(2) There must be a documented change to the land management regime of the project area to a human-assisted regeneration activity.

(3) For the purposes of subsection (2), there is a documented change to a human-assisted land management activity if the project proponent provides at least one of the following with respect to the project area:

(a) an application to the Regulator for an eligible offsets project declaration;

(b) records of activities that assist native forest regeneration such as records of fencing to exclude livestock, to remove feral animals, or to manage non-native plant species;

(c) registration of carbon property rights under state or territory carbon rights legislation; or

(d) other documents involving third parties indicating a clear intention of the project proponent to cease mechanical or chemical suppression of regrowth either to establish a forest or to commence a carbon project.

Note The third parties specified in paragraph (2)(d) could include livestock businesses, agricultural advisors, local planning bodies, legal advisors, or financial institutions.

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2.4 Test for baseline carbon stock taken to be zero

(1) For the purposes of paragraph 2.3(1)(b), the baseline carbon stock is taken to be zero unless:

(a) the timing and nature of suppression activities during the baseline period result in carbon stocks that exceed 5% of the maximum carbon stock of the project area at any time during the baseline period, based on modelling using RMT; or

(b) there is evidence that regeneration in a part of the project area that is not identified as an exclusion area in accordance with section 3.5, was at any time during the baseline period at least:

(i) 2 metres in height; and

(ii) 20 per cent crown cover;

Note The evidence specified in paragraph (b) could include date-stamped, geo-referenced, remotely-sensed imagery.

(2) For the purposes of subsection(1)(a), suppression activities must be modelled using the RMT and documented evidence of their timing and extent provided in an application for a declaration of an eligible offsets project.

Note The evidence specified in subsection (2) could include fuel use associated with suppression activities, labour associated with suppression activities, chemical use associated with suppression activities, herd records, or livestock purchases.

(3) For the purposes of subsection (1), the modelling commencement using RMT must be from a date one year after any suppression activity or disturbance event.

(4) In this section:

baseline carbon stock means the carbon stock during the baseline period, excluding carbon from tree debris and tree litter.

2.5 Project mechanism

The project must aim to generate Australian carbon credit units by enabling native vegetation to grow to achieve forest cover through the promotion and management of regeneration from in situ seed, rootstock or lignotuber sources, applying a human-assisted regeneration activity, and not by direct seeding or planting.

2.6 Identification of project area

The project proponent must delineate the boundaries of the project area in accordance with the CFI Mapping Guidelines and Division 3.2.

Note Regulation 3.1 of the Regulations includes a requirement to provide, in an application for a declaration of an eligible offsets project, a geospatial map of the project area that meets the requirements of the CFI Mapping Guidelines.

Part 3 Requirements for operation of eligible projects

Note See paragraphs 27(4)(c), 35(2)(a) and 106(1)(b) of the Act and regulations 1.12 and 3.26 of the Regulations.

Division 3.1 Operation of eligible projects

3.1 Operation of eligible projects

An eligible offsets project to which this Determination applies must be operated in accordance with this Part.

Division 3.2 Stratification of the project area

3.2 Initial stratification of project area

Before submitting the first offsets report for the project, the project proponent must define in the project area one or more carbon estimation areas in accordance with the CFI Mapping Guidelines and with this Division.

3.3 Requirements for a carbon estimation area

(1) A carbon estimation area must:

(a) be within the project area;

(b) be a single area with an unbroken perimeter;

(c) consist of land with even-aged regeneration; and

(d) have a uniform land management regime across the area.

(2) A carbon estimation area must contain a model point location which must be located at the approximate centre of the carbon estimation area.

(3) The model point location within a carbon estimation area must not change unless the carbon estimation area is re-stratified in accordance with section 3.4.

(4) For this Division, a land management regime is uniform in an area if the native vegetation that is likely to regenerate will have the same mix of plant species across that area.

3.4 Re-stratification or re-classification of a carbon estimation area

(1) The project area, or a part of it, may be re-stratified only as provided in this Division.

(2) This section applies to a carbon estimation area if:

(a) the land management regime ceases to be uniform across the area;

(b) the regeneration of vegetation is heterogeneous or absent; or

(c) there is a significant disturbance event that kills trees.

(3) Any part of the area that can no longer be used to undertake the project activity must be defined as an exclusion area.

(4) The remainder of the area must be re-stratified into one or more carbon estimation areas in accordance with section 3.3.

(5) If a carbon estimation area is re-stratified, the new boundaries must be identified in the next offsets report that is submitted to the Regulator.

3.5 Requirements for an exclusion area

(1) Any land in the project area that:

(a) has forest cover immediately before project commencement;

(b) does not have forest potential at the time of stratification; or

(c) will not be used to undertake the project activity; or

(d) fails to regenerate after undertaking the project mechanisms;

must be defined as an exclusion area.

(2) An exclusion area must not contain a model point location.

(3) In the event that an area defined as an exclusion area exhibits regeneration as a result of the project mechanism, the area may be redefined as a carbon estimation area in accordance with sections 3.3 and 3.4.

3.6 Carbon estimation area boundaries

(1) The geographic boundaries of each carbon estimation area within the project area must be identified on a geospatial map in accordance with the CFI Mapping Guidelines.

(2) The boundaries must be identified before submitting the first offsets report to the Regulator.

(3) If a carbon estimation area is re-stratified, the new boundaries must be identified in the next offsets report that is submitted to the Regulator.

(4) Subject to subsections (6) and (7), the boundary of a carbon estimation area must be no more than:

(a) two metres from the stems of the regeneration; or

(b) the edge of the crown cover of the regeneration.

(5) If the proposed boundary of a carbon estimation area would overlap with the boundary of another carbon estimation area, then the boundary of each carbon estimation area must be located equidistant between the areas along the length of the area where the overlap would otherwise have occurred.

(6) For the avoidance of doubt, if any proposed boundary of a carbon estimation area would be outside the project area—then the boundary of the carbon estimation area must instead be aligned with the boundary of the project area.

(7) For the avoidance of doubt, if any proposed boundary of a carbon estimation area would result in the boundary overlapping the boundary of an exclusion area—then the boundary of the carbon estimation area must instead be aligned with the boundary of the exclusion area.

Division 3.3 Project operation

3.7 Commercial harvesting exclusion

(1) Biomass must not be removed from carbon estimation areas except in accordance with this section.

(2) Up to 10% of fallen timber may be removed from the project area in a calendar year for firewood for personal use.

3.8 Livestock restrictions

(1) If the human-assisted regeneration activity undertaken as part of the project includes the exclusion of livestock, then:

(a) livestock must be excluded from a carbon estimation area until such time as the regeneration in the carbon estimation area has achieved forest cover; and

(b) after the time specified in paragraph (a), livestock may be permitted in the carbon estimation area but must not prevent or inhibit the growth or maintenance of forest cover.

(2) For paragraph (1)(b), evidence must be provided that the presence of livestock has not prevented or inhibited the maintenance of forest cover.

(3) For any other human-assisted regeneration activity undertaken as part of the project, evidence must be provided that the presence of livestock in a carbon estimation area has not prevented the regeneration achieving forest cover.

Note Evidence required under section 3.8 may include date-stamped, geo-referenced remotely-sensed imagery.

3.9 Thinning permitted

Trees in a carbon estimation area may be thinned for ecological purposes, provided that the biomass resulting from thinning remains in the carbon estimation area.

3.10 Use of lime or fertiliser

Lime or fertiliser must not be used on land in a carbon estimation area.

Part 4 The net abatement amount

Division 4.1 The net abatement amount

4.1 The net abatement amount

Note See paragraph 106(1)(c) of the Act.

For an eligible offsets project to which this Determination applies, the carbon dioxide equivalent net abatement amount in relation to a reporting period for the project is taken to be the change in carbon stock for the project area less the project emissions—see section 4.15 and Equation 11.

Division 4.2 Calculations—Preliminary

4.2 General

In this Part:

(a) all calculations are in respect of activities undertaken, or outcomes achieved, during a reporting period for the eligible offsets project; and

(b) if a calculation refers to a factor or parameter prescribed in the *NGER Measurement Determination* or the *NGER Regulations*, the person carrying out the calculations must apply, to the whole reporting period, that factor or parameter from the *NGER Measurement Determination* or *NGER Regulations* in force at the time that the offsets report was submitted or was required to be submitted, whichever is earlier.

4.3 Greenhouse gas assessment boundary

When making calculations under this Part:

(a) the carbon pools and emission sources and the corresponding greenhouse gases in the following table must be taken into account; and

(b) no other gases, carbon pools or emission sources may be taken into account.

Table of gases accounted for in the abatement calculations

Carbon pools and emission sources	**Greenhouse gas**
Live above-ground biomass	Carbon dioxide (CO_2)
Live below-ground biomass	Carbon dioxide (CO_2)
Dead plant material and debris	Carbon dioxide (CO_2)
Fuel use	Methane (CH_4) Nitrous oxide (N_2O) Carbon dioxide (CO_2)
Fire	Methane (CH_4) Nitrous oxide (N_2O) Carbon dioxide (CO_2)

4.4 Baseline for the project

For the purposes of paragraph 106(4)(f) of the Act the baseline amount for a project in relation to a reporting period is:

(a) the carbon stock that the carbon estimation areas for the project would have had in the absence of the project if the land use and management had continued as they were during the baseline period for the project; and

(b) taken, for the purposes of this Methodology, to be zero provided that the conditions in section 2.4 are met.

Note The baseline amount will not normally be precisely zero for land that has forest potential, but will be small enough to be taken to be zero for the purposes of this Determination.

4.5 Forest potential required for modelling

(1) For the purposes of calculating carbon stock, the modelling commencement date in the RMT must be the date when sufficient regeneration has occurred to achieve forest cover as demonstrated by:

(a) remotely-sensed imagery;

(b) documented regeneration at the time of project commencement; or

(c) expert information about local growth rates and rainfall data, including number of stems per hectare.

(2) The carbon stock of a carbon estimation area that does not yet have forest potential must be recorded as zero.

4.6 Changes in carbon estimation areas

All calculations under this Part must be made on the basis of the carbon estimation areas of the project as they stood at the end of the current reporting period.

4.7 Use of Reforestation Modelling Tool

(1) The RMT must be used to determine the following amounts under Part 4:

(a) the initial carbon stock for each carbon estimation area ($IC_{CEA,i,rc}$) at the beginning of the reporting period;

(b) the carbon stock for a carbon estimation area at the end of the reporting period ($C_{CEA,i,rc}$);

(c) the tree layer carbon emitted to the atmosphere for each month of a reporting period ($M_{tree,i,t}$);

(d) the debris layer carbon emitted to the atmosphere for each month of a reporting period ($M_{debris,i,t}$); and

(e) the emissions from fire within a carbon estimation area ($E_{P,fire,rc}$).

(2) To determine the parameters specified in subsection (1), the project proponent must collect, provide and record input data to the RMT, in the format required by the tool, including the following information:

(a) the area and modelling point latitude and longitude data for each carbon estimation area; and

(b) forest management information as specified in section 5.5 for each carbon estimation area.

Model settings for RMT

(3) The 'mixed species environmental planting' species setting and the 'non-harvested regime, planting density: direct seeding' regime setting in the RMT must be used in conjunction with the information specified in subsection (2).

Division 4.3 Calculation of carbon stock change

4.8 Step 1—Calculate the initial carbon stock of the project area

(1) For the first offsets report, the initial carbon stock ($IC_{PA,rc}$) is:

(a) for a project other than a pre-existing project—zero; and

(b) for a pre-existing project—the carbon stock for the project area at the declaration date.

Note Paragraph (b) applies to a pre-existing project where the project began before the declaration date. The carbon stock that had accumulated by that date must be calculated because the project proponent is not entitled to credits for it.

(2) Initial carbon stock must be re-calculated for each reporting period, using the current version of the RMT, as follows:

$\mathbf{IC_{PA,rc} = \sum_{i=1}^{n} IC_{CEA,i,rc}}$	**Equation 1a**

Where:

$IC_{PA,rc}$ = initial carbon stock (in tonnes C) for the project area, calculated for the purposes of the current reporting period (rc).

$IC_{CEA,i,rc}$ = carbon stock (in tonnes C) for the i^{th} carbon estimation area within the project area on the declaration date, determined using the RMT as it stood at the end of the current reporting period (rc).

i = the i^{th} carbon estimation area, where n is the total number of carbon estimation areas within the project area.

Note As the RMT is updated, it is possible that the modelled output for initial carbon stock could change significantly. The calculation steps in this Division, which require initial carbon stocks to be modelled for each offset report, address the effects of changes in the model output resulting from RMT upgrades.

4.9 Step 2—Calculate the carbon stock of the project area at the end of a reporting period

The carbon stock for the project area must be calculated at the end of each reporting period as follows:

$\mathbf{C_{PA,rc} = \sum_{i=1}^{n} C_{CEA,i,rc}}$	**Equation 1b**

Where:

$C_{PA,rc}$ = carbon stock (in tonnes C) for the project area at the end of the current reporting period (rc).

$C_{CEA,i,rc}$ = carbon stock (in tonnes C) for the i^{th} carbon estimation area within the project area at the end of the current reporting period (rc), determined using the RMT.

i = the i^{th} carbon estimation area, where n is the total number of carbon estimation areas within the project area.

4.10 Step 3—Calculate the carbon stock change for the project area

(1) The carbon stock change for the project area for the first reporting period must be calculated as follows:

$\Delta C_{PA,rc} = C_{PA,rc} - IC_{PA,rc}$	**Equation 2a**

Where:

$\Delta C_{PA,rc}$ = carbon stock change (in tonnes C) for the project area for the first reporting period (rc).

$C_{PA,rc}$ = carbon stock (in tonnes C) for the project area at the end of the first reporting period (rc)—see Equation 1b.

$IC_{PA,rc}$ = initial carbon stock (in tonnes C) for the project area, calculated for the purposes of the first reporting period (rc)—see Equation 1a.

(2) The carbon stock change for the project area for subsequent reporting periods must be calculated as follows:

$\Delta C_{PA,rc} = (C_{PA,rc} - C_{PA,rp}) - (IC_{PA,rc} - IC_{PA,rp})$	**Equation 2b**

Where:

$\Delta C_{PA,rc}$ = carbon stock change (in tonnes C) for the project area for the current reporting period (rc).

$C_{PA,rc}$ = carbon stock (in tonnes C) for the project area at the end of the current reporting period (rc)—see Equation 1b.

$C_{PA,rp}$ = carbon stock (in tonnes C) for the project area at the end of the previous reporting period (rp)—see Equation 1b.

$IC_{PA,rc}$ = initial carbon stock (in tonnes C) for the project area, calculated for the purposes of the current reporting period (rc)—see Equation 1a.

$IC_{PA,rp}$ = initial carbon stock (in tonnes C) for the project area, calculated for the purposes of the previous reporting period (rp)—see Equation 1a.

4.11 Step 4—Convert the carbon stock change to CO_2-equivalent (CO_2-e)

The carbon stock change in CO_2-e for the project area for the reporting period is calculated as follows:

$\Delta C_{PA,CO_2,rc} = \Delta C_{PA,rc} \times \frac{44}{12} \times GWP_{CO_2}$	**Equation 3**

Where:

$\Delta C_{PA,CO_2,rc}$ = carbon stock change (in tonnes CO_2-e) for the project area for the current reporting period (rc).

$\Delta C_{PA,rc}$ = carbon stock change (in tonnes C) for the project area for the current reporting period (rc)—see Equation 2b.

GWP_{CO_2} = global warming potential of carbon dioxide as specified in the *NGER Regulations*.

Division 4.4 Calculation of project emissions

4.12 Step 1—Calculate methane and nitrous oxide emissions from fire

Emissions of methane (CH_4) and nitrous oxide (N_2O) as a result of fire events for the reporting period must be calculated in accordance with Equations 4 to 7 as follows:

$E_{P,CH_4,rc} = \sum_{i=1}^{n} \left(\sum_{t=t_p+1}^{t=t_c} (M_{tree,i,t} + M_{debris,i,t}) \times EF_{mass,CH_4} \times GWP_{CH_4} \right)$	**Equation 4**

Where:

$E_{P,CH_4,rc}$ = emissions of CH_4 (in tonnes CO_2-e) from biomass burning for the project area (E_P) for the current reporting period (rc).

$M_{tree,i,t}$ = tree layer carbon (in tonnes C) for each carbon estimation area (i), emitted to the atmosphere for each month (t) of the current reporting period (rc) determined using the RMT.

$M_{debris,i,t}$ = debris layer carbon (in tonnes C) for each carbon estimation area (i), emitted to the atmosphere for each month (t) of the current reporting period (rc) determined using the RMT.

EF_{mass,CH_4} = 7.182×10^{-3}—derived constant calculated from the product of carbon mass, emission factor and molecular mass fraction.

GWP_{CH_4}= global warming potential of methane as specified in the *NGER Regulations*.

i= the i^{th} carbon estimation area, where n is the total number of carbon estimation areas within the project area.

t = month in the current reporting period, where t_p is the last month of the previous reporting period and t_c is the last month of the current reporting period.

(1) Emissions of nitrous oxide due to biomass burning for the reporting period are calculated as follows:

$$\mathbf{E_{P,N_2O,rc}} = \sum_{\mathbf{i=1}}^{\mathbf{n}} \left(\sum_{\mathbf{t=r_p+1}}^{\mathbf{t=r_c}} \left(\mathbf{M_{tree,i,t}} + \mathbf{M_{debris,i,t}} \right) \times \mathbf{EF_{mass,N_2O}} \times \mathbf{GWP_{N_2O}} \right) \qquad \textbf{Equation 6}$$

Where:

$E_{P,N_2O,rc}$ = emissions of N_2O (in tonnes CO_2-e) from biomass burning for the project for the current reporting period (rc).

$M_{tree,i,t}$ = tree layer carbon (in tonnes C) for each carbon estimation area (i), emitted to the atmosphere for each month (t) of the reporting period determined using the RMT as it stood at the end of the current reporting period (rc).

$M_{debris,i,t}$= debris layer carbon (in tonnes C) for each carbon estimation area (i), emitted to the atmosphere for each month (t) of the reporting period determined using the RMT as it stood at the end of the current reporting period (rc).

EF_{mass,N_2O}= 1.329×10^{-5}—derived constant, calculated from the product of carbon mass, emission factor and molecular mass fraction.

GWP_{N_2O}= global warming potential of nitrous oxide as specified in the *NGER Regulations*.

i= the i^{th} carbon estimation area, where n is the total number of carbon estimation areas within the project area.

t = month in the current reporting period, where t_p is the last month of the previous reporting period and t_c is the last month of the current reporting period.

(2) Total emissions due to biomass burning for the reporting period are calculated as follows:

$\mathbf{E_{P,fire,rc} = E_{P,CH_4,rc} + E_{P,N_2O,rc}}$	**Equation 7**

Where:

$E_{P,fire,rc}$ = total emissions (in tonnes CO_2-e) from biomass burning for the project for the current reporting period (rc).

$E_{P,CH_4,rc}$ = emissions of CH_4 (in tonnes CO_2-e) from biomass burning for the project for the current reporting period (rc)—see Equation 4.

$E_{P,N_2O,rc}$ = emissions of N_2O (in tonnes CO_2-e) from biomass burning for the project for the current reporting period (rc)—see Equation 6.

4.13 Step 2—Calculate emissions from fuel use

(1) The fuel emissions from a fossil fuel that is combusted while carrying out a project activity in the project area must be calculated in accordance with Equations 8 to 10.

(2) For the purpose of Equations 8 to 10, where fuel use occurs while carrying out a project activity outside the boundaries of any carbon estimation area, the quantity of fuel used must be included in the calculation of fuel emissions.

(3) The quantity of fuel used for each fuel type (f) for the project for the current reporting period is calculated as follows:

$\mathbf{Q_{P,f,rc} = \sum_{t=t_p+1}^{t=t_c} Q_{P,f,t}}$	**Equation 8**

Where:

$Q_{P,f,rc}$ = quantity of fuel type (f) (in kilolitres) combusted within the current reporting period (rc).

$Q_{P,f,t}$ = quantity of fuel type (f) (in kilolitres) combusted for the period t_p to t_c for:

(a) stationary energy purposes; and

(b) transport energy purposes.

t = month in the current reporting period, where t_p is the last month of the previous reporting period and t_c is the last month of the current reporting period.

(4) The fuel emissions for each fuel type (f) and each greenhouse gas type (j) (carbon dioxide, nitrous oxide and methane) for the reporting period is calculated as follows:

$\mathbf{E_{P,f,j,rc}} = \dfrac{\mathbf{Q_{P,f,rc}} \times \mathbf{EC_f} \times \mathbf{EF_{fj,oxec}}}{\mathbf{1000}}$	**Equation 9**

Where:

$E_{P,f,j,rc}$= fuel emissions for each fuel type (f) and each greenhouse gas (j) for the current reporting period (rc).

$Q_{P,f,rc}$ = quantity of fuel type (f) (in kilolitres) combusted within the current reporting period (rc)—see Equation 8.

EC_f = energy content factor of fuel type (f) (gigajoules per kilolitre), as prescribed in Schedule 1 of the *NGER Measurement Determination.*

$EF_{fj,oxec}$ = emission factor for gas type (j) (carbon dioxide, nitrous oxide and methane)for fuel type (f) (in kilograms CO_2-e per gigajoule) as prescribed in Schedule 1 of the *NGER Measurement Determination.*

(5) The total fuel emissions for the project for the reporting period are calculated as follows:

$\mathbf{E_{P,E,rc}} = \sum_{\mathbf{i=1}}^{\mathbf{p}} \sum_{\mathbf{j=1}}^{\mathbf{q}} \mathbf{E_{P,f,j,rc}}$	**Equation 10**

Where:

$E_{P,E,rc}$= total project fuel emissions (in tonnes CO_2-e) for the current reporting period (rc).

$E_{P,f,j,rc}$= fuel emissions for each fuel type (f) and each greenhouse gas (j) (carbon dioxide, nitrous oxide and methane) (in tonnes CO_2-e) for the current reporting period (rc)—see Equation 9.

f= denotes the f^{th} type of fuel, where p is the number of different types of fuel.

j= denotes the j^{th} type of greenhouse gas (carbon dioxide, methane or nitrous oxide) emitted where q is the number of different types of greenhouse gases emitted from combustion of fuel type (f).

4.14 Total project emissions

Note The total project emissions in CO_2-e for the project for a reporting period are the sum of the total emissions due to biomass burning as specified in section 4.12 and the total emissions from fuel use as specified in section 4.13.

Division 4.5 Calculating the carbon dioxide equivalent net abatement amount

4.15 Calculating the carbon dioxide equivalent net abatement amount

Note See paragraph 106(1)(c) of the Act.

For an eligible offsets project to which this Determination applies, the carbon dioxide equivalent net abatement amount for the project in relation to a reporting period is taken to be the amount ($A_{P,rc}$) calculated as follows:

$\mathbf{A_{P,rc} = \Delta C_{P,CO_2,rc} - E_{P,fire,rc} - E_{E,rc}}$	**Equation 11**

Where:

$A_{P,rc}$ = project abatement (in tonnes CO_2-e) for the current reporting period (rc).

$\Delta C_{P,CO_2,rc}$ = carbon stock change (in tonnes CO_2-e) for the project for the current reporting period (rc)—see Equation 3.

$E_{P,fire,rc}$ = total project emissions from biomass burning (in tonnes CO_2-e) for the current reporting period (rc)—see Equation 7.

$E_{E,rc}$ = total project fuel emissions (in tonnes CO_2-e) for the current reporting period (rc)—see Equation 10.

Part 5 Monitoring, record-keeping and reporting requirements

Note See subsection 106(3) of the Act.

Division 5.1 General

5.1 Application

For subsection 106(3) of the Act, a project proponent of an eligible offsets project to which this Determination applies must comply with the monitoring, record-keeping and reporting requirements of this Part.

5.2 Geospatial information requirements

The CFI Mapping Tool or a geographic information system that meets the requirements of the CFI Mapping Guidelines must be used to monitor and report on geospatial information in accordance with the CFI Mapping Guidelines.

Division 5.2 Monitoring requirements

5.3 Project monitoring

(1) A project proponent must monitor the carbon estimation areas of the project for compliance with Part 3.

(2) A project proponent must monitor disturbance events within the project area and provide the relevant information required by the RMT.

Note Monitoring specified in this section may be done by ground observation or remotely-sensed imagery.

Division 5.3 Record-keeping requirements

5.4 Records that must be kept

The project proponent must create and maintain the following records:

(a) evidence of the commencement of one or more human-assisted regeneration activities that resulted in or could result in the establishment of forest cover;

(b) evidence of the suppression activities for the 10 years prior to project commencement;

(c) evidence that regeneration over the baseline period is taken to be zero in accordance with section 2.4;

(d) a description of how carbon estimation areas were identified and evidence to support stratification and re-stratification (such as remotely-sensed imagery, soil, vegetation and landform maps);

(e) evidence of plant species or species mix regenerating within the project area;

(f) date stamped RMT output files (.rmd file) for each carbon estimation area in a project area;

(g) forest management information as set out in section 5.5;

(h) project area information as set out in section 5.6;

(i) all input data for the RMT;

(j) the result of each Equation in Part 4; and

(k) records relating to fuel use on project activities.

Note For example records could include invoices, vehicle logbooks, records of project activity, or reports of calculated consumption based on hourly or per hectare consumption rates.

If fuel use records for project activities cannot be disaggregated from other non-project activities, estimates of project fuel use may be based on the time spent undertaking project activities and the known average fuel consumption of vehicles or machinery.

5.5 Forest management information

Forest management information includes:

(a) in relation to each carbon estimation area:

(i) evidence that there was no forest cover before project commencement;

(ii) evidence of forest potential, including:

(A) estimated tree density (stems per hectare);

(B) anticipated crown cover at maturity; and

(iii) the modelling commencement date;

(b) the information required as inputs to the RMT, including:

(i) type and timing of management events; and

(ii) type, timing and extent of disturbance events;

Note For example, these include management events such as thinning, regeneration, weed control and disturbance events such as fire.

(c) a description of any management actions or disturbance events that affected a carbon estimation area during the reporting period, including actions proposed and undertaken to ensure that carbon stocks are restored; and

(d) evidence that grazing, if any, has not affected forest cover.

5.6 Project area information

Project area information includes:

(a) geospatial maps that identify:

(i) the project area;

(ii) carbon estimation areas;

(iii) exclusion areas; and

(iv) carbon estimation area model points; and

(b) a list of names or other labels used to identify the project area and associated carbon estimation areas if the information specified in paragraph (a) is not clearly visible on the maps.

Division 5.2 Offsets report requirements

5.7 Information that must be included in first offsets report

The following information must be included in the first offsets report for a project to which this Determination applies:

(a) carbon dioxide equivalent net abatement amount for the project;

(b) carbon stock change for the first reporting period for the project;

(c) total emissions due to biomass burning for the project;

(d) fossil fuel use in relation to project activities;

(e) calculated emissions arising from the fossil fuel use;

(f) initial carbon stock for the first reporting period;

(g) where project commencement occurred before the declaration date, the initial carbon stock for the project at the declaration date;

(h) carbon stock for the project at the end of the reporting period;

(i) forest management information set out in section 5.5;

(j) project area information set out in section 5.6; and

(k) date stamped RMT output files (.rmd file) for each carbon estimation area in the project area.

5.8 Subsequent reporting periods

The following information must be included in the second and subsequent offsets reports:

(a) carbon dioxide equivalent net abatement amount for the project for the reporting period;

(b) carbon stock change for the project for the reporting period;

(c) total emissions due to biomass burning for the project;

(d) an estimate of fossil fuel use in relation to project activities;

(e) calculated emissions arising from the fossil fuel use;

(f) initial carbon stock for the project;

(g) carbon stock for the project at the end of the reporting period;

(h) forest management information in section 5.5 and any change to the forest management information provided in the previous reporting period;

(i) any change to the carbon estimation area or exclusion area information provided in the previous reporting period; and

(j) date stamped RMT output files (.rmd file) for each carbon estimation area in the project area.

Note

1. All legislative instruments and compilations are registered on the Federal Register of Legislative Instruments kept under the *Legislative Instruments Act 2003*. See http://www.frli.gov.au.