EXPLANATORY STATEMENT

Carbon Credits (Carbon Farming Initiative) Act 2011

Carbon Credits (Carbon Farming Initiative—Facilities) Methodology Determination 2015

Background: Emissions Reduction Fund

The *Carbon Credits (Carbon Farming Initiative) Act 2011* (the Act) enables the crediting of greenhouse gas abatement from emissions reduction activities across the economy. Greenhouse gas abatement is achieved either by reducing or avoiding emissions or by removing carbon from the atmosphere and storing it in soil or trees.

In 2014, the Parliament passed the *Carbon Farming Initiative Amendment Bill 2014*, which establishes the Emissions Reduction Fund (ERF). The ERF has three elements: crediting emissions reductions, purchasing emissions reductions, and safeguarding emissions reductions.

Emissions reduction activities are undertaken as offsets projects. The process involved in establishing an offsets project is set out in Part 3 of the Act. An offsets project must be covered by, and undertaken in accordance with, a methodology determination.

Subsection 106(1) of the Act empowers the Minister to make, by legislative instrument, a methodology determination. The purpose of a methodology determination is to establish procedures for estimating abatement (emissions avoidance or sequestration) from eligible projects and rules for monitoring, record-keeping and reporting. These methodologies will ensure that emissions reductions are genuine—that they are both real and additional to business as usual.

In deciding to make a methodology determination, the Minister must have regard to the advice of the Emissions Reduction Assurance Committee (ERAC), an independent expert panel established to advise the Minister on proposals for methodology determinations. The Minister must not make or vary a methodology determination if the ERAC considers it inconsistent with the offsets integrity standards, which are set out in section 133 of the Act. The Minister must also consider any adverse environmental, economic or social impacts likely to arise from the carrying out of the kind of project to which the determination applies.

Offsets projects that are undertaken in accordance with the methodology determination and approved by the Clean Energy Regulator (the Regulator) can generate Australian Carbon Credit Units (ACCUs), representing emissions reductions from the project.

Project proponents can receive funding from the ERF by submitting their projects into a competitive auction run by the Regulator. The Government will enter into contracts with successful proponents, which will guarantee the price and payment for the future delivery of emissions reductions.

Further information on the ERF is available on the Department of the Environment website, www.environment.gov.au/emissions-reduction-fund.

Background: Facilities

The Government outlined in the Emissions Reduction Fund White Paper that facility-wide methods will be developed using existing data under the National Greenhouse and Energy Reporting (NGER) scheme to encourage abatement from a wide range of activities.

The *Carbon Credits (Carbon Farming Initiative—Facilities) Methodology Determination 2015* (the Determination) provides a high-level, activity-neutral framework within which proponents can calculate abatement from facilities that report under the NGER scheme. This approach provides flexibility for project proponents to determine what abatement activities are most appropriate for each facility and encourages innovation in project design.

Projects undertaken under the Determination could potentially lower facility energy costs and improve productivity, while also lowering emissions. For example, projects established under the Determination may include:

- replacing or modifying boilers;
- improving control systems and processes;
- waste heat capture and re-use;
- upgrading turbines;
- improving the efficiency of crushing or grinding equipment;
- replacing low efficiency motors, fans and pumps with high efficiency versions;
- installing variable speed drives;
- improving compressed air processes;
- reducing industrial process emissions;
- behavioural changes;
- installing low emissions-intensity electricity generation equipment; and
- fuel switching.

Any project that occurs under the Determination must take place at a facility that has submitted reports under the NGER scheme.

To reduce any reporting burden, the Determination allows project proponents to use data already reported under the NGER scheme to calculate emissions reductions. All eligible projects will be able to receive ACCUs for emissions reductions from eligible NGER facilities for a seven year crediting period.

The Determination credits NGER facilities for improvements in the level of emissions per unit of output (also referred to as a reduction in emissions intensity of one or more production variables). In broad terms, a facility receives credits equal to its reduction in emissions intensity (compared to its baseline level), multiplied by its total output in the crediting period. This crediting approach broadly assumes that the relationship between emissions and production is linear.

Because the Determination has been designed with large facilities in mind, which have the potential to provide large quantities of abatement from a wide range of operational changes (large or small), this methodology is conservative in its approach to crediting abatement. In particular, baselines are set based on the NGER reporting year with the lowest emissions per unit of product over the four year period preceding the project.

Furthermore, emissions reductions in an NGER reporting year are capped at 100,000 tonnes of carbon dioxide equivalent (CO_2-e) per facility unless a statement has been provided by the chief financial officer (however described) that the abatement activities would not have gone ahead in the absence of credits provided under the *Carbon Credits (Carbon Farming Initiative) Act 2011*.

Application of the Determination

The Determination sets out the detailed rules for implementing and monitoring an eligible offsets project at a facility (or group of facilities) reporting under the *National Greenhouse and Energy Reporting Act 2007* (the NGER Act).

Proponents are encouraged to read the Determination in combination with any applicable regulations, rules, and guidance documents.

The Determination reflects the requirements of the Act's offsets integrity standards and helps to ensure that emissions reductions are real and additional to business as usual. The offsets integrity standards require that an eligible project should result in carbon abatement that is unlikely to occur in the ordinary course of events, and is eligible carbon abatement under the Act. The offsets integrity standards also require that:

- amounts are measurable and capable of being verified;
- the methods used are supported by clear and convincing evidence;
- material emissions which are a direct consequence of the project are deducted; and
- estimates, assumptions or projections used in the Determination should be conservative.

Project proponents that wish to implement projects under the Determination must make an application to the Regulator under section 22 of the Act. They must also meet the general eligibility requirements for an offsets project set out in subsection 27(4) of the Act, which include compliance with the requirements set out in the Determination, and the additionality requirements in subsection 27(4A) of the Act. The additionality requirements are:

- the newness requirement;
- the regulatory additionality requirement; and
- the government program requirement.

The government program requirement is provided for in the *Carbon Credits (Carbon Farming Initiative) Rule 2015* (the legislative rule). Subsection 27(4A) of the Act provides that a methodology determination may specify requirements in lieu of the Act's newness requirement or the regulatory additionality requirement. Section 19 of the Determination specifies a requirement in lieu of the newness requirement for facilities projects. The regulatory additionality requirement in the Act applies to facilities projects.

Public Consultation

The Determination has been developed by the Department of the Environment in collaboration with a technical working group of experts from industry and the Regulator. The technical working group reviewed several draft versions of the Determination.

The Determination also benefited from a public consultation period that ran from 15 October 2014 to 12 November 2014. Four submissions were received. Details of the non-confidential submissions are provided on the Department of the Environment website: www.environment.gov.au/emissions-reduction-fund.

Determination Details

Details of the Determination are at Attachment A. Numbered sections in this explanatory statement align with the relevant sections of the Determination. The definition of terms highlighted in ***bold italics*** can be found in the Determination.

For the purpose of subsections 106(4), (4A) and (4B) of the Act, in making this Determination the Minister has had regard to, and agrees with, the advice of the ERAC that the Determination complies with the offsets integrity standards and that the proposed Determination should be made. The Minister is satisfied that the carbon abatement used in ascertaining the carbon dioxide equivalent net abatement amount for a project is eligible carbon abatement from the project. The Minister also had regard to whether any adverse environmental, economic or social impacts are likely to arise from the carrying out of the kind of project to which the Determination applies and other relevant considerations.

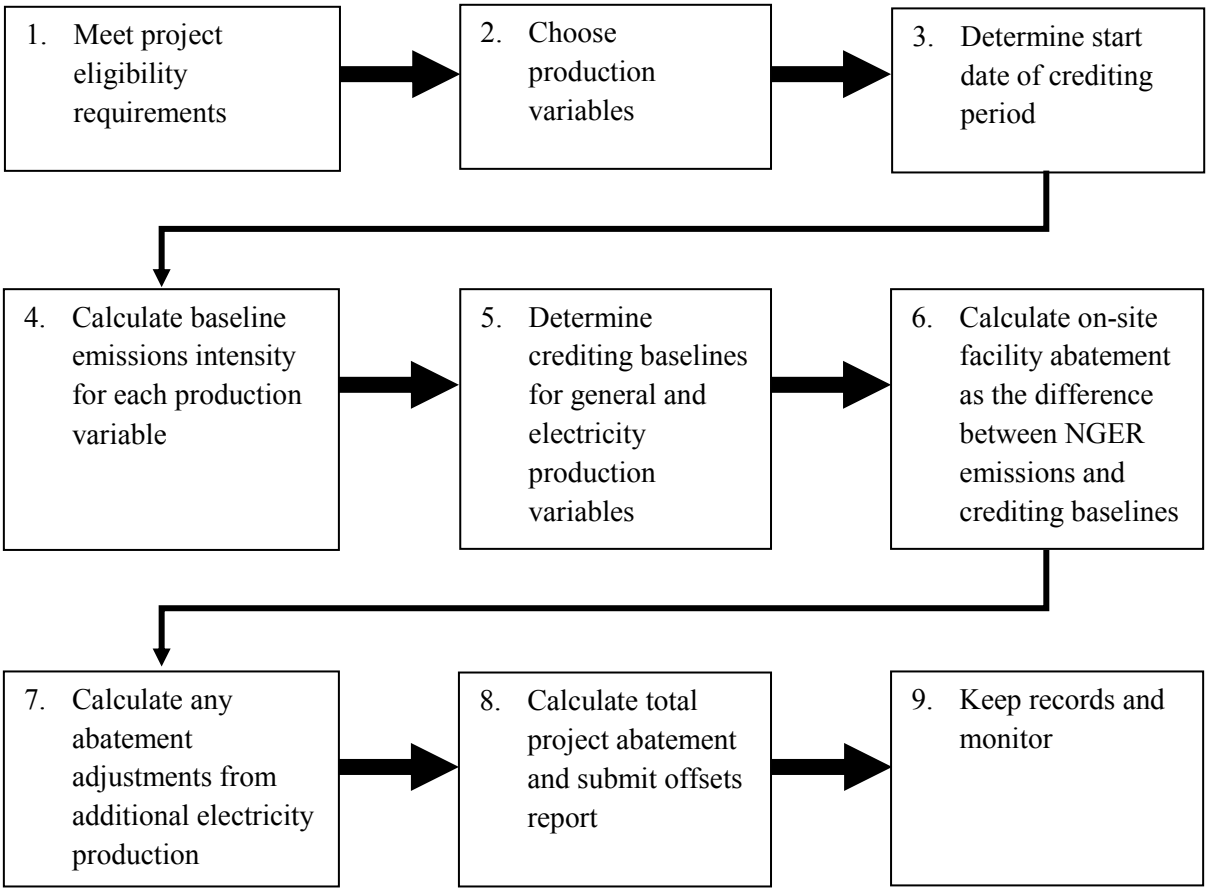
Subitem 393A(2) of Schedule 1 of the *Carbon Farming Initiative Amendment Act 2014* operated in relation to this Determination to deem the request to the Interim ERAC to be the relevant request to the statutory ERAC under subsection 106(10) of the Act. Subitem 393A(3) then allowed the ERAC to consider the consultation on the exposure draft which occurred before 13 December 2014 and not re-open consultation under section 123D of the Act.

A Statement of Compatibility prepared in accordance with the *Human Rights (Parliamentary Scrutiny) Act 2011* is at Attachment B.

Guide to navigating the Determination

The following section describes how a prospective project proponent could navigate through the Determination in determining eligibility, calculating baselines and subsequently, calculating abatement.

Overview of steps involved



1. Meeting project eligibility requirements

To establish a project under the Determination, a prospective project proponent must register his or her project with the Regulator, which involves providing the details of each facility under the project, the production variable(s) that will be used in the calculation of abatement, and a *statement of activity intent* for each facility, signed by an officer of the person that has operational control over the facility (see section 18). The statement of activity intent must be in the form approved by the Regulator. It must state that all project abatement activities that the project proponent intends to implement (or has implemented) at the time the statement is made would not be (or would not have been) implemented during the crediting period at the facility in the absence of a declaration of the project as an eligible offsets project.

The project proponent can choose whether the statement is signed by the chief financial officer or another officer. However, if the statement is not signed by the chief financial officer, then the abatement from that facility will be capped at 100,000 tonnes of CO_2-e per NGER reporting year. If the statement is signed by the chief financial officer, abatement is not capped. A proponent can provide the statement signed by the chief financial officer as part of the application for project declaration, or alternatively they can provide the statement prior to submitting an offsets report.

Part 3 of the legislative rule specifies other information that is required at project registration.

To have a project declared and maintained as an eligible offsets project by the Regulator, the eligibility requirements in Part 3 of the Determination must be met (see sections 15 to 17). Section 15 establishes a number of minimum requirements, including that each facility must have submitted NGER reports over the project's baseline period (see section 5), and that no facility can have experienced major changes in the four NGER reporting years before the NGER reporting year in which the first abatement activity begins to be implemented. Section 5 sets out what constitutes a major change.

The Determination also identifies a number of ineligible activities, such as activities that generate abatement simply by changing the level of a production variable (see subsection 15(5)), and activities undertaken at a transport facility (see paragraph 15(2)(f)). Other ineligible activities are listed in section 8 of the Determination, and include activities that are undertaken as part of another eligible offsets project, activities that result in an increase in fugitive emissions, and some activities that increase emissions outside the project boundary.

2. Choosing production variables

Project proponents need to choose production variables in accordance with section 16 or 17. Production variables are used to calculate the level of baseline emissions in an NGER reporting year. By default, production variables are outputs. If there is more than one output, project proponents may be able to group similar outputs together. In certain circumstances, projects proponents may be able to use an input or intermediate product (or a group of similar inputs or intermediate products) as the production variable instead of using outputs.

3. Determining the start date of the crediting period

After registering their project with the Regulator, the project proponent may undertake the project abatement activity, or activities. Project proponents must also choose a crediting period start date, which may be up to 18 months after project declaration (see subsection 69(5) of the Act).

The first reporting period starts in conjunction with the start of the crediting period. Should the crediting period end during the final NGER reporting year of the project, abatement for the final reporting period is based on the percentage of the final NGER reporting year that is covered by the final reporting period (see subsection 25(2)).

4. Calculating the baseline emissions intensity for each production variable

To calculate the level of abatement from a project, the level of baseline emissions, or the crediting baseline, must be determined for each facility. The crediting baseline represents the emissions that would have occurred had the project not been undertaken. The crediting baseline for a facility is calculated using the baseline emissions intensity for each of the facility's production variables.

Part 4 Division 5 sets out how the baseline emissions intensity of a production variable is calculated. Using an emissions intensity approach prevents over or under crediting in the event a facility's production levels change during the crediting period, and is consistent with standard calculation practices for avoided emissions projects of the type covered by this Determination.

The emissions intensity of a production variable is equal to baseline NGER emissions attributable to the production variable, divided by the quantity of the production variable. Subdivision B of Part 4 Division 5 sets out how to attribute emissions to a production variable, including apportioning emissions where there are multiple production variables.

The baseline emissions intensity of a production variable is the lowest annual emissions intensity of a production variable out of all the NGER reporting years in a project's baseline period. The NGER reporting year in which the lowest annual emissions intensity occurred is referred to as the baseline year.

Subdivision C of Part 4 Division 5 describes how project proponents need to recalculate emissions intensity due to changes in factors used in a facility's NGER report, changes in the amount of processing a production variable goes through within a facility, or the discovery of an error that affects the baseline period.

5. Determining crediting baselines for general and electricity production variables

The Determination includes two types of crediting baselines: the *crediting baseline (general)*, which represents the baseline level of emissions associated with one or more non-electricity production variables; and the *crediting baseline (electricity)*, which represents the baseline level of emissions where exported electricity is a production variable.

The crediting baseline (general) for a facility in an NGER reporting year during the crediting period is calculated as the sum of each production variable's baseline emissions intensity multiplied by its quantity of production in that year (see section 30).

Similarly, the crediting baseline (electricity) is calculated by multiplying the baseline emissions intensity of on-site generated and exported electricity (see section 55) by the quantity of electricity generated and exported from the facility, less any additional electricity that is exported as result of efficiency improvements achieved by the project (see section 31). The crediting baseline (electricity) also includes a component for calculating abatement from new generating units that have replaced generating units that were operating during the baseline period, when the new units have an emissions intensity lower than the grid average.

6. Calculating on-site facility abatement as the difference between NGER emissions and the crediting baselines

Abatement in an NGER reporting year from each facility under the project, called the on-site facility abatement amount, is calculated in section 27 as the difference between the crediting baselines (both general and electricity), and the corresponding emissions in the NGER reporting year (see sections 44 and 45).

Where an ineligible activity occurs at a facility in an NGER reporting year, the resulting abatement is removed in equation 5 (see section 28).

To avoid penalising genuine attempts to reduce emissions, should emissions at the facility be greater than the sum of the crediting baselines, the on-site facility abatement amount is taken to be zero, unless the facility abatement calculation requires an electricity abatement adjustment as described in Step 7 (see subsection 27(2)).

7. Calculate any abatement adjustments from additional electricity production

Project proponents who increase the efficiency with which they generate electricity for export, or who install new generating units that export electricity, must use the electricity abatement adjustments in sections 46 to 54. These adjustments account for the difference in the emissions intensity of the facility's electricity generation and that of other generators' output that is displaced as a result of the project.

8. Calculate total project abatement and submit offsets report

Abatement for the project as a whole is calculated under equation 1 in section 25 as the sum of abatement from each facility.

If the project proponents have chosen to provide a statement of activity intent signed by the chief financial officer of each facility involved in the project, then abatement is uncapped. However, if proponents have provided a statement signed by an officer other than the chief financial officer of a facility, abatement from that facility is capped at 100,000 tonnes of CO_2-e for the year.

Should the sum of abatement from all the facilities be a negative number, the project abatement amount is taken to be zero to avoid penalising genuine attempts to reduce emissions (see subsection 25(3)).

Project proponents must submit an offsets report in accordance with Part 5 Division 1 of the Determination.

9. Keep records and monitor

Project proponents must keep relevant records and monitor certain parameters in accordance with the Act, the legislative rules, and Part 5 of the Determination.

Details of the Methodology Determination

Part 1 Preliminary

1 Name

Section 1 sets out the full name of the Determination, which is the *Carbon Credits (Carbon Farming Initiative—Facilities) Methodology Determination 2015.*

2 Commencement

Section 2 provides that the Determination commences on the day after it is registered on the Federal Register of Legislative Instruments.

3 Authority

Section 3 provides that the Determination is made under subsection 106(1) of the Act.

4 Duration

Under subparagraph 122(1)(b)(i) of the Act, a methodology determination remains in force for the period specified in the Determination.

Section 4 specifies that the Determination will cease to be in force on the day before it would otherwise be repealed under subsection 50(1) of the *Legislative Instruments Act* 2003, that is, the day before 1 April or 1 October following the tenth anniversary of registration of the Determination on the Federal Register of Legislative Instruments.

However, the Determination will cease to be in force earlier if it is revoked in accordance with section 123 of the Act or section 42 of the *Legislative Instruments Act 2003*.

If the Determination expires in accordance with section 122 or is revoked in accordance with section 123 during a crediting period for a project to which the Determination applies, it will continue to apply to the project during the remainder of the crediting period under subsections 125(2) and 127(2) of the Act. Project proponents may apply to the Regulator during a reporting period to have a different methodology determination apply to their projects from the start of that reporting period (see subsection 128(1) of the Act).

Under section 27A of the Act, the ERAC may also suspend the processing of applications under a determination if there is reasonable evidence that the determination does not comply with one or more of the offsets integrity standards. This does not impact applications for declaration already received by the Regulator before such a suspension occurs, or declared eligible offset projects that already apply this Determination.

5 Definitions

Section 5 defines a number of terms used in the Determination.

Under section 23 of the *Acts Interpretation Act 1901*, words in the Determination in the singular number include the plural, and words in the plural number include the singular.

Generally, where terms are not defined in the Determination, they have the meaning given by section 5 of the Act. Key definitions in section 5 of the Determination include those set out below.

Baseline period refers to the four consecutive NGER reporting years preceding the start of the project. Data in this period will be used to set the crediting baseline against which abatement will be measured.

The start of the project is considered to be the commencement of the crediting period, not the date of declaration of the project, unless those two dates are the same. The start of the crediting period can be delayed in accordance with subsection 69(5) of the Act, which provides for the proponent to choose the start of the crediting period up to 18 months after project declaration.

A project proponent is expected to be able to obtain emissions and production variable data from the current person with operational control of a facility. If the ownership or operational control of a facility has changed in the preceding years, a project proponent is still expected to obtain the relevant data.

The NGER reporting years in the baseline period are immediately followed by the NGER reporting years referred to when calculating abatement in the crediting period. This means that the baseline period can continue after project registration until the end of the last full NGER reporting year before the crediting period starts.

By-products and ***waste-products*** are products that result from a facility's production processes set up for the purpose of producing another product. They will be disposed of without undergoing any further processing by the facility, except for processing in accordance with standard industry practice. ***By-products*** and ***waste products*** differ in that a ***by-product*** is a product that may be sold or gifted by the facility for potential reuse, whereas a ***waste product*** will not be sold or gifted and will be disposed of in a final way (for example to landfill).

An ***essential component*** of a generating unit is defined as the generator of electricity and any related equipment that comprise the generating unit. This equipment is the equipment related to the generator that is essential to its functioning as a single entity. This definition only applies where the concept of essential component is used in the context of generating units. Any other mentions of an essential component take on the ordinary English language meaning.

Excluded NGER fugitive emissions refers to fugitive emissions estimated under the following sections of the ***NGER (Measurement) Determination***:

- Part 3.2 (fugitive emissions from coal mining);
- Division 3.3.2 (fugitive emissions from venting or flaring from oil or gas exploration activities);
- Subdivision 3.3.3.3 (fugitive emissions from crude oil production (flared));
- Subdivision 3.3.3.4 (fugitive emissions from crude oil production (non flared));
- Subdivision 3.3.5.2 (fugitive emissions from deliberate releases from process vents, system upsets and accidents during crude oil refining activities);
- Subdivision 3.3.5.3 (fugitive emissions released from gas flared from oil refineries);

- Division 3.3.9 (fugitive emissions from venting or flaring from natural gas production or processing activities); and
- Part 3.4 (fugitive emissions from the transport of captured carbon dioxide).

These emissions are excluded from calculations of the net abatement amount as they are highly variable and are generally poorly correlated with production. This variability could lead to abatement reported by the project to be either artificially enhanced or offset.

Generating unit (existing, new and replaced) and shared generating equipment: The concept of a ***generating unit***, as used in the Determination, is intended to replicate the concept used in many facilities that generate electricity, where the facility is divided into a number of largely independent generating units. In the case of a coal-fired power station, a single generating unit may consist of a boiler, turbine and transformer, as well as other related equipment that is used solely by that generating unit.

A facility may also contain equipment that is used to generate electricity, but that is not part of a particular generating unit, and instead is shared between multiple generating units. In the Determination, this is described as ***shared generating equipment***. For a facility for which electricity is the only production variable, for example a power station, shared equipment includes all equipment or processes that are not used to produce electricity, and all equipment that is used by more than one generating unit. This may include a cooling pump that is used to cool multiple generating units or emissions associated with running the facility's office. For a facility for which electricity is not a production variable, or not the only production variable, shared equipment includes equipment that is used in the production of electricity and is used by multiple generating units, such as a cooling pump.

When a facility generates electricity and exports it from the facility, the approach used by the Determination to calculate abatement requires that, during the crediting period, all generating units at the facility are classified as ***existing generating units, new generating units*** or ***replaced generating units***.

The Determination distinguishes between new, existing and replaced generating units to determine the abatement associated with improving the emissions intensity of output, and from displacing more emissions intensive generation elsewhere in an electricity network. Section 59 provides an example of a facility with multiple generating units, and how the different units are categorised when equipment is added or replaced.

For generating units that are generating electricity during an NGER reporting year in the crediting period, they are classified either as ***new generating units*** or ***existing generating units***. If a generating unit was built after the baseline year, or it was built before or during the baseline year but did not generate electricity in the baseline year, it is classified as new. Also, if a generating unit did generate electricity during the baseline year but has had an ***essential component*** replaced or installed since the baseline year, then it is also considered to be new. In this case, that same generating unit, operating during the baseline year, is classified as replaced.

If a generating unit was generating electricity during the baseline year, but does not generate electricity during an NGER reporting year, it is classified as a replaced generating unit for that NGER reporting year. However, if the generating unit only operates for a part of the NGER reporting year (even just one hour) then it would still be considered to be existing. It would need to cease operating for the entire year if it is to be considered replaced. Note that this classification does not require the equipment to be removed from the facility or a new generating unit to be built in its place. If the unit generates electricity in a subsequent NGER reporting year, it would no longer be classified as replaced.

If a generating unit was generating electricity during the baseline year, is generating electricity in the NGER reporting year, and has had no essential components replaced or installed since the baseline year, then it is generally classified as an ***existing generating unit***. The exception to this is the case where ***shared generating equipment*** is added or replaced at the facility.

If emissions from ***shared generating equipment*** that is added or replaced at the facility are, individually or in aggregate, greater than or equal to 10,000 tonnes of CO_2-e or 5 per cent of the emissions associated with any of the generating units using the equipment (whichever is least), then all the generating units using that equipment are classified as new.

Input purity refers to the percentage of the total quantity of an input that represents, or is required to produce, the key substance of value in the output produced from the processing of the input. In some circumstances, including where chemical processing occurs, the key substance of value in the output may not be present in the input. For this reason, proponents should consider the purity of the input substance that is used to produce the output, whether or not it is the same as the key substance of value in the output.

Major change refers to a significant event occurring at the facility during the baseline period that affects the comparability of data before and after the major change. A lack of data comparability will have implications for setting the crediting baseline. Significant events include ***ramp-up***, ***significant expansions***, ***major disruption to production***, and a ***significant output variable change*** as defined in the Determination. To be eligible to undertake a facilities project, a facility cannot have undergone a major change during the baseline period (subsection 15(2)). Two of the events described under a major change are also applicable in a reporting period. If a facility undergoes a significant expansion or significant output variable change in a reporting period, abatement from the facility is taken to be zero under subsection 27(4). Each type of major change is to be considered in isolation of the others.

Major disruption to production can involve either a maintenance activity or a ***plant shutdown*** (***disrupting activities***) that significantly affects the level of production during an NGER reporting year. Disrupting activities, on their own or in combination with one or more other disrupting activities, amount to a major disruption to production if they coincide with a 10 per cent or more difference in the emissions intensity of a production variable for the facility in comparison to the ***NGER reporting year*** preceding or following the activity. Disruption activities would include both intentional and unintentional maintenance, such as preventative maintenance and repairs to equipment.

NGA Factors document means the document entitled 'National Greenhouse Account Factors', published on the Department of the Environment's website, www.environment.gov.au, and as in force from time to time. These factors are used to convert electricity use to emissions under the Determination. Factors published in the document will be updated from time to time to allow for more accurate estimates of emissions that maintain consistency with Australia's National Greenhouse Accounts.

Output purity refers to the percentage of the total quantity of an output that represents the key substance of value in the output. In identifying the key substance of value within a saleable product, proponents should consider the basis upon which the products are sold. For example, aluminium ingots sold may require a concentration of at least 98 per cent primary aluminium, indicating that the substance of value is the primary aluminium. However, glass containers may be sold without a purity requirement, indicating that the substance of value is simply the tonnes of glass sold.

Output variable refers to a saleable ***output*** from a chemical or physical process undertaken at a facility, where an increase (or decrease) in the quantity of its production results in an increase (or decrease) in the emissions from the facility. The output variable must be expressed in a unit of measurement that complies with the *National Measurement Act 1960* and must not be an ***intermediate product***, ***by-product***, or ***waste product***.

Plant shutdown refers to the period where all or part of a facility is not in operation for a period of time. Note that a plant shutdown is considered to be a ***major disruption to production*** if there is a 10 per cent or more change in the emissions intensity of a production variable for the facility relative to the NGER reporting year preceding or following the plant shutdown. This applies to intentional and unintentional plant shutdowns.

Production variable refers to an output variable, input or intermediate product chosen to be a production variable for the facility in accordance with section 16 or 17.

Statement of activity intent is a statement, in a form approved by the Regulator, stating that all project abatement activities that the project proponent intends to implement (or has implemented) at the time the statement is made would not be (or would not have been) implemented at the facility during the crediting period in the absence of a declaration of the project as an eligible offsets project.

Section 18 describes that an application for project declaration is required to include a statement of activity intent signed by an officer of the person with operational control over the facility. A statement should be provided for each facility covered by the project. Note that the person with operational control of the facility may not necessarily be the controlling corporation with respect to the facility.

Project proponents can choose whether or not the officer signing the statement is the chief financial officer. However, if the statement is signed by an officer other than the chief financial officer, then total facility abatement for that facility is capped at 100,000 tonnes of CO_2-e for the NGER reporting year under subsection 26(2).

A statement of activity intent signed by the chief financial officer can also be provided at a time after project declaration. This could arise where an officer has previously provided a statement of activity intent and would like to have the abatement limit of 100,000 tonnes of CO_2-e removed. The limit of 100,000 tonnes of CO_2-e will not apply to facilities for any offsets reports submitted after a statement of activity intent signed by a chief financial officer has been provided to the Regulator. However, this limit will apply to facilities for all offsets reports submitted prior to a statement of activity intent signed by a chief financial officer being provided to the Regulator.

A statement of activity intent provided by a chief financial officer after project declaration would reaffirm that project abatement activities, identified at the time that the statement is made, would not have been implemented at the facility in the absence of a declaration of the project as an eligible offsets project. It would also need to include that any activities that were not identified in a previous statement of activity intent, would not have been implemented at the facility in the absence of a declaration of the project as an eligible offsets project.

6 Meaning of baseline monitoring requirements

The ***baseline period monitoring requirements*** describe how a production variable must be monitored during the baseline period. Subsection 6(1) contains requirements that apply for all production variables. Subsection 6(2) includes further requirements (including modifications to those in subsection 6(1)) that apply when exported electricity is a production variable.

To ensure that data from the baseline period is consistent across all years, it is important that production variables are monitored in the same manner for each NGER reporting year in the baseline period. Further, the quantity and the purity of the production variable must be measured at the time that is as close as possible to when the variable entered, or left, the production or processing process at the facility.

When electricity is the production variable, the Regulator needs to be able to determine how much electricity was exported from each generating unit at the facility. If a facility is connected to part of the National Electricity Market (NEM) operating in eastern Australia, then the facility will have one or more ***designated metering points*** that are considered ***NEM standard metering*** under the National Electricity Rules. It is the intention that, where possible, electricity exported from the facility is measured at these metering points.

In some cases, the facility will have an individual NEM standard metering point for each generating unit at the facility. If this is the case, this metering point should be used to measure the amount of electricity exported from that generating unit. In other cases, a facility may have multiple generating units connected to a single NEM standard metering point. In this circumstance, the total electricity exported from the facility should be measured at that point. Internal facility metering should then be used to apportion electricity between the individual generating units, noting that this internal metering may not be considered NEM standard.

For facilities that do not have NEM standard metering points, electricity exported from the facility must be measured using metering that allows the Regulator to determine the total quantity of the electricity generated and exported by each generating unit at the facility. The electricity should be measured at a time that is as close as possible to when the electricity leaves the facility.

7 Meaning of fixed proportion

In both the baseline and reporting periods two inputs or two intermediate products are used in a ***fixed proportion*** if there is less than 5 per cent difference in the ratio in which they are used in any two NGER reporting years in the baseline period, or any two NGER reporting years in the reporting period.

In both the baseline and reporting periods an output is produced in a ***fixed proportion*** to an input or intermediate product if there is less than 5 per cent difference in the ratio of the amount of the input or intermediate product used to the amount of the output produced in any two NGER reporting years in the baseline period, or any two NGER reporting years in the reporting period.

8 Meaning of ineligible abatement activity

An ***ineligible abatement activity*** for a facilities project refers to an abatement activity where its impact on abatement was not reflected, in full or in part, in the baseline year, or whose abatement has increased since the baseline year such that it has a material effect on project abatement in an NGER reporting year, and:

- is in operation as part of another offsets project that has been registered under the ERF; or
- does not meet the additionality requirements set out in subsection 27(4A) of the Act and would have a material effect on the project emissions reduction on its own, or in combination with one or more other activities mentioned in subsection 8(3), subsection 8(4) or subsection 8(5); or
- would be an excluded offsets project and would have a material effect on the project emissions reduction on its own, or in combination with one or more other activities mentioned in subsection 8(3), subsection 8(4) or subsection 8(5); or
- would be a project covered by the *Carbon Credits (Carbon Farming Initiative—Landfill Gas) Methodology Determination 2015* and would have a material effect on the project emissions reduction on its own, or in combination with one or more other activities mentioned in subsection 8(3), subsection 8(4) or subsection 8(5); or
- would result in an increase in the excluded NGER fugitive emissions for the facility, but only if the operation of the activity at the facility would have a material effect on the project emissions reduction on its own, or in combination with one or more other activities mentioned in subsection 8(3) or subsection 8(5); or
- emissions increases outside the boundary of the facility associated with an abatement activity are more than decreases outside the boundary of the facility associated with the activity, but only if:
    - the overall increase is such that, if it were to occur inside the boundary of the facility, it would, either on its own or in combination with one or more other activities mentioned in subsection 8(3) or subsection 8(4) have a material effect on the project abatement; and
    - the activity is not an ***input or output purity change***.

For the purposes of paragraph 8(5)(a), the following are not to be taken into account in determining whether the amount by which an activity increases emissions outside of the boundary of the facility is more than the amount by which the activity decreases emissions outside of the facility:

- increases or decreases in emissions associated with:
    - the extraction, transportation, transmission or distribution of fuel to the relevant facility;
    - the production and installation of new equipment at the relevant facility;
    - the sale or other disposal of equipment removed from the relevant facility;
    - the transportation, transmission, distribution, storage, consumption or disposal of a production variable for the relevant facility; or
    - the disposal of waste from the relevant facility.
- increases or decreases in emissions that occur at another facility as a result of changes in the importation or exportation of electricity, heat or cooling from the relevant facility, if the emissions are:
    - scope 1 emissions of a category mentioned in subsection 1.3(4) of the NGER (Measurement) Determination;
    - emissions associated with electricity consumption at the other facility; or
    - emissions of a kind mentioned in paragraph (a) that occur at the other facility.
- decreases in emissions that have, or will be, used to calculate:
    - the carbon dioxide equivalent net abatement amount for another eligible offsets project; or
    - the abatement associated with an activity that would not meet the additionality requirements under subsection 27(4A) of the Act if the activity were implemented as a separate offsets project;
- increases or decreases in emissions associated with the use of an eligible renewable energy source used by the relevant facility to produce a production variable, electricity, heat or cooling.

These ineligible abatement activities are excluded to ensure that ACCUs are only provided for genuine and additional abatement projects, are not issued twice for the same project, and are not issued for projects that result in emissions increasing at other facilities, thereby potentially offsetting emissions reductions achieved by the project.

For the purposes of the Determination, an activity is only considered to have increased emissions outside of the facility if it raises overall emissions outside of the relevant facility. This means that an activity that increases emissions outside a facility would not be considered an ineligible abatement activity, so long as it creates equal or higher decreases in emissions elsewhere outside of the facility. However, decreases associated with a project that generates credits from the reduction of emissions, for example through other *Carbon Credits (Carbon Faming Initiative) Act 2011* projects, or other facilities in the same project, do not count towards this calculation.

The activities listed in subsection 8(6) are not counted as increases outside the facility because they may be remote in relation to the facility, there is lack of ability to obtain data, they are expected to only have minor impacts on overall project abatement, represent embodied emissions, or they are accounted for elsewhere in the Determination. Emissions increases outside of the facility associated with ***eligible renewable energy sources*** are not counted, but activities associated with the production of biomass energy sources not listed in Section 17 of the *Renewable Energy (Electricity) Act 2000* are to be counted as emissions increases outside a facility boundary.

Emissions increases outside of the facility boundary resulting from additional electricity generation within the facility are not an ineligible abatement activity because these emissions increases are accounted for by the electricity abatement adjustment in Division 7. Similarly, changes of the purity of an input or output that cause an increase in emissions outside the facility are not ineligible abatement activities because these emissions increases are accounted for by the adjustment at section 41.

Emissions reductions achieved by landfill gas projects are also ineligible as the *Carbon Credits (Carbon Farming Initiative—Landfill Gas) Methodology Determination 2015* has been specifically designed to capture emissions reductions from these projects and takes into account variables that cannot be controlled for under this Determination.

The reference to abatement activities that would not meet the additionality requirements set out in subsection 27(4A) of the Act includes activities that have been, or have begun to be, implemented and thus do not meet the newness test in subsection 27(4A)(a)(i), as well as activities that would fail the regulatory additionality requirement in subsection 27(4A)(b)(i) or the government program requirement in subsection 27(4A)(c)(i). For instance, the installation of energy efficiency equipment in the middle of the baseline year would be an ineligible abatement activity as it would not satisfy the newness requirement. This assumes that the equipment had a material effect (on its own or in combination with other activities) on the project emissions reductions in an NGER reporting year during which the equipment was in operation. The definition of ineligible activities does not and is not intended to supersede any additionality requirement specified under the Act.

Abatement from ineligible activities at a facility must be deducted from the facility's abatement at section 28. For abatement activities that increase overall emissions outside the boundary of the facility, the quantity of the increase in emissions outside the facility does not need to be known. Instead, the proponent must estimate the abatement that occurred at the facility as a result of the activity in accordance with the criteria at subsections 28(4) or 28(5). If on its own, or in combination with one or more other activities mentioned in subsection 8(3), subsection 8(4) or subsection 8(5), it would have a material effect on project abatement, this ineligible abatement must then be subtracted from the facility's total abatement at section 28. The existence of, and abatement estimates for, ineligible abatement activities are subject to the audit processes set out in the Act.

9 Meaning of material effect

Section 9 provides the meaning of ***material effect***. A material effect arises when something has, would have, or is likely to have, either a five per cent or 25,000 tonnes of CO_2-e (whichever is smaller) impact or more on the project abatement amount (the carbon dioxide equivalent net abatement amount).

This concept is introduced in the Determination to reduce the burden on proponents by only requiring specific adjustments or action when something has, would have, or is likely to have a material effect on the project abatement amount. The material effect definition is applied in several instances in the Determination and the rules about its application are specified as appropriate. This means the concept is applied to each circumstance and is not cumulative across the Determination.

10 Meaning of materially similar

An output or output variable is ***materially similar*** to another relevant output or output variable if during the project's baseline period the difference in their average emissions per unit of production is no greater than 5 per cent.

A similar input or similar intermediate product is ***materially similar*** to another relevant similar input or similar intermediate product if during the project's baseline period the difference in the average per unit emissions produced processing each input or intermediate product through the facility is no greater than 5 per cent.

The intention of two inputs, outputs or intermediate products being considered materially similar is that substituting one for the other in the production process does not make a material difference to emissions from the facility. For example, if it takes 100 tonnes of CO_2-e to make a tonne of output A and 103 tonnes of CO_2-e to make a tonne of output B, then these would be materially similar outputs and could be grouped together as a single output. If product B, only required 90 tonnes of CO_2-e to produce, then the two outputs are not similar (the emissions intensity of product A is greater than 5 per cent more than that of product B).

11 Meaning of significant expansion

Section 11 provides the meaning of ***significant expansion***. A significant expansion is considered to have occurred when new equipment is used by the facility during an NGER reporting year, and the maximum productive capacity of all the equipment at the facility is 20 per cent greater than the maximum productive capacity during the earliest of the NGER reporting years of the baseline period.

This concept is referred to in the Determination under section 27(4). Where a significant expansion takes place at a facility, abatement from that facility is reduced to zero for all subsequent NGER reporting years in the crediting period for that project. This is because historical data from before the expansion would no longer be comparable, preventing the development of crediting baselines.

The significant expansion rule does not apply to new equipment that is primarily used to generate electricity. This is because the electricity abatement adjustment outlined in Division 7 allows comparison of reporting year and baseline year data where the equipment is used to generate electricity.

12 Meaning of significant output variable change

Section 12 provides the meaning of a ***significant output variable change***. A significant output variable change occurs when a facility starts to produce or process an output variable it has not produced or processed before, and the change has a material effect on the emissions from the facility.

The definition of significant output variable change is slightly different for the baseline period and the reporting period. This is because the definition that relates to the reporting period requires a comparison to the project abatement amount and to the output variable produced in the baseline year. However, these comparisons are not possible until the baseline year has been determined and an abatement amount has been calculated.

This concept is referred to in the Determination under section 27(4). Where a significant output variable change takes place at a facility, project abatement from that facility is reduced to zero for all subsequent NGER reporting years in the crediting period for that project. This is because there is no historical data relating to the new output variable that can be used to calculate a crediting baseline.

An output of heat, cooling or electricity does not meet the definition of a significant output variable change. This is because the electricity abatement adjustment outlined in Division 7, and the adjustment to facility NGER emissions at section 44 address changes in emissions that result from producing these new outputs.

This definition does not apply to production variables that are inputs or intermediates.

Part 2 Facilities projects

13 Facilities projects

The effect of paragraphs 27(4)(b) and 106(1)(a) of the Act is that a project must be covered by a methodology determination, and that the methodology determination must specify the kind of offsets project to which it applies.

Section 13 provides that the Determination applies to an offsets project that involves the implementation of activities that could reasonably be expected to result in eligible carbon abatement from a facility. Such a project is referred to as a ***facilities project*** throughout the Determination and activities that make up the project are referred to as ***project abatement activities***.

Part 3 Project Requirements

Division 1 General Requirements

14 Operation of this Division

The effect of paragraph 106(1)(b) of the Act is that a methodology determination must set out requirements that must be met for a project to be an eligible offsets project. Under paragraph 27(4)(c) of the Act, the Regulator must not declare that a project is an eligible offsets project unless the Regulator is satisfied that the project meets these requirements.

This Division specifies requirements that must be met in order for a project to be an eligible offsets project. These requirements are set out in sections 15 to 18.

15 Implementation of activities that aim to reduce emissions from a facility

Section 22 of the Act provides that a person may apply to the Regulator for the declaration of an offsets project as an eligible offsets project. In line with this, section 15 of the Determination sets out the eligibility requirements for a project to be declared an eligible offsets project.

The Determination requires that for each facility involved in the project:

- NGER reports about the operation of the facility during the baseline period must have been submitted to the Regulator;
- the facility has one or more production variables in both the baseline and crediting periods;
- the facility has not undergone a major change during the baseline period, that is the four consecutive NGER reporting years preceding the year in which the project begins to be implemented; and
- the proponent has access to NGER data and production variable data for the facility for all four years of the baseline period.

These requirements ensure that proponents have access to appropriate and comparable data to calculate the carbon dioxide equivalent net abatement amount for the project under Part 4 of the Determination.

They also ensure an option for a facility that has fallen below the NGER reporting threshold to still undertake a project under the Determination if they fulfil the baseline period requirement and have reported their emissions under the NGER scheme for at least four consecutive years before the start of the project. This provision is explored in greater depth in sections 68 and 72.

The second dot point means that the Determination does not apply to facilities which do not produce an output in both the baseline and crediting periods. For example, a large shopping centre or a storage warehouse which consume electricity and/or natural gas but do not have relevant production variables in the baseline period would be excluded from using the Determination.

The Determination does not apply to ***transport facilities*** as the *Carbon Credits (Carbon Farming Initiative—Land and Sea Transport) Methodology Determination 2015* and the *Carbon Credits (Carbon Farming Initiative—Aviation) Methodology Determination 2015* have been specifically designed to capture abatement from these facilities and takes into account variables that cannot be controlled for under this Determination. However, the Determination allows facilities to reduce emissions from transport within the facility if the facility is not a transport facility. An example of this is a project which aims to reduce emissions from trucks that move goods within an industrial facility.

The Determination cannot be used at a facility that is currently part of another project registered under the Determination. This is because projects under the Determination cover emission reductions from entire facilities. However, because the Determination allows abatement from other activities to be deducted from a facility's abatement calculation (see ***equation 5***); it is possible to have a concurrent project registered under a different methodology determination while also applying this Determination to a project at a facility (subject to the requirements of the other relevant methodology determinations).

The Determination does not apply to facilities that use biomass not defined as an ***eligible renewable energy source*** in the *Renewable Energy (Electricity) Act 2000* to produce energy at the facility. For example, a heat recovery activity involving a furnace or boiler fuelled by a type of biomass that is not eligible under the *Renewable Energy (Electricity) Act 2000*, would not be able to use the Determination. The Determination also does not apply to facilities that import heat, cooling or electricity produced using biomass that is not defined as an ***eligible renewable energy source*** in the *Renewable Energy (Electricity) Act 2000*. In the case of electricity, this requirement only applies to electricity purchased and transmitted directly from an external generator, and does not apply to electricity purchased from a grid where multiple parties draw or supply electricity.

These requirements align the Determination's coverage of biomass with the Renewable Energy Target scheme's requirements. Comparable provisions in other relevant methodology determinations, such as the *Carbon Credits (Carbon Farming Initiative-Industrial Electricity and Fuel Efficiency) Methodology Determination 2015*, will also align with these requirements.

The Determination does not apply to facilities that formed part of a facility aggregate (described under regulation 4.25 of the *National Greenhouse and Energy Reporting Regulations 2008* (NGER Regulations)) during the baseline period or form part of a facility aggregate during the crediting period.

It is also a requirement that the project abatement activities that are implemented do not include ineligible abatement activities. If an ineligible abatement activity is undertaken at the same facility as a facilities project, abatement resulting from the ineligible activity must be excluded from the calculated facility abatement amount in accordance with section 28.

Section 15 also requires that a project must not include a project abatement activity that is expected to result in abatement solely by changing the amount of a production variable at a facility. This is to ensure that ACCUs granted under the Determination are not provided for simply by changing output in response to market conditions without any investment in an emissions reduction project.

The facilities to which a project applies must also be identified in the application to the Regulator, and new facilities cannot be added to the project at a later date.

16 Choosing production variables for facilities – output variables

To apply this Determination, proponents must choose one or more production variables at project declaration. In general, a production variable is an output variable (as defined in section 5) that is produced or processed by the facility. The definition of an output variable also describes key criteria for an output variable that can be chosen, including that a change in the quantity of the product processed would result in a change to the quantity of greenhouse gas emissions from the facility.

Once production variables are chosen for a facility, they form the basis of the abatement calculations over the entire crediting period for the project. Circumstances where production variables can change are limited to where a new output variable, described in subsection 16(3), can be added.

If the facility produces or processes more than one output variable, it would normally be the case that all of the variables would be chosen as separate production variables. Subsection 16(2) sets out the circumstances in which a facility that produces multiple outputs can be considered to be producing or processing a single output variable. The quantity of the single output variable would be the total of the multiple output quantities. Using a single production variable will reduce the burden on proponents by removing the need to apportion emissions between production variables as outlined in section 37.

This includes situations where the emissions intensities associated with the production of the multiple outputs are ***materially similar***. That is, the average emissions per unit of production of each output variable during the project's baseline period are no more than five per cent greater than the average emissions per unit of production of the other output variables during that period.

The criteria under subsection 16(2) are intended to allow groupings of outputs that may look different, or contain different materials or components, as long they can be quantified using the same unit of measurement and have materially similar emissions intensities because they go through similar production processes within the facility. The following example outlines the process for determining if outputs have materially similar emissions intensities.

Take A as an output variable with emissions intensity I_A. To consider if another output variable, B with intensity I_B is materially similar, the average emissions intensities of I_A and I_B over the baseline period must be within 5 per cent of each other. If their emissions intensities are materially similar, then A and B can be classed as a single production variable under 16(2). If a third output, C is also produced, the proponent must determine whether its emissions intensity (I_C) is materially similar to both I_A and I_B. If I_C is not within 5 per cent of both of both I_A and I_B, then A, B and C cannot all be classed as a single production variable.

The Determination allows for proponents to group some similar output variables together as a single production variable, which is then used in conjunction with other outputs that are designated individually as production variables. It should be noted that when multiple similar output variables have been grouped together as a single production variable, the individual similar output variables should not also be considered individually as production variables, or as part of another grouping of similar production variables that are being considered as a single production variable. That is, each output variable should only be considered once.

Subsection 16(3) allows a facility that starts producing or processing a new output variable during the crediting period to combine the new output variable with another production variable if the emissions per unit of production of the two variables are materially similar. This is so the facility can continue to receive credits under the Determination.

The ability to designate a single or multiple outputs as production variables may be especially useful for facilities which produce multi-component elaborately transformed products, such as electric drills. For a manufacturer of electric drills, choosing the finished drill as the facility's production variable is likely to reduce the measurement and reporting burden on proponents, as apportioning facility emissions across different models of drill is likely to be resource intensive.

17 Choosing production variables for facilities – inputs and intermediate products

Section 17 allows for facilities to choose an input or intermediate product to be a production variable for the facility. This allows facilities, such as petroleum refineries and some chemical manufacturers, to choose a single input or intermediate product as a production variable, thereby avoiding a complicated apportionment of emissions from the facility across different outputs. When an input or intermediate product is chosen as a production variable, it will be the only production variable for the facility.

Subsection 17(1) covers the situation where a facility's production process only involves a single input or a single intermediate product. In this case, the input or intermediate product can be chosen as the production variable instead of the facility's outputs if it meets the requirements set out in subsection 17(5).

Subsections 17(2) and 17(3) apply when a facility uses multiple inputs, or produces multiple intermediate products, that are used in a fixed proportion to produce all its products. In this case, the project proponent can choose as a production variable the input or intermediate product that makes the largest contribution to emissions when processed through the facility.

Subsection 17(4) applies when a facility uses multiple ***similar inputs*** or multiple ***similar intermediate products*** in its production process to produce all its products. Inputs or intermediate products are considered similar if they can be quantified using the same unit of measurement, and the emissions produced processing a unit of input or intermediate product through the facility are ***materially similar*** for all the inputs or intermediate products respectively. In this situation, the project proponent may choose the similar inputs or the similar intermediate products to be a single production variable instead of the facility's outputs.

Subsection 17(5) sets out further criteria that must apply in all cases before a facility can choose an input or intermediate product as a production variable. It must be the case that:

- the outputs from the facility are produced in a fixed proportion to the inputs, or the outputs can all be measured using the same unit of measurement and the emissions per unit of output are materially similar;
- an increase (or decrease) in the quantity of the input or intermediate product must result in an increase or decrease in quantity of greenhouse gas emissions from the facility;
- if the input or intermediate products were omitted from the production process it would prevent the production process working; or if the input or intermediate product were omitted from the production process in an NGER reporting year there would be a material effect on project abatement for the NGER year; and
- the quantity of the input or intermediate product chosen must be also able to be expressed in a unit of measurement that complies with the *National Measurement Act 1960*.

18 Information to be included in application for declaration

Section 22 of the Act provides that a person may apply to the Regulator for the declaration of a project as an eligible offsets project. Pursuant to this, section 18 of the Determination sets out that the application for declaration must include a number of details in addition to those required by the legislative rule. These additional items include a description of each facility, descriptions of each production variable chosen in accordance with sections 16 or 17, and information that shows that each production variable has been chosen following the requirements of section 16 or 17.

The description of a facility is intended to be the same, or similar, to the description of the facility provided when reporting under the NGER Act. For example if the facility is named 'Facility A – Smith Street' when reporting under the NGER Act, the same descriptor would be provided in the project application. This description is in addition to location details that are required to be provided in accordance with the legislative rule.

If ***biomass*** will be, or is likely to be, used as an energy source at a facility involved in the project, a declaration is required from the person making the application that the biomass meets the definition of an ***eligible renewable energy source*** under the *Renewable Energy (Electricity) Act 2000*. Similarly, if the facility will, or is likely to, import off-grid electricity, heat, or cooling generated from biomass, a similar declaration is required.

In the case of electricity, this requirement only applies to electricity purchased and transmitted directly from an external generator, and does not apply to electricity purchased from a grid where multiple parties draw or supply electricity.

An application is also required to include a ***statement of activity intent*** signed by an ***officer*** of the ***person*** with operational control over the facility. The statement, in a form approved by the Regulator, must state that all project abatement activities that the project proponent intends to implement (or has implemented) at the time the statement is made would not be (or would not have been) implemented at the facility during the crediting period in the absence of a declaration of the project as an eligible offsets project. A statement should be provided for each facility covered by the project. Note that the person with operational control of the facility may not necessarily be the controlling corporation with respect to the facility.

Project proponents can choose whether or not the officer signing the statement is the ***chief financial officer*** or another officer. However, if the statement is signed by an officer other than the ***chief financial officer***, then total facility abatement for that facility is capped at 100,000 tonnes of CO_2-e for the NGER reporting year, under subsection 26(2).

A full description of the statement of activity intent is set out under its definition in section 5.

Division 2 Additionality requirements

19 Requirements in lieu of newness requirements

Transitional provisions under the Act allowed prospective proponents, who gave notice of their intentions before the date of Proclamation of that Act, to have the newness of their projects assessed as at the time of their notice, provided that they made the section 22 application before 1 July 2015. The effect of this section is to extend this deadline to 1 July 2016 for this Determination.

Part 4 Net abatement amount

Division 1 Preliminary

20 Operation of this Part

Paragraph 106(1)(c) of the Act provides that a methodology determination must specify how to calculate the CO_2-e net abatement amount for the project in relation to a reporting period.

Division 2 Method for calculating net abatement amount

21 Carbon dioxide equivalent net abatement amount

The net abatement amount for a reporting period is the sum of the project abatement from each NGER reporting year over the reporting period. Abatement from each of these NGER reporting years must be added together for each facility where the project is carried out. The intention under the Determination is that reporting periods coincide with NGER reporting years. However, it is not a requirement of the Determination that this approach be followed. Subsection 25(2) of the Determination allows for abatement to be calculated in the final reporting period if the crediting period ends partway through the final NGER reporting year.

Subsection 69(5) of the Act provides for the proponent to choose the start of the crediting period up to 18 months after project declaration. Where the project proponent chooses the start of the crediting period to be after project declaration and partway through an NGER reporting period:

- the final year of baseline period is the NGER reporting year which immediately precedes the NGER reporting year that the crediting period starts in (that is, it is possible for the baseline period to end after project declaration)
- the project abatement for the first reporting period will include the entire NGER reporting period that starts immediately after the end of the baseline period, even if this includes a period of time that is not in the crediting period.

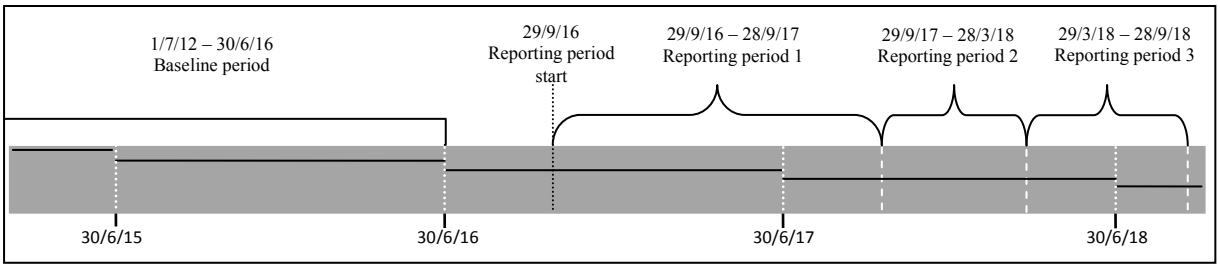
Section 76 of the Act provides for proponents to provide offsets reports for a period that is no longer than two years for emissions avoidance projects. For the scenario where a project proponent has chosen a reporting period that is between six months and twelve months long, it is possible for this reporting period to not include the end of an NGER reporting year. In such a circumstance, the proponent would have zero abatement for this reporting period. However, the proponent would calculate abatement for the entire NGER reporting year that ended during the next reporting period.

The example below refers to a project which is implemented on 29 September 2016. The baseline period covers the four NGER reporting years preceding the date that the project abatement activity begins implementation (1 July 2012 – 30 June 2016).

The project proponent chooses a reporting period ending 28 September 2017. In this period, abatement is calculated using the NGER reporting year ending 30 June 2017. The project proponent chooses six month intervals for subsequent reporting periods.

There is no NGER reporting period that ends in the second reporting period (29 September 2017 – 28 March 2018), therefore the abatement calculation for that reporting period would equal zero.

In the third reporting period (29 March 2018 – 28 September 2018) abatement is calculated based on the NGER reporting year that ends 30 June 2018.



22 Basis of calculation for certain NGER reporting facilities

Section 22 applies to facilities that reported as part of a vertically integrated production process (VIPP) under the NGER scheme during any NGER reporting year during the baseline period. For the purpose of calculating abatement, proponents must continue to treat all the facilities that were part of the VIPP as if they were a single facility.

Facilities can no longer report as VIPPs under the NGER scheme. Regulation 4.29 of the NGER Regulations, as in force on 30 June 2014, sets out that an NGER report could, in certain circumstances, include aggregated information about facilities involved in a VIPP.

Division 3 Method for calculating project abatement

23 Summary

Under the Determination, the project abatement is the level of abatement achieved from the implementation of the project in an NGER reporting year.

24 Timing of calculation

Section 24 specifies that abatement must be worked out after the NGER reporting year has ended in relation to the whole of that year. This means that, in practice proponents will be able to submit their offsets report either annually or biennially. The Determination does not prevent more frequent reporting. However, if there is no NGER reporting year that ends during a reporting period, the abatement reported would equal zero.

25 Calculation of project abatement

Project abatement for the NGER reporting year is calculated using **equation 1**. **Equation 1** provides for the sum of each facility's total abatement where a project is carried out in the reporting period.

Subsection 25(2) provides that where the crediting period for the project ends part way through the final NGER reporting year, rather than at the end of the final reporting year, **equation 2** must be used to apportion project abatement based on the number of days in the final NGER reporting year that fall within the crediting period. As outlined in section 25, this calculation will need to be undertaken at the end of the NGER reporting year. For example, if a project commenced on 1 January 2016, the standard seven year crediting period would end on 31 December 2023. Project abatement would be calculated for each whole NGER reporting year from 1 July 2015 to 30 June 2023 using **equation 1**, and the project abatement from 1 July 2023 to 31 December 2023 would be calculated at the end of the NGER reporting year using **equation 2**.

Subsection 25(3) allows proponents who have generated negative abatement for the project for an NGER reporting year to make that negative abatement equal zero. This ensures that if a proponent unintentionally increases their emissions, they do not owe credits when submitting an offset report.

26 Total facility abatement

Total facility abatement for the NGER reporting year is calculated using **equation 3**. **Equation 3** states that a facility's total abatement for an NGER reporting year is the sum of the facility's on-site abatement, electricity abatement adjustment A, and electricity abatement adjustment B for the NGER reporting year.

Electricity abatement adjustment A applies to facilities where exported electricity is a production variable, and additional electricity is exported from the facility as a result of the project. These projects involve activities that increase the thermal efficiency of existing generating units at the facility. The abatement adjustment is calculated using **equation 18**.

Electricity abatement adjustment B applies to facilities that generate and export electricity from new generating units added as part of the project. The abatement adjustment is calculated using **equation 20**. A facility can generate abatement for additional electricity exported as a result of the project installing new generating units, even if there is no on-site abatement at the facility, as long as the emissions intensity of the electricity generated is below the grid average emissions intensity on the declaration date of the project.

Where proponents have chosen not to submit a ***statement of activity intent*** signed by the ***chief financial officer*** (or equivalent) of the person with operational control of the facility, the total facility abatement worked out in **equation 3** is capped at 100,000 tonnes of CO_2-e for the NGER reporting year. If they have provided such statement, then abatement from the facility is uncapped.

In order to avoid having abatement capped, a statement of activity intent signed by the chief financial officer (however described) is only taken to have been received if it was provided to the Regulator as part of the project application (as allowed for in section 18), or prior to the submission of the offsets report for the relevant NGER reporting year (see subsection 26(3)).

A full description of the statement of activity intent is set out under its definition in section 5.

27 On-site facility abatement

The on-site facility abatement for an eligible offsets project is calculated using **equation 4**. The term 'on-site facility abatement' refers to abatement that occurs from activities at a facility. It contrasts with the term 'total facility abatement', which includes both on-site facility abatement and electricity displacement abatement calculations. Electricity displacement abatement occurs where the abatement results from exported electricity that is less emissions-intensive than the average of the electricity grid it is exported into. The use of the term 'on-site' has no other meaning beyond this.

A facility's on-site abatement in a reporting period is calculated as its crediting baseline minus reported emissions in an NGER reporting year. The equation separates out the abatement calculation associated with generated and exported electricity from the rest of the abatement calculation. The first part of the equation relates to the general abatement calculation, where the crediting baseline is worked out using **equation 6** in section 30 and emissions in the NGER reporting year are calculated using **equation 16** in section 44.

The second part of the equation relates to the electricity abatement calculation, where the crediting baseline is worked out using **equation 7** in section 31, and emissions in the NGER reporting year are calculated using **equation 17** in section 45. The calculation in relation to electricity is for emissions reductions at the facility, as opposed to emission reductions across a grid, worked out under Subdivision A or B of Division 7.

Subsection 27(2) allows facilities that have negative abatement during the NGER reporting year to have their abatement taken to be zero. The intent of this is to ensure that proponents are not faced with a liability to the Commonwealth in the event that the project results in negative abatement as a result of project activities. This is separate from any contractual obligations the proponent or another party may have with the Commonwealth.

Some methodology determinations do not allow for negative abatement to be taken as zero. This is generally because these methods rely on negative abatement in one year or under one implementation of the method to be offset by positive abatement in another year or implementation, thereby ensuring that proponents are not credited for natural variations in emissions. Under this Determination, the risk of crediting for business-as-usual emissions variations is primarily addressed by setting the baseline emissions intensity for a facility as the lowest emissions intensity in the baseline period.

However, paragraph 27(2)(b) sets out that if electricity abatement adjustments A or B, calculated at Subdivisions A and B of Division 7, apply to a facility, a negative facility abatement amount must not be taken as zero. This is because the electricity abatement adjustments are specifically designed to adjust a facility's abatement to account for increases in emissions in an interconnected electricity grid. The correct operation of these adjustments relies on the calculated facility abatement (whether it is positive or negative).

Subsection 27(3) requires abatement for the facility to be set to zero in some circumstances where project proponents choose an input or intermediate product, or similar inputs or similar intermediate products, to be the production variable for the facility. These include circumstances when either: outputs produced by the facility are not produced in a fixed proportion to the relevant input or intermediate product during an NGER reporting year; or, the input or intermediate product that was chosen as a production variable is no longer produced in a fixed proportion to other inputs or intermediate products.

Subsection 27(4) specifies that if a facility undergoes a significant expansion or a significant output variable change during the relevant NGER reporting period, then the facility abatement in the reporting period is zero. This is because there is no historical data from the baseline period against which the expansion or new output variable can be compared. For instance, the emissions intensity of a facility that has doubled its capacity in the crediting period may not be comparable with that of the same facility in the baseline period. After a significant expansion or significant output variable change, a facility would be required to wait four years before applying for another abatement project under this Determination, because the baseline period must have at least four consecutive NGER reporting years after the major change occurs.

28 Adjusted on-site facility abatement

The calculation of the adjusted on-site facility abatement provides that on-site facility abatement excludes abatement achieved through the operation of one or more ineligible abatement activities at a facility during the NGER reporting year, as set out in **equation 5**.

Adjusted on-site facility abatement will only need to be calculated when ineligible abatement activities (see section 8 for ineligible abatement) is undertaken at a facility during the reporting period, and abatement from the ineligible activities is not already fully reflected in the baseline year. This is to ensure the crediting baseline and the NGER emissions in the reporting year can be compared.

Section 28 provides that ineligible abatement can be excluded based on either:

- the level of abatement calculated for another reason and reported to a government body (for example, as reported under a state energy efficiency scheme); or
- an estimation using an appropriate abatement estimation approach that adheres to the criteria outlined under subsection 28(6).

The calculation of E_{NA} allows abatement from the ineligible activities to be pro-rated for the days it was not in operation in the baseline year. This is done by multiplying the abatement from an ineligible activity by:

> Days activity NOT in operation ÷ days in baseline year (see subparagraph 28(2)(b)(ii)).

If an abatement activity was in operation for the whole of the baseline period and there has been an increase in the amount of abatement from that activity during the reporting period, the amount of the increase in abatement from this activity must also be excluded as ineligible abatement.

Subsection 28(6) sets out the criteria for approaches to estimate ineligible abatement. These criteria apply when project proponents determine the assumptions and procedures they intend to use to estimate ineligible emissions. The criteria are intended to ensure that estimates are consistent with other well established approaches, such as those set out in other methodology determinations, and are measurable, capable of being verified, and conservative.

Division 4 Method for calculating crediting baseline

29 Summary

The crediting baseline represents the emissions that the facility would have released had the abatement project not been implemented. The crediting baseline will be used to determine the abatement achieved by the facility in the reporting period.

30 Crediting baseline (general)

The calculation of the general crediting baseline for a facility with an eligible offsets project is set out in **equation 6**, which must be used if the facility has a production variable that is not electricity. It represents the hypothetical scenario of what emissions would have been in the NGER reporting year in the reporting period had the project not been implemented. This is a total emissions figure calculated as the sum of each production variable's baseline emissions intensity multiplied by its quantity of production in the NGER reporting year. The method for calculating baseline emissions intensity is set out in Division 5.

31 Crediting baseline (electricity)

The calculation of crediting baselines for facilities that produce and export electricity as a production variable must be calculated using **equation 7**, regardless of whether the facility also has non-electricity production variables. For instance, a manufacturing plant that has a combined heat and power plant (CHP) that exports electricity from the facility would need to use **equation 6** to calculate the crediting baseline for the manufactured good, and **equation 7** to calculate the crediting baseline for the exported electricity. If a facility has not exported electricity and is installing new generating units, then they would not use the calculation in section 31, and would defer to the calculations specified in Division 7 Subdivision B.

The first component of **Equation 7** works out the crediting baseline for calculating abatement from existing electricity generating units that have not been replaced. It multiplies the baseline emissions intensity of exported electricity from existing generating units by the quantity of electricity generated by the existing generating units less additional electricity exported due to thermal efficiency improvements.

The second component works out the crediting baseline for calculating abatement from new generating units that have replaced generating units that were operating during the baseline period. It multiplies the baseline emissions intensity of exported electricity from replaced generating units by the lesser of the quantity of electricity generated and exported by the replaced generating units and by the new generating units. Electricity generated from replaced generating units is defined in subsection 54(1) and means the quantity of electricity generated from replaced generating units and exported during the baseline year. Electricity from new electricity generating units is defined in section 53 and means the quantity of electricity generated from new electricity generating units and exported during the NGER reporting year. The lesser of the two quantities is taken because any additional generation beyond the replaced amount is accounted for in the electricity adjustment calculation in Division 7 Subdivision B.

The baseline emissions intensity of replaced electricity generating units is taken to be zero if the emissions intensity of the new electricity generating units multiplied by the marginal loss factor for the NGER reporting year is greater than the grid average emissions intensity on the declaration date of the project. This means that electricity generating units that replace existing units must not be more emissions intensive than the grid average at the start of the project if it is to receive credits, even if the unit has a lower emissions intensity than the unit it is replacing. This is intended to avoid providing any incentive for generators to invest in new equipment that extends its asset life, unless the electricity generated using this new equipment is better than the grid average emissions intensity. To provide certainty at the time of investment, the emissions intensity of new electricity generating units is multiplied by the marginal loss factor that is valid for the NGER reporting year. Because marginal loss factors are also accounted for in the calculation of emissions intensity of new generating units in **equation 21**, this has the effect of cancelling out the impact of changes in marginal loss factor when considering whether the new electricity generating units are better than the grid average emissions intensity.

Finally the quantity of electricity exported is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of the NGER reporting year (see section 48 for more information on these factors).

Division 5 Method for calculating baseline emissions intensity

Subdivision A – Baseline emissions intensity

32 Summary

The baseline emissions intensity for each production variable will be set at the lowest emissions intensity during the baseline period. The year with the lowest emissions intensity for one production variable will be the same year for all production variables produced at a facility due to the approach to apportioning emissions set out in section 37. The lowest emissions intensity has been selected to calculate the crediting baseline to reduce the risk of crediting normal fluctuations in emissions, or abatement projects that have already been implemented.

Once identified, the baseline emissions intensity will only change if a recalculation is required under Subdivision C that has a material effect on the level of project abatement achieved in an NGER reporting year.

An example of this approach would be if a project is declared in February 2016 and the project begins to be implemented in April 2017 (in the 2016-17 NGER reporting year). The project would need to have reported NGER data with no major changes for the NGER reporting years 2012-13 to 2015-16. The baseline period for this project is 2012-13 to 2015-16 inclusive, and includes an NGER reporting year that is after the project application/project declaration day. In this case, the baseline year is the NGER reporting year with the lowest emissions intensity in those four reporting years, representing the baseline period.

33 Baseline emissions intensity and baseline year

The baseline emissions intensity of a production variable is measured in tonnes of CO_2-e per unit, in accordance with Subdivision B. Project proponents must calculate this for each NGER reporting year in the baseline period, in order to identify the year with the lowest emissions intensity. This number is the production variable's baseline emissions intensity. Section 5 of the Determination defines the baseline period as the four consecutive NGER reporting years preceding the NGER reporting year in which the project commences.

Using emissions intensity to calculate the crediting baseline allows emissions reductions arising from genuine effort to be distinguished from emissions reductions caused by changes in production levels.

Subdivision C sets out circumstances where the baseline emissions intensity of a production variable must be adjusted to ensure data from the baseline year and an NGER reporting year are compared on a consistent basis.

Subsection 33(3) sets out that the original baseline year will not change if an adjustment is required to the baseline emissions intensity due to the use of a new factor or a change to input and output purity.

If an adjustment is required due to a miscalculation in the original data used to set the baseline emissions intensity, the adjustment is only required to be undertaken to the data in which the error relates. However, proponents will need to assess whether this adjustment will result in a change to the baseline year.

Subdivision B – Calculations relating to emissions intensity

34 Emissions intensity of a production variable

The calculation of emissions intensity of a relevant production variable is set out in **equation 8**. It represents the average tonnes of emissions released to produce a unit of the relevant production variable during an NGER reporting year in the baseline period.

35 Baseline NGER emissions attributable to a relevant production variable

In order to determine the baseline emissions intensity, the amount of NGER baseline emissions occurring during each NGER reporting year in the baseline period will need to be calculated for the facility using **equation 9**. Baseline NGER emissions must be apportioned in accordance with section 37 in situations where the facility produces more than one production variable.

36 Total baseline NGER emissions

The calculation of baseline NGER emissions for a facility is set out in **equation 9**. The result of this equation is then apportioned to each of the facility's production variables using **equation 10**. Total baseline NGER emissions are calculated for each NGER reporting year of the baseline period. Total baseline NGER emissions from the facility are calculated by adding:

- the quantity of direct (scope 1) emissions reported by the facility in its NGER report;

- emissions from electricity imported to the facility (scope 2). To calculate the emissions from imported electricity, the number of megawatt hours of electricity imported and used at the facility is multiplied by the applicable electricity emissions factor (see below for more information on these factors) and by a marginal loss factor to adjust for losses in transmission to the facility; and
- the quantity of indirect (scope 2) emissions from heat or cooling reported by the facility in its NGER report.

Any excluded NGER fugitive emissions (as defined under section 5) must then be deducted to arrive at the total baseline NGER emissions. These fugitive emissions are excluded from the total baseline NGER emissions because emissions from these sources are highly variable and are generally poorly correlated with production. This variability could offset abatement reported by the project or artificially enhance abatement without changing the level of genuine and additional abatement achieved.

Electricity emission factors are set out in the NGA Factors document published by the Department of the Environment, as updated from time to time. Proponents will apply the relevant electricity emissions factor from the document in force on the day the project is declared an eligible offsets project. This is intended to provide certainty to proponents that the emissions intensity of electricity imported will not deviate due to factors outside of their control once a project has commenced.

If a facility imports electricity from a grid, it will use the applicable grid factor set out in the NGA Factors document. For example, if a facility obtains electricity from the NEM, it will use the NEM grid factor. If the electricity is from a source other than an electricity grid included in the NGA Factors document, then the project should apply the factor provided by the supplier of the electricity. If that factor is not known, the factor for off-grid electricity as set out in the NGA Factors document should be used.

Emissions factors expressed as kilograms of CO_2-e per kilowatt hour are equivalent to tonnes of CO_2-e per megawatt hour. Multiplying megawatt hours of electricity imported by the applicable electricity factor yields a tonnes of CO_2-e figure.

This approach to electricity emissions applies to all relevant emission reduction methodologies. The approach differs to the approach taken in determinations made under the former Carbon Farming Initiative, prior to the proclamation of the *Carbon Farming Initiative Amendment Act 2014*. These determinations refer to state based factors published in the *NGER (Measurement) Determination 2008*.

Emissions from electricity imports are adjusted for losses in the electricity network by applying a marginal loss factor. Marginal loss factors apply to electricity exported from the facility in the NGER reporting years of the baseline period (using ***equation 9***) and the crediting period (using ***equation 16***). Marginal loss factors account for energy that is lost due to electrical resistance and the heating of conductors as electricity flows through electricity networks.

If a facility is connected within a distribution network that is part of the NEM, the marginal loss factor for the facility will be 1. If the facility purchases electricity from the NEM and is connected to a transmission network, the marginal loss factor is the factor published by the Australian Energy Market Operator (AEMO) on its website that was valid at the end of the NGER reporting year for the relevant baseline year. If neither of these cases apply, and a relevant State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year for the relevant baseline year, then the marginal loss factor is taken to be this factor. If none of the preceding cases apply, the marginal loss factor is taken to be 1.

Network losses impact emissions and abatement calculations. When the marginal loss factor is greater than 1 at a given location, electricity consumption is greater than electricity generation. Any reduction in consumption at this location decreases the need to transmit electricity from elsewhere in the network, avoiding network electricity losses.

When the marginal loss factor is smaller than 1at a given location, electricity generation is greater than electricity consumption. Any reduction in consumption at this location increases the amount of electricity that is available to be transmitted elsewhere in the network, creating more losses as this electricity flows through the network.

Multiplying the reduction in electricity imported (the difference in the relevant calculations in **equation 9** and **equation 16**) by the marginal loss factor:

- where the marginal loss factor is greater than 1 – increases the amount of emission reductions achieved because it reduces network losses; and
- where the marginal loss factor is smaller than 1 – decreases the amount of emission reductions achieved because it results in increased network losses.

Marginal loss factors applied in this Determination provide a signal to invest in emission reduction projects at locations where this is higher consumption than generation (where the MLF is greater than 1) because doing so causes more network losses to be avoided.

Finally, this calculation differs from the calculation in **equation 16**. While they have similar formulas, **equation 9** refers to the calculation in the baseline period, and **equation 16** refers to the calculation done during the crediting period.

37 Apportioning of total baseline NGER emissions

This section applies to facilities that produced more than one production variable during the NGER reporting years in the baseline period. Under **equation 10**, a proportion of total baseline NGER emissions are allocated to each production variable. This is then used to calculate the emissions intensity of each production variable in **equation 8**. The apportioning calculation must be carried out for each NGER reporting year of the baseline period to work out the baseline emissions intensity under section 33.

For facilities that produce multiple outputs, total emissions are apportioned between production variables to enable emissions intensities to be calculated for each production variable. This is intended to diminish any distortionary impacts from relative changes in the production mix on a project's abatement. For example, if left unaccounted for where a facility shifts production from high emissions intensity outputs to lower emissions intensity outputs in response to market demand, this would artificially enhance the emissions reductions reported by the project without changing the quantity of genuine and additional abatement achieved. The calculations under section 37 normalise for changes in the production mix so data between the baseline period and the reporting period is comparable.

Equation 11 under subsection 37(2) determines the percentage of total baseline NGER emissions that should be allocated to the production of the relevant production variable. Proponents can use either a default apportioning metric or a facility-specific apportioning metric to allocate emissions between products. The sum of percentages of emissions apportioned to each production variable cannot exceed 100 per cent.

The default apportioning metric, set out under subsection 37(3), is based on data submitted to determine allocative baselines for emissions-intensive trade-exposed (EITE) activities under the former Jobs and Competitiveness Program. If facility-specific EITE baseline data is available, this must be used to determine the weighted average emissions per unit of production using **equation 12**. Electricity consumption data submitted under the Jobs and Competitiveness Program from 2006-07 and 2007-08 must be converted to scope 2 emissions using the applicable electricity emissions factor. Direct (scope 1) emissions and scope 2 emissions from 2006-07 and 2007-08 are added together and divided by the total production over the same period to calculate the facility-specific weighted average emissions per unit of production.

Where proponents do not have access to this data, the industry average baselines set out under Schedule 1 can be used, with **equation 13** available to calculate the total industry average emissions intensity for a relevant production variable. The industry average electricity intensity per unit of production listed under column 4 of Schedule 1 must be converted to emissions per unit of production using the applicable electricity emissions factor. This figure is then added to the industry average scope 1 emissions intensity of production listed under column 3 of Schedule 1 to determine the total industry average emissions intensity for a relevant production variable.

Subsection 37(5) allows project proponents without relevant data under the Jobs and Competitiveness Program to develop a facility-specific apportioning metric to allocate emissions between production variables. This facility-specific apportioning metric will need to adhere to the criteria outlined in this subsection. Typically, a facility specific apportioning metric will be an emissions intensity figure relevant to a production variable produced at the facility, although this is not a requirement under the subsection. The subsection does require that:

- the apportioning metric be determined using an approach that includes any material emissions source associated with the production variable; and,
- if an emissions source spans across multiple production variables, the sum of emissions apportioned to the variables in any NGER reporting year during the baseline period is not more than 5 per cent greater than total emissions from that source in that year.

Subdivision C – Recalculating emissions intensity

38 Application of Subdivision

Abatement calculated under this Determination measures improvements in emissions intensity achieved in the reporting period in comparison to the baseline period.

To ensure that data between the baseline period and the reporting period are comparable, there may be instances where the baseline emissions intensity will need to be adjusted.

The baseline emissions intensity will need to be adjusted in situations where, in the calculation year, one or more of the following circumstances apply and would result in a material effect on the abatement from the project:

- new factors are used to calculate NGER emissions;
- there are changes to the input or output purity of a production variable, other than cases where the production variable is a multi-component, elaborately transformed product, electricity, heat, or cooling;
- errors in data used to calculate the baseline emissions intensity are identified.

Subsection 38(2) sets out the definition of a new factor and subsection 38(3) sets out the definition of an input or output purity change.

These adjustments are necessary to ensure the level of abatement reported reflects genuine abatement achieved rather than, for example, changes to the way emissions have been calculated over time, like a move to a lower or higher method, as described in the *NGER (Measurement) Determination 2008*. Similarly, a facility might change the input or output purity of the goods it produces in a way which materially impacts on emissions. These changes to emissions are likely to be the result of a business reacting to market forces rather than an intention to reduce emissions, so would not be considered additional.

Once the baseline emissions intensity is recalculated, the new baseline emissions intensity is to be used in all subsequent reporting years unless one or more of the circumstances occur in a later reporting year have a material effect on abatement and require that the baseline emissions intensity be recalculated again. However, recalculations of baseline year emissions are always worked out relative to emissions in the baseline year, not the previously recalculated values.

39 Recalculating emissions intensity

Section 39 sets out the sections that proponents should use to recalculate the original emissions intensity and the order of these calculations. The original emissions intensity should be recalculated where:

- new factors are used to calculate NGER emissions;
- there are input and output purity changes; and/or
- there are error correction changes.

40 Recalculating because of a new factor

If the baseline emissions intensity needs to be recalculated due to the application of new factors, such as default energy content or default emissions factors, Global Warming Potentials, or moving to a lower or higher order NGER measurement method, then the total baseline NGER emissions, as calculated under section 36, will need to be adjusted to reflect the new factors as if they had been used during the baseline period. This adjusted data will then be used to calculate the baseline emissions intensity for each production variable at the facility.

The recalculation only needs to occur for the baseline year, instead of the baseline period, as it is expected that the adjustment of a new factor is unlikely to change the lowest emissions intensity year, because the change would act in a similar manner across all years. Factor changes that occur during the reporting period will only need to be reflected in the NGER emissions reported under the baseline year identified under section 33. Proponents will not need to recalculate the baseline emissions intensity for other years in the baseline period.

If, in adjusting the NGER facility level emissions data, it is not possible to calculate the emissions for a parameter using the same NGER measurement method, measurement procedure or frequency as is used for the calculation year, then the recalculated emissions are to be worked out using **equation 14**. An example of circumstances where this may occur is when a proponent moves from a Method 1 NGER calculation to a Method 4 NGER calculation in their NGER report. In this case, it may not be possible to calculate the baseline emissions intensity using the higher order method as it would have required equipment specific sampling. In such circumstances, **equation 14** would be used.

41 Recalculating because of an input or output purity change

If the baseline emissions intensity needs to be recalculated due to a change in input or output purity during the calculation year, proponents should use a facility-specific method to do so. The adjustment will need to be applied to emissions allocated to each relevant production variable in the baseline year identified under section 33.

To recalculate the baseline emissions intensity, proponents must determine a facility-specific *change in processing factor* that can be shown to accurately reflect the change in emissions from the facility resulting from the input of output purity change. For example, if a facility changed the purity of its output such that the process to produce the output only required half the amount of emissions as was the case in the baseline year, then the change in processing factor would be 0.5. The factor is then used in **equation 15** to adjust the amount of emissions attributed to the relevant production variables in the baseline year. The adjusted emissions figures will then be used to calculate the new baseline emissions intensities for the relevant production variables.

When proponents determine the facility-specific change in processing factor for recalculating baseline NGER emissions for a change in input and output purity, they must do so in accordance with the criteria described in subsection 41(3). These criteria ensure that the factor is worked out in a robust, credible and conservative way that is specific to the facility and takes account of all relevant variables that may affect the emissions intensity of the production variable as a result of the input or output purity changes.

Proponents cannot use this process to increase the emissions intensity of a production variable by more than 50 per cent. If the proponents work out that the change in processing factor is greater than 1.5, then 1.5 is used instead to adjust the baseline emissions in **equation 15**.

An example input purity adjustment calculation can be found in Attachment C in Case 7.

42 Recalculating because of an error

Where an error has been identified in the data originally used to calculate baseline emissions intensity, proponents must recalculate the baseline emissions intensity for the NGER reporting year in which the error occurred. Proponents will then need to identify whether the recalculation changes the baseline year identified under section 33. This section could apply if a proponent or the Regulator realises that figures submitted in an NGER report contain an error or miscalculation, and allows proponents to correct for this mistake to ensure an accurate reflection of both emissions and abatement in the National Greenhouse Gas Inventory. Section 85 of the legislative rule is applicable where errors in offset reports are identified.

Division 6 Method for calculating NGER emissions

43 Summary

In order to determine the level of abatement achieved by the project, the NGER emissions that occurred during the reporting period must first be calculated for each facility to which the project applies. Division 6 separates out the general facility NGER emissions calculation in section 44, and the calculation necessary for a facility that has electricity as a production variable in section 45.

44 NGER emissions (general)

The calculation of NGER emissions for a facility during a reporting year is set out in **equation 16** and applies to all facilities that have a production variable that is not electricity, even if the facility also produces electricity as a production variable. The calculation starts by summing the following:

- The quantity of direct (scope 1) emissions reported by the facility in its NGER report.
- Emissions from electricity imported to the facility (scope 2). To calculate the emissions from imported electricity, the number of megawatt hours of electricity imported and used at the facility is multiplied by the applicable electricity emissions factor, and by a marginal loss factor that was valid at the end of the NGER reporting year to adjust for losses in transmission to the facility (see section 36 for more information on these factors).
- The quantity of indirect (scope 2) emissions from heat or cooling reported by the facility in its NGER report.

The following emissions must then be subtracted to arrive at the NGER emissions for the facility:

- Any excluded NGER fugitive emissions (as defined under section 5). These emissions are excluded from the total baseline NGER emissions because emissions from these sources are highly variable and are generally poorly correlated with production. This variability could offset abatement reported by the project or artificially enhance that abatement without changing the level of genuine and additional abatement achieved.
- If the facility exports electricity in the NGER reporting year, the total emissions from electricity exported from the facility during the NGER reporting year worked out using **equation 26**.

- If the facility exports heat or cooling in the NGER reporting year and did not export heat or cooling in the baseline year, then the emissions associated with heat or cooling exported from the facility must be subtracted. This is because facilities that install a CHP plant as part of a facilities project may export some of the heat or cooling it generates. Excluding the emissions from these outputs prevents them offsetting emissions reductions achieved by the project. Subdivision C of Division 7 sets out how to apportion emissions to exported electricity and a similar approach must be applied when apportioning emissions to exported heat and cooling.

This calculation differs from the calculation in **equation 9**. While they have similar formulas, **equation 9** refers to the calculation of emissions in the baseline period, and **equation 16** refers to the calculation for a reporting year during the crediting period.

45 NGER emissions (electricity)

The calculation of NGER emissions from facilities that have nominated electricity as a production variable is worked out using **equation 17**.

The first component of **equation 17** works out emissions from existing electricity generating units that have not been replaced. It multiplies the emissions intensity of exported electricity from existing generating units during the NGER reporting year by the quantity of electricity exported by the existing generating units during the NGER reporting year less additional electricity exported due to thermal efficiency improvements.

The second component works out emissions from new generating units that have replaced existing generating units. It multiplies the emissions intensity of exported electricity from the new generating units by the lesser of the quantity of electricity generated by the replaced generating units and the new generating units. Electricity generated from replaced generating units equipment is defined in subsection 54(1) and means the quantity of electricity generated from replaced electricity generating units and exported during the baseline year. Electricity from new electricity generating units is defined in section 53 and means the quantity of electricity generated from new electricity generating units and exported during the NGER reporting year. The lesser of the two quantities is taken because any additional generation beyond the replaced amount is accounted for in the electricity adjustment calculation in Division 7 Subdivision B.

The emissions intensity of replaced electricity generating units is taken to be zero if the emissions intensity of the new generating units is greater than the grid average. This means that electricity generating units that replace existing units must not be more emissions intensive than the grid average at the start of the project if it is to receive credits, even if this unit has a lower emissions intensity than the units it is replacing. This is intended to avoid providing any incentive for generators to invest in new units that extend its asset life, unless the electricity generated using this new units is better than the grid average emissions intensity. To provide certainty at the time of investment, the emissions intensity of new electricity generating units is multiplied by the marginal loss factor that is valid for the NGER reporting year. Because marginal loss factors are also accounted for in the calculation of emissions intensity of new generating equipment in **equation 21**, this has the effect of cancelling out the effects of changes in marginal loss factor when considering whether the new electricity generating units are better than the grid average emissions intensity.

Finally the quantity of electricity exported is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of the NGER reporting year (see section 48 for more information on these factors).

Division 7 Method for calculating electricity abatement adjustments

Subdivision A – Electricity abatement adjustment A

46 Summary

Electricity abatement adjustment A applies to projects that improve the thermal efficiency of existing generating units, where electricity exported is a production variable for the facility.

The electricity abatement adjustment for a facility represents the change in emissions outside of the facility boundary resulting from a project that causes the additional export of electricity. This additional export displaces output of electricity generators elsewhere and leads to increases or decreases in emissions, depending on the emissions intensity of the displaced output.

This abatement adjustment is calculated as the difference between the emissions intensity of the electricity exported by the facility and the grid average emissions intensity, multiplied by the total output unlocked by the project for each NGER reporting year over the project.

47 Application of Subdivision

Subdivision A of Division 7 applies to facilities that have electricity as a production variable and the additional electricity is exported as a result of project abatement activities that improve the thermal efficiency of generation from existing generating units.

An example of a project that would be eligible to receive credits under the Determination is upgrading a boiler at a coal-fired electricity generator which improves the thermal efficiency of the generator. The improved thermal efficiency enables the facility to export a greater amount of electricity. However, the electricity abatement adjustment would reduce the amount of credits received for the project because the emissions intensity of the electricity generation is greater than the grid average.

48 Calculation of electricity abatement adjustment A

Section 48 provides the equation to calculate electricity abatement adjustment A. **Equation 18** takes the difference between the grid average and the facility's reporting year emissions intensity of electricity exported, multiplied by the additional electricity generation resulting from project abatement activities, calculated using **equation 19**.

The grid average emissions intensity of electricity exported is used as a proxy for the emissions intensity of the electricity displaced by the project. This streamlined approach is used rather than trying to determine exactly what output has been displaced by a particular project as this would be highly complex and difficult for project proponents to apply.

As a final step, the equation is adjusted for losses in the network for the additional electricity that is exported from the facility as a result of the project abatement activities. This is done by applying a marginal loss factor. Marginal loss factors account for energy that is lost due to electrical resistance and the heating of conductors as electricity flows through electricity networks.

In this Determination the marginal loss factor is taken to be 1 if the electricity is exported directly to a local distribution network (for example, in the NEM the facility is considered by the AEMO to be an embedded generator). If this is not the case, and if the facility is directly connected to a transmission network and exports electricity to the NEM, the marginal loss factor is the factor published by the AEMO on its website that was valid at the end of the NGER reporting year. If neither of these cases apply, and a relevant State or Territory in which the facility's generating units are located has determined a factor that was valid at the end of the NGER reporting year, then the marginal loss factor is taken to be this factor. If none of the preceding cases apply, the marginal loss factor is taken to be 1.

In the NEM, marginal loss factors are factored into wholesale electricity spot prices. A marginal loss factor that is less than 1 reduces the price paid for the output from a generator. It reflects that network losses will increase as more output is dispatched at that location and provides a signal to decrease generation. A marginal loss factor that is greater than 1 increases the price paid for output from a generator. It reflects that network losses will decrease as more output is dispatched at that location and provides a signal to increase generation.

Network losses also impact emissions and abatement calculations. When the marginal loss factor is greater than 1 at a given location, electricity consumption is greater than electricity generation. Any additional generation at this location reduces the need to transmit electricity from elsewhere in the network, allowing network electricity losses that would have occurred to be avoided.

When the marginal loss factor is smaller than 1 at a given location, electricity generation is greater than electricity consumption. Any additional generation at this location increases the amount of electricity that is transmitted elsewhere in the network, creating more losses as this electricity flows through the network.

Multiplying the additional electricity exported by the marginal loss factor:

- where the marginal loss factor is greater than 1 – increases the amount of emission reductions achieved because it reduces network losses; and
- where the marginal loss factor is smaller than 1 – decreases the amount of emission reductions achieved because it results in increased network losses.

Marginal loss factors applied in this Determination provide a signal to invest in projects that increase generation where this is higher consumption than generation (where the MLF is greater than 1) because doing so causes more network losses to be avoided.

49 Additional electricity generation resulting from improved thermal efficiency of existing generating units

This section sets out how to calculate the quantity of additional electricity exported as a result of the project, which is used to calculate the electricity abatement adjustment A in **equation 18**. The amount of additional electricity exported by the facility is equal to the amount unlocked by thermal efficiency improvements from the project. This amount is worked out in **equation 19** as the quantity of electricity exported from the facility during the NGER reporting year, using generating units that existed during the baseline period, multiplied by the improvement in thermal efficiency.

The improvement in thermal efficiency is worked out as the thermal efficiency of the generating units in the NGER reporting year divided by the thermal efficiency in the baseline year, minus one. Thermal efficiency is worked out as the gigajoules of electricity generated by the facility using generating units that existed in a baseline year, divided by the gigajoules in the fuel consumed by the units to generate the electricity.

Subsection 49(2) provides that the amount of additional electricity exported from the facility as a result of project abatement activities that improve the thermal efficiency of existing electricity generating units is taken to be zero if the amount worked out under subsection 49(1) is less than zero. This is because this amount is used to calculate the additional electricity generation resulting from project abatement activities in **equation 18,** and is not meant to reflect decreases in output resulting from project abatement activities. Additionally, if the thermal efficiency of electricity generation in the baseline period is zero, then the amount worked out in subsection 49(1) is taken to be zero.

This equation can provide a positive number for additional electricity exported even when less electricity is exported from the facility in the NGER reporting year than in the baseline year. This is because of an underlying assumption that an improvement in thermal efficiency at the facility would result in more electricity being exported from the facility than would otherwise have been the case.

Subdivision B – Electricity abatement adjustment B

50 Summary

Electricity abatement adjustment B applies to projects that add new generating units to generate and export electricity from a facility, whether or not the electricity exported is a production variable for the facility.

The electricity abatement adjustment for a facility represents the change in emissions outside the facility boundary resulting from a project that causes the additional export of electricity from new generating units. This additional export of electricity displaces output of electricity generators elsewhere and leads to increases or decreases in emissions, depending on the emissions intensity of the output displaced.

This abatement adjustment is calculated as the difference between the emissions intensity of the electricity exported from the new generating units at the facility and the grid average emissions intensity, multiplied by the total output unlocked by the project for the NGER reporting year.

51 Application of Subdivision

Subdivision B of Division 7 applies to a facility that undertakes a project to add new generating units to produce electricity that is exported from the facility.

52 Calculation of electricity abatement adjustment B

Section 52 provides the equation to calculate electricity abatement adjustment B. **Equation 20** takes the difference between the grid average emissions intensity and the emissions intensity of electricity exported from the new generating units in the reporting year, and multiplies it by the net amount of electricity exported from the new generating units during the NGER reporting year. This result is then multiplied by the marginal loss factor which adjusts the amount of electricity exported to account for the marginal losses of delivered electricity to a connection point (see section 48 for more information on these factors).

The emissions intensity of electricity exported from new generating units is worked out using **equation 21**, and the net quantity of electricity exported from new generating units is worked out using **equation 22**.

The grid average emissions intensity of electricity exported is used as a proxy for the emissions intensity of the electricity displaced by the project. This streamlined approach is used rather than trying to determine exactly what output has been displaced by a particular project as this would be highly complex and difficult for project proponents to apply.

53 Emissions intensity of electricity generated using new generating units and exported from a facility

The emissions intensity of electricity exported from new units added as part of a project is calculated using **equation 21**. The equation divides emissions in the NGER reporting year that are apportioned to the new electricity generating units in accordance with section 59 by the quantity of electricity exported from the new electricity generating units.

The quantity of electricity in the denominator is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of the NGER reporting year (see section 48 for more information on these factors).

54 Electricity generated using new generating units and exported from a facility

The net quantity of electricity generated using new electricity generating units and exported from a facility is calculated using **equation 22**. To calculate the net quantity of electricity exported, this equation takes the total amount of electricity exported from the facility during the NGER reporting year and subtracts the quantity of electricity exported using existing generating units in the reporting year. To ensure that the calculation does not overestimate the net amount of electricity exported from new generating units, the quantity of electricity exported using replaced generating units in the baseline year is also subtracted from the total.

Replaced generating units are defined in section 5 as equipment that was used to generate electricity during the baseline year and is not used to generate electricity at the facility during the NGER reporting year.

Subsection 54(2) provides that the net amount of electricity generated using new generating units is taken to be zero if the amount worked out under subsection 54(1) is less than zero. This is because this amount is used to calculate the additional electricity generation resulting from project abatement activities in **equation 20**, and is not meant to reflect decreases in output resulting from project abatement activities.

Division 8 – General calculations relating to electricity

55 Baseline emissions intensity of electricity generated using existing generating units and exported from a facility.

This section sets out how the baseline emissions intensity of electricity exported from existing generating units is to be calculated using **equation 23**. The equation sets out that baseline emissions intensity consists of NGER emissions in the baseline year attributable to electricity exported from generating units used, worked out in accordance with section 35, divided by the megawatt hours of electricity exported from the generating units in the baseline year.

Subsection 55(2) provides that to work out the amount of NGER emissions to be apportioned to electricity generated using existing generating units and exported from the facility during the baseline year, the approach described in section 35 should be used as if this electricity was itself a production variable.

The quantity of electricity in the denominator is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of NGER reporting year in the relevant baseline year (see section 48 for more information on these factors).

56 Emissions intensity of electricity generated using existing generating units and exported from a facility.

The emissions intensity of existing generating units during an NGER reporting year is determined in accordance with **equation 24**. This is worked out as NGER emissions in the reporting year attributable to electricity exported from existing generating units, worked out in accordance with section 59, divided by the quantity of electricity generated using existing generating units at the facility and exported from the facility during the reporting year.

The quantity of electricity in the denominator is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of the NGER reporting year (see section 48 for more information on these factors).

57 Emissions intensity of electricity generated using replaced generating units and exported from a facility

The emissions intensity of electricity generated using replaced electricity generating units at a facility and exported from the facility during the baseline year is determined using **equation 25**. This is worked out by dividing the baseline NGER emissions attributable to electricity generated using replaced electricity generating units at the facility and exported from the facility during the baseline year by the quantity of electricity generated using replaced electricity generating units at the facility and exported from the facility during the baseline year.

Subsection 57(2) provides that to work out the amount of NGER emissions to be apportioned to electricity generated using replaced generating units and exported from the facility during the baseline year, the approach described in section 35 should be used as if this electricity was itself a production variable.

The quantity of electricity in the denominator is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of the NGER reporting year for the relevant baseline year (see section 48 for more information on these factors).

58 Total emissions from exported electricity

Total emissions from exported electricity during an NGER reporting year is worked out using **equation 26**. This equation is the sum of emissions in the NGER reporting year from generating units that existed during the baseline year and the emissions in the NGER reporting year from new generating units.

Emissions in the NGER reporting year from generating units that existed during the baseline year is worked out by multiplying the emissions intensity of these units, worked out using **equation 24,** and the megawatt hours of exported electricity produced, measured in accordance with applicable monitoring requirements set out in Division 4 of Part 5.

The emissions intensity of electricity exported from new generating units added as part of a project is calculated using **equation 21**.

The quantity of electricity from existing electricity generating units is adjusted for losses in the electricity network by applying the marginal loss factor that was valid at the end of the NGER reporting year (see section 48 for more information on these factors).

59 Emissions apportioned to electricity generated using new generating units and exported from a facility

Section 59 sets out how emissions (both direct emissions and emissions from the use of imported electricity) are to be apportioned to electricity generated using new or existing generating units (the ***relevant units***) and exported from the facility in a reporting period. Emissions apportioned to electricity generated by the relevant units and exported from the facility include any emissions arising from the combustion of fuel to generate electricity, and auxiliary processes that support the functioning of the relevant units, as well as any other existing equipment used to produce exported electricity. Section 35 applies to apportioning emissions in the baseline period.

Section 59 sets out the approach for how project proponents can use an apportioning metric to apportion emissions to the electricity generated and exported by the relevant units. Key requirements include that the apportioning metric:

- include any material facility emissions associated with the relevant units;
- apportions emissions to electricity generated from a CHP plant in accordance with **equation 27**; and
- does not result in an emissions intensity of the electricity generated and exported from the relevant units being less than the emissions intensity of the fuel combusted in order for the relevant units to generate the exported electricity.

This apportioning approach works out the emissions attributable to all electricity generated using the relevant units as opposed to isolating emissions specific to the relevant piece of equipment. For example, if new equipment is installed as part of a chain of processes that is set up to produce electricity, then the emissions apportioned to the electricity generated and exported using the new equipment are the emissions from the entire chain of processes.

These emissions are then divided by all electricity generated and exported using the relevant units to work out the emissions intensity of new equipment in **equation 21,** and existing equipment in **equation 24**. For example, if new equipment is installed at a generating unit, then all the electricity generated from the generating unit that is exported from the facility is counted in the calculation of Q_{new} in **equation 21**.

The diagram below provides a simplified illustration of this concept. If new equipment is installed anywhere in Generating Unit 1 (for example replacing Boiler 1), then Generating Unit 1 is considered to be a ***new generating unit***. The apportioning approach, together with the emissions intensity calculations in **equation 21,** work out the total resulting emissions intensity of electricity generated and exported by the new generating unit.

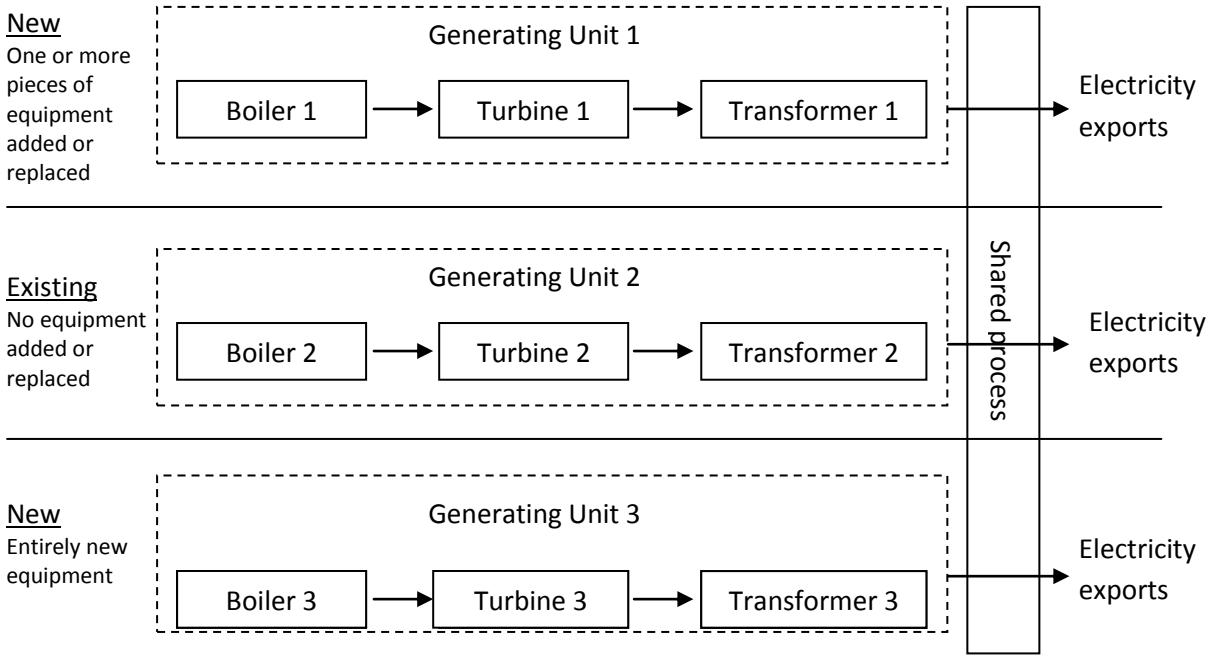
Since the replacement of Boiler 1 in Generating Unit 1 involves the replacement of equipment (in this case the old boiler), this means that Generating Unit 1, as it was operating in the baseline period with the old boiler, would be considered a ***replaced generating unit***. The emissions intensity of electricity generated using replaced generating units during the baseline year is calculated using **equation 25**.

No new equipment is added to Generating Unit 2, so the unit is considered to be an ***existing generating unit***. The emissions intensity of electricity generated and exported from existing generating units during the reporting period is worked out using the apportioning approach together with **equation 24**. In this case, a project may involve a change that affects the emissions from Generating Unit 2, such as changing the quality of fuel used, but does not involve the replacement of any equipment.

In the diagram below, Generating Unit 3 is made up entirely of new equipment. In this case, Generating Unit 3 is also considered to be a ***new generating unit***. So the apportioning approach, together with the emissions intensity calculations in **equation 21**, would be used to work out the emissions intensity of electricity generated and exported from new generating units by considering emissions and electricity relating to both Generating Units 1 and 3.

Continuing the example to a later reporting year, a new piece of equipment is added to the facility that is used by all three generating units (***shared electricity generating equipment***). In this case, all three generating units would then be considered to be new generating units if the emissions produced by, or required to operate, the shared generation equipment in a reporting year are greater than the smallest of 10,000 tCO_2-e and 5 per cent of the emissions associated with any one of the three generating units. If this occurs, then the three generating units operating during the baseline period are considered to be replaced generating units.

These calculations differentiate between new and existing equipment, to ensure projects are not over-credited or under-credited as a result of the emissions intensity of completely new generating units being averaged with that of existing generating units. While the three generating units depicted in the diagram form part of the same facility, the electricity generated and exported from the generating units is apportioned separately as being either from new or existing units.



60 Emissions apportioned to electricity generated by a CHP plant

The emissions associated with electricity generation from a new CHP plant are calculated using **equation 27**. To calculate the emissions apportioned to electricity, proponents must first calculate the thermal efficiencies of electricity, heat and cooling generation by the CHP plant in accordance with section 62. These efficiencies are then used in **equation 27** to apportion emissions to electricity generated by the plant. The numerator of the ratio in **equation 27** represents the energy required by the CHP plant to generate the electricity. The denominator represents the energy required by the plant to generate the electricity, heat and cooling. This ratio is then applied to the total emissions from the CHP plant to allocate emissions to electricity. If the plant does not produce any cooling, then the quantity and efficiency of cooling should be equal to zero.

If the emissions associated with exported heat and/or cooling need to be calculated for the purposes of **equation 16** in section 44, an adjusted form of this equation should be used, where the efficiency ratio of the exported substance produced by the CHP plant would be in the numerator of **equation 27**.

61 Quantity of heat and cooling generated

The quantity of heating and cooling generated is needed to calculate the total emissions from electricity generation from a CHP plant in section 60. These quantities may also be required to calculate the emissions from heating and/or cooling if these emissions are required to be deducted from total NGER emissions in section 44.

Unlike electricity, heating and cooling are difficult to measure directly. For this reason, this Determination uses a standard equation that relies on the physical relationship between inputs and outputs to identify the quantity produced.

The quantity of heat produced is determined by calculating the difference between the energy contained in the steam produced by the CHP plant and the energy contained in the feedwater. This equation (**equation 28**) is divided by one million to convert the result into gigajoules.

Similarly, the quantity of cooling is determined by calculating the difference between the energy contained in the return water that goes into the absorption chiller and the energy contained in the water outflow from the absorption chiller. This equation (**equation 29**) must also be divided by one million to convert the result to gigajoules.

62 Efficiency of electricity, heat and cooling generation

A measure of the efficiency of the electricity, heat and cooling generation is required to complete the calculation in **equation 27**. Efficiencies can be worked out using an approach that is consistent with the efficiency method described in the ***Allocation of Emissions from a CHP Plant Guide***. To avoid doubt, this version of the guide should be used if superseded by a new version or if the name of the guide changes.

These efficiencies may also be required to calculate the emissions from heat and/or cooling if these emissions are required to be deducted from total NGER emissions at section 44.

This reference to the ***Allocation of Emissions from a CHP Plant Guide*** relates to version 1 as stated in the method, not any updated or changed versions available at a later date.

Part 5 Reporting, record keeping, and monitoring requirements

Subsection 106(3) of the Act provides that a methodology determination may require the project proponent of an eligible offsets project to comply with specified monitoring, record keeping and reporting requirements.

Under Parts 17 and 21 of the Act, a failure to comply with these requirements may constitute a breach of a civil penalty provision, and a financial penalty may be payable.

The monitoring, record keeping and reporting requirements specified in Part 5 of the Determination are in addition to any requirements specified in the Act, Regulations and Rules.

Reporting periods

The Act, Regulations and Rules provide for flexible reporting periods between six months and two years in duration. The Act and its subordinate legislation may also specify other reporting and notification requirements affecting the Determination, including allowing shorter reporting periods.

Changed audit requirements

The Act provides for a risk-based approach to auditing abatement. Subsections 13(1) and 76(4) of the Act provide for legislative rules to be made by the Minister, specifying the level of assurance, frequency and scope of the audit report that must be provided with project reports for different types of projects.

Division 1 Offset report requirements

Subdivision A – Requirements relating to timing

63 Operation of this Subdivision

The effect of subparagraph 76(4)(e)(ii) of the Act is that a methodology determination may specify the time period by which an offsets report must be submitted to the Regulator.

64 Timing for final offsets report

Section 64 of the Determination applies if the crediting period for a facilities project ends part way through the NGER reporting year. Under these circumstances, the offsets report for the final NGER reporting year in the reporting period must be submitted to the Regulator within six months following the end of the final NGER reporting year.

Subdivision B – Information that must be included in an offsets report

65 Operation of this Division

The effect of paragraph 106(3)(a) of the Act is that a methodology determination may set out requirements to be included in each offsets report.

66 Information about new production variables

Section 66 sets out that in the event that a new production variable is chosen in accordance with subsection 16(3), then the offsets report must include a description of that production variable. The description must include details of the output variable's key substance of value, unless the output variable is electricity, heat, cooling or a multi-component, elaborately transformed product.

67 Information about biomass used as an energy source and imported electricity, heat or cooling from biomass

Section 67 sets out that the offsets report must include a declaration that any biomass used during the reporting period by the facility satisfies the definition of ***eligible renewable energy source*** in the *Renewable Energy (Electricity) Act 2000*.

If electricity, heat or cooling generated using biomass has been imported, the offsets report should include a declaration that the biomass satisfies the definition of ***eligible renewable energy source*** in the *Renewable Energy (Electricity) Act 2000*.

In the case of electricity, this requirement only applies to electricity purchased and transmitted directly from an external generator, and does not apply to electricity purchased from a grid where multiple parties draw or supply electricity.

68 Information about greenhouse gas emissions, energy production and energy consumption

Section 68 applies to an offsets report if the facility is not required to submit an NGER report to the Regulator or the facility is not required to include information about the greenhouse gas emissions, energy production or energy consumption from the operation of the facility in the facility's NGER report because the facility no longer meets the NGER reporting threshold.

If this section applies, the proponent must include in the offsets report the same information about greenhouse gas emissions, energy production and energy consumption from the operation of the facility as would be required to include in an NGER report. This will allow the Regulator to continue to issue ACCUs for verified abatement achieved through the offsets project.

This section may apply if, for example, a facility reduces its emissions below the NGER reporting threshold for facilities and is therefore not required to report its NGER emissions to the Regulator. It may also apply if there is a change in ownership such that the facility no longer forms part of a business structure that exceeds the NGER corporate group threshold and does not exceed the facility reporting threshold on its own.

69 Information about facilities

For each facility included in the project, the offsets report is required to contain its name as used for NGER reporting purposes, the total facility abatement worked out using **equation 3**, and whether a Statement of Abatement Intent that is signed by the Chief Financial Officer of the person with operational control over the facility has been given to the Regulator. This information will allow the Regulator to determine whether abatement worked out using **equation 3** has been done so in accordance with the requirements set out under subsection 26(2).

70 Determination of certain parameters

In the context that section 81 applies because a project proponent fails to monitor a ***parameter***, such as a production variable, an input, an output or electricity, then section 70 requires that offsets report include details about the parameter in question. These details include the name of the parameter, the start and end dates of each non-monitoring period, the estimated value of the parameter, how it was estimated, and the reasons why the project proponent failed to monitor the parameter in accordance with the monitoring requirements.

Division 2 Notification requirements

71 Operation of this Division

The effect of paragraph 106(3)(b) of the Act is that a methodology determination must set out the notification requirements for a facilities project that is an eligible offsets project.

72 Notification requirements

If a facility falls below an NGER reporting threshold or is no longer required to provide an NGER report to the Regulator, the project proponent must notify the Regulator within 60 days of the project proponent becoming aware of the matter. This will allow the Regulator and the proponent to agree on alternative arrangements for reporting facility emissions to calculate abatement from the project.

Division 3 Record-keeping requirements

73 Operation of this Division

The effect of paragraph 106(3)(c) of the Act is that a methodology determination may set out the record-keeping requirements for a facilities project.

74 Record-keeping requirements

The specific record-keeping requirements for a facilities project are set out in section 74 of the Determination, including concerning the removal and disposal of equipment or other components as part of a project. Where this occurs, project proponents are required to keep a record of evidence that the equipment was disposed of in accordance with relevant Commonwealth, State or Territory legislative requirements. The Act and legislative rules also specify other offset report and record keeping requirements that apply to all ERF projects.

Under the New South Wales Energy Saving Scheme, there are restrictions on the disposal of equipment that is replaced as part of an abatement project to ensure there are no increases in emissions elsewhere in the economy if the equipment is sold and reused. However, under this Determination there will be no restrictions on the disposal of replaced equipment, and the sale and reuse of replaced equipment by another facility not included in the project is not considered as a project activity that increases emissions outside of the facility. This is because equipment used by NGER reporters is likely to be large and high-value, and implementing the restriction in this case may render projects uncompetitive. Further, a blanket restriction across all NGER reporters may prevent equipment being reused where it was inappropriately sized for its previous use but well suited to a new use.

Division 4 Monitoring requirements

75 Operation of this Division

The effect of paragraph 106(3)(d) of the Act is that a methodology determination must set out the monitoring requirements for a facilities project.

76 Requirement to monitor greenhouse gas emissions, energy production and energy consumption

Section 76 sets out the requirement that proponents must monitor greenhouse gas emissions, energy production and energy consumption from the operation of each facility to which the project relates. No consequences for failing to monitor parameters are specified in this Determination as this is captured by the requirements of the NGER Act.

77 Requirement to monitor abatement activities implemented

Section 77 sets out the requirement that proponents must monitor implemented abatement activities to enable an assessment of whether the activity materially contributes to project abatement.

78 Requirement to monitor changes relating to the operation of a facility

Section 78 applies if a change is made at a facility after the end of the baseline period and as a result of the change, the facility has potentially undergone a significant expansion or a significant output variable change.

Proponents must monitor these changes in such a manner to enable the assessment of whether or not a significant expansion or significant output variable change has occurred. For example if a manufacturing plant extends a production line which increases the output and emissions from the facility, this change must be monitored in order to determine whether or not the expansion is a significant expansion as defined by the Determination.

79 Requirement to monitor production variables etc.

Subsection 79(1) sets out the requirement that proponents must monitor the quantity and purity of each production variable produced or processed by a facility to which the project relates.

Subsection 79(3) sets out the requirement that proponents must monitor the purity of input and output variables produced or processed by a facility. This is to recalculate the crediting baseline under section 41, if necessary.

80 Requirement to monitor exported electricity

Section 80 provides that proponents must monitor exported electricity in such a way that the Regulator can determine the amount of electricity that has been generated and exported by each generating unit at the facility.

If a facility is connected to the NEM, then the facility will have one or more ***designated metering points*** that are considered ***NEM standard metering*** under the National Electricity Rules. It is the intention that, where possible, electricity exported from the facility is measured at these metering points.

In some cases, the facility will have an individual NEM standard metering point for each generating unit at the facility. If so, this metering point should be used to measure the amount of electricity exported from that generating unit. In other cases, a facility may have multiple generating units connected to a single NEM standard metering point. In these cases, the total electricity exported from the facility should be measured at that point. Internal facility metering should then be used to apportion electricity between the individual generating units, noting that this internal metering may not be considered NEM standard.

For facilities that do not have NEM standard metering points, electricity exported from the facility must be measured using metering that allows the Regulator to determine the total quantity of the electricity generated and exported by each generating unit at the facility. The electricity should be measured at a time that is as close as possible to when the electricity leaves the facility.

81 Consequences of not meeting certain monitoring requirements

Section 81 provides that if a project proponent fails to monitor a parameter described in sections 79 and 80 for up to and including 20 per cent of the days in a reporting period, the project proponent must make conservative estimates of the parameter for each non-monitored period.

Subsection 81(2) provides that if the total number of days in all the non-monitored periods in a reporting period is greater than 20 per cent of the total number of days in the reporting period, then the project abatement for each NGER reporting year in the reporting period is taken to be zero.

Subsection 81(4) sets out that, in order to avoid doubt, this section does not prevent the Regulator from taking action under the Act, or regulations or rules made under the Act, in relation to the project proponent's failure to monitor a parameter as required by the monitoring requirements. Examples of action that may be taken include the following:

a) if the failure constitutes a breach of a civil penalty provision in section 194 of the Act (which deals with project monitoring requirements), the Regulator may apply for a civil penalty order in respect of the breach;

b) if false or misleading information was given to the Regulator in relation to the failure, the Regulator may revoke the project's section 27 declaration under regulations or rules made for the purposes of section 38 of the Act;

c) if the giving of false or misleading information in relation to the failure led to the issue of Australian carbon credit units, the Regulator may require all or some of those units to be relinquished under section 88 of the Act.

Part 6 Dividing a facilities project

82 Operation of this Part

Part 6 sets out requirements for dividing a facilities project that is an eligible offsets project.

83 Requirements for division of project

A project proponent may only divide a facilities project into parts if the project relates to two or more facilities. Following the division, each part of the project must consist of at least one facility and each facility must be included in only one part. These requirements ensure that an NGER report for a single facility is never divided into smaller sub-facility parts.

Schedule 1 – Industry Average Emissions Intensities

1 Industry average emissions intensities

Clause 1 sets out that Schedule 1 provides industry average emissions-intensive trade-exposed emissions intensity baselines, which can be used by proponents to calculate an apportioning metric that represents the emissions resulting from the production of each unit of a production variable at the facility, consistent with the calculations under section 33. These have been adopted from baselines under the Jobs and Competitiveness Program.

Attachment B

Statement of Compatibility with Human Rights

Prepared in accordance with Part 3 of the Human Rights (Parliamentary Scrutiny) Act 2011

Carbon Credits (Carbon Farming Initiative—Facilities) Methodology Determination 2015

This Legislative Instrument is compatible with the human rights and freedoms recognised or declared in the international instruments listed in section 3 of the *Human Rights (Parliamentary Scrutiny) Act 2011*.

Overview of the Legislative Instrument

The *Carbon Credits (Carbon Farming Initiative—Facilities) Methodology Determination 2015* (the Determination) sets out the detailed rules for implementing and monitoring offsets projects that would reduce direct emissions and/or electricity consumption per unit of product at facilities that report emissions under the National Greenhouse and Energy Reporting Scheme.

Project proponents wishing to implement the Determination must make an application to the Clean Energy Regulator (the Regulator) and meet the eligibility requirements set out under the Determination. Offsets projects that are approved by the Regulator can generate Australian Carbon Credit Units, representing emissions reductions from the project.

Project proponents can receive funding from the Emissions Reduction Fund by submitting their projects into a competitive auction run by the Regulator. The Government will enter into contracts with successful proponents, which will guarantee the price and payment for the future delivery of emissions reductions.

Human rights implications

This Legislative Instrument does not engage any of the applicable rights or freedoms.

Conclusion

This Legislative Instrument is compatible with human rights as it does not raise any human rights issues.

Greg Hunt, Minister for the Environment

Attachment C

Examples for the application of the facilities method This section contains a series of examples to illustrate the calculation of abatement for different projects using the Facilities Methodology Determination. The intention of these examples is to give further insight into how the method might operate, and the calculations different facilities with different circumstances may need to make at different project stages. It should be noted that the examples are simplified and are unlikely to reflect real world circumstances, and as such they should not be used as a definitive project guide.

The examples cover:

Case 1 involves a manufacturing facility with a single product creating abatement through a project that improves the efficiency of fuel and electricity use.

Case 2 extrapolates Case 1 to a situation where a manufacturing facility produces multiple products.

Case 3 involves a project to improve the thermal efficiency of a power station.

Case 4 involves a power station adding a new generating unit (with improved emissions intensity) to the existing generating units.

Case 5 considers the case of a change in product to a materially similar product.

Case 6 includes a facility undertaking a project to install a CHP plant.

Case 7 considers a case where abatement has to be adjusted in a facility where input and output purity changes without any change in processing.

Case 8 concerns a facility that undergoes an improvement to one of its generating units, without changing the parameters of the other units.

Note: Calculations use rounding for ease of reading. Full calculated figures are tabulated at the end of each section.

Case 1 – Manufacturing facility with one product

A facility refines alumina, using fuel combusted on-site, heat imported from a neighbouring facility and electricity imported from the grid. An abatement project is undertaken at the facility, using the facilities method, by implementing a general plant upgrade, improving the efficiency of fuel and electricity use. The project will commence on 1 July 2016. The facility has refined alumina, without any major changes, from 2012-13 to 2015-16 (*the baseline period*). It has reported facility-level NGER data for all four years. For the purpose of simplicity, it is assumed that the project proponent has identified 2014-15 as the baseline year. The relevant facility data for the facility for 2014-15 is shown in the table below.

Alumina facility – facility data and grid parameters for 2014-15

Parameter	Equation term	Number	Units	Source
Production	Q_b	1,500,000	tonnes alumina	*Facility data*
Scope 1 emissions	$E_{S1,b}$	830,000	tCO_2-e	*Facility data*
Fugitive emissions (included in scope 1 emissions)	$E_{Fug,b}$	10,000	tCO_2-e	*Facility data*
Imported electricity	EI_b	315,000	MWh	*Facility data*
Other scope 2 emissions (from importing heat)	$E_{S2,Other,b}$	50,000	tCO_2-e	*Facility data*
Grid emissions intensity on the declaration date of the project*	EF_{EP}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal loss factor – 2014-15	MLF_b	1.02		*Grid authority*

*To provide certainty to project proponents, the same grid emissions intensity applies for all calculations.

Equation 1 will be used to calculate total abatement from the project each year (A_P). There is only one facility in this project, so abatement does not need to be summed across multiple facilities.

Equation 1: $$A_P = \sum_f A_{T,f}$$

Since the facility does not export electricity, abatement does not need to be adjusted for the impact of exported electricity displacing other generation in the grid. So Subdivision A of Division 7 does not apply, and both A_E and A_R are zero in Equation 3.

Equation 3: $$A_{T,f} = A_{F,f} + A_{E,f} + A_{R,f}$$

Each reporting year, on-site facility abatement (A_F) is calculated relative to the facility's crediting baselines, as per equation 4. Each year, the facility's NGER emissions ($E_{NGER,r}$) are compared to the crediting baseline (general) (E_{CB}). Since this facility does not export electricity, the crediting baseline (electricity) ($E_{CB,Elec}$) and the NGER emissions from electricity generation ($E_{Elec,NGER,r}$) are both zero.

Equation 4: $$A_F = \left(E_{CB} - E_{NGER,r}\right) + \left(E_{CB,Elec} - E_{Elec,\,NGER,r}\right)$$

Baseline calculations

The crediting baseline (general) is calculated as the sum of the product of the baseline emissions intensity for each production variable (I_n) and the quantity of each production variable produced in the reporting year ($Q_{n,r}$), as per equation 6.

Equation 6: $E_{CB} = \sum_{n} \left(I_n \times Q_{n,r} \right)$

This facility only produces one production variable (alumina), so the next step is to calculate the baseline emissions intensity for alumina. The baseline emissions intensity is calculated according to Equation 8. The NGER baseline emissions in the baseline year attributable to the production variable ($\boldsymbol{E_n}$) is divided by the quantity produced in the baseline year ($\boldsymbol{Q_{n,b}}$).

Equation 8: $I_n = \frac{E_n}{Q_{n,b}}$

Since this facility only produces one production variable, all the NGER emissions are attributed to this variable. NGER emissions are calculated according to Equation 9. Using the facility's emissions data for 2014-15, NGER emissions ($\boldsymbol{E_{NGER,b}}$) for 2014-15 are 1.15 $MtCO_2$-e. These emissions are all attributed to the single production variable, alumina.

Equation 9: $E_{NGER,b} = E_{S1,b} + \left(EI_b \times EF_{EP} \times MLF_b \right) + E_{S2,Other,b} - E_{Fug,b}$

$E_{NGER,b}$ = 830 $ktCO_2$-e + (315 GWh x 0.86 tCO_2-e/MWh x 1.02) + 50 $ktCO_2$-e – 10 $ktCO_2$-e

$E_{NGER,b}$ = 1.15 $MtCO_2$-e

The baseline emissions intensity for the production of alumina in 2014-15 is then calculated, using equation 8, as 0.76 tCO_2-e/tonne of alumina. Similar calculations would be undertaken for all four years in the baseline period. In this case, the emissions intensity in 2014-15 is the lowest of the four years. So 2014-15 is deemed to be the *baseline year*, and 0.76 tCO_2-e/tonne of alumina is the *baseline emissions intensity* for the production variable.

Equation 8: I = 1.15 $MtCO_2$-e / 1.5 Mt of alumina

I = 0.76 tCO_2-e / tonne of alumina

Alumina facility – calculated values for a baseline year 2014-15

Parameter	Equation term	Number	Units	Source
Total baseline NGER emissions	$E_{NGER,b}$	1,146,318	tCO2-e	*Equation 9*
Baseline emissions intensity of alumina	*I*	0.76*	tCO2-e/tonne alumina	*Equation 8*

*Since the emissions intensity of production in 2014-15 is the lowest of the four years in the baseline period, 2014-15 is considered to be the baseline year and this value is the baseline emissions intensity.

Reporting year calculations

The first reporting year of the project is 2016-17. The reported facility data and the relevant grid parameters are shown in the table below.

Alumina facility - facility data and grid parameters for 2016-17

Parameter	Equation term	Number	Units	Source
Production	Q_r	1,600,000	tonnes alumina	*Facility data*
Scope 1 emissions	$E_{S1,r}$	840,000	tCO_2-e	*Facility data*
Fugitive emissions (included in scope 1 emissions)	$E_{Fug,r}$	11,000	tCO_2-e	*Facility data*
Imported electricity	EI_r	340,000	MWh	*Facility data*
Other scope 2 emissions (from importing heat)	$E_{S2,Other,r}$	40,000	tCO_2-e	*Facility data*
Grid emissions intensity on the declaration date of the project	EF_{EP}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal loss factor – 2016-17	MLF_r	1.01		*Grid authority*

The first step is to use equation 6 to calculate the crediting baseline for the facility, which is the product of production in the reporting year ($\boldsymbol{Q_r}$) and the baseline emissions intensity ($\boldsymbol{I}$). The value in 2016-17 is 1.22 $MtCO_2$-e.

Equation 6: E_{CB} = 0.76 tCO_2-e/tonne of alumina x 1.6 Mt of alumina

E_{CB} = 1.22 $MtCO_2$-e

The next step is to calculate the reporting year NGER emissions ($\boldsymbol{E_{NGER,r}}$), worked out using equation 16. This can be calculated using facility data and grid parameters from the table above. Note that since the facility does not export electricity, heating or cooling, emissions from exported electricity ($\boldsymbol{E_{Elec,r}}$) and emissions from exported heating and cooling ($\boldsymbol{E_{HC,r}}$) are both zero. The value of NGER emissions in 2016-17 is 1.16 $MtCO_2$-e.

Equation 16: $$E_{NGER,r} = E_{S1,r} + \left(EI_r \times EF_{EP} \times MLF_r \right) + E_{S2,Other,r} - E_{Fug,r} - E_{Elec,r} - E_{HC,r}$$

$E_{NGER,r}$ = 840 $ktCO_2$-e + (340 GWh x 0.86 tCO_2-e/MWh x 1.01) + 40 $ktCO_2$-e – 11 $ktCO_2$-e – 0 – 0

$E_{NGER,r}$ = 1.16 $MtCO_2$-e

The on-site abatement from the facility is then calculated using equation 4 as the difference between the crediting baseline and the reporting year NGER emissions. The value in 2016-17 is 58 $ktCO_2$-e. This is also the value of total facility abatement, since there are no adjustments required for electricity exported to the grid (equation 3), and project abatement, since the project involves a single facility (equation 1). So the proponents would be issued with 58,415 ACCUs for 2016-17.

Equation 4: A_F = (1.22 $MtCO_2$-e – 1.16 $MtCO_2$-e) + (0 – 0)

A_F = 58 $ktCO_2$-e

Alumina facility – calculated values for 2016-17

Parameter	Equation term	Number	Units	Source
Baseline emissions intensity of alumina	I	0.76	tCO_2-e/tonne alumina	*Equation 8 (baseline year data)*
Crediting baseline	E_{CB}	1,222,739	tCO_2-e	*Equation 6*
Total reporting year NGER emissions	$E_{NGER,r}$	1,164,324	tCO_2-e	*Equation 16*
On-site facility abatement	A_F	58,415	tCO_2-e	*Equation 4*
Total facility abatement	A_T	58,415	tCO_2-e	*Equation 3*
Project abatement*	A_P	58,415	tCO_2-e	*Equation 1*
ACCUs issued for the project	-	58,415		-

*Same as facility abatement since the project consists of only a single facility that does not export electricity.

Case 2 – Manufacturing facility with multiple products

A facility produces both zinc and lead in an integrated production process, using fuel combusted on-site, heat imported from a neighbouring facility, and electricity imported from the grid. As with Case 1, the facility undertakes an abatement project to improve the efficiency of the plant. The project will begin on 1 July 2016. NGER facility data is available for the preceding four years. For the purpose of simplicity, it is assumed that the project proponent has identified 2013-14 as the baseline year. The facility data and calculated parameters for the year 2013-14 are shown in the table below.

Integrated lead and zinc facility – data and grid parameters for 2013-14

Parameter	Equation term	Number	Units	Source
Production of zinc (production variable 1)	$Q_{1,b}$	200,000	tonnes zinc	*Facility data*
Production of lead (production variable 2)	$Q_{2,b}$	25,000	tonnes lead	*Facility data*
Scope 1 emissions	E_{S1}	600,000	tCO_2-e	*Facility data*
Fugitive emissions (included in scope 1 emissions)	$E_{Fug,b}$	5,000	tCO_2-e	*Facility data*
Imported electricity	EI_b	180,000	MWh	*Facility data*
Other scope 2 emissions (from importing heat)	$E_{S2,Other}$	8,000	tCO_2-e	*Facility data*
Grid emissions intensity on the declaration date of the project	EF_{EP}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal loss factor – 2013-14	MLF_b	1.02		*Grid authority*

Baseline calculations

As in Case 1, project abatement is calculated with equation 1, total facility abatement with equation 3, and on-site facility abatement with equation 4. The crediting baseline is calculated using equation 6, but since the facility has more than one production variable, the facility's emissions must be apportioned between the two variables. A baseline emissions intensity will be calculated for each variable. Total NGER emissions are calculated with equation 9 in the same way as Case 1. The value of emissions in 2013-14 is 761 $ktCO_2$-e.

The NGER emissions should now be apportioned to each production variable using equation 10, where $\boldsymbol{AD_n}$ is the apportioning percentage for production variable $\boldsymbol{n}$.

Equation 10: $E_n = AD_n \times E_{NGER,b}$

The apportioning percentage is worked out using equation 11, where $\boldsymbol{M_n}$ is calculated in one of three ways. If the facility submitted data as part of the Jobs and Competitiveness Program, then $\boldsymbol{M_n}$ is the weighted average emissions intensity of production variable $\boldsymbol{n}$ for the financial years 2006-07 and 2007-08, worked out using equation 12. This facility did not operate during these years, so this method cannot be used.

Equation 11: $$AD_n = \frac{M_n \times Q_{n,b}}{\sum_n \left(M_n \times Q_{n,b} \right)}$$

The second option for calculating M_n is to use the industry average emissions intensities of the production variables, worked out using Equation 13. The values for the industry average scope 1 emissions intensity ($I_{S1,n}$) and the electricity intensity ($I_{EI,n}$) for each production variable are found in Clause 1 of Schedule 1 of the determination. Integrated lead and zinc production is an activity found in this schedule, and the industry average intensities are shown in the table below. These are used with equation 13 to calculate M_1 for zinc to be 3.78 tCO_2-e / tonne of zinc and M_2 for lead (with 99.7 per cent concentration) to be 1.43 tCO_2-e / tonne of lead. M_3 could also be calculated for lead with a lower concentration than 99.7 per cent, but lead of this concentration is not produced by this facility.

Equation 13: $$M_n = I_{S1,n} + \left(I_{EI,n} \times EF_{EP} \right)$$

M_1 = 3.07 tCO_2-e/tonne zinc + (0.82 MWh/tonne zinc x 0.86 tCO_2-e / MWh)

M_1 = 3.78 tCO_2-e/tonne zinc

M_2 = 1.12 tCO_2-e/tonne lead + (0.355 MWh/tonne lead x 0.86 tCO_2-e / MWh)

M_2 = 1.43 tCO_2-e/tonne lead

The values for M_n and the quantities produced ($Q_{n,b}$) are then used with Equation 11 to calculate the apportioning percentage for each production variable (AD_n). This means that 95.5 per cent of the facility's NGER emissions will be apportioned to zinc production, and 4.5 per cent to lead production. These apportioning percentages will be used to apportion emissions in each year of the baseline period.

Equation 11: AD_1 = (3.78 tCO_2-e/tonne zinc x 200 kt zinc) /

[(3.78 tCO_2-e/tonne zinc x 200 kt zinc) + (1.43 tCO_2-e/tonne lead x 25 kt lead)]

AD_1 = 95.5%

AD_2 = (1.43 tCO_2-e/tonne lead x 25 kt lead) /

[(3.78 tCO_2-e/tonne zinc x 200 kt zinc) + (1.43 tCO_2-e/tonne lead x 25 kt lead)]

AD_2 = 4.5%

Note that if the facility produced production variables that are not listed in Clause 1 of Schedule 1, then proponents would need to use a *facility specific apportioning metric* to apportion emissions, as described in subsection 37(5).

The apportioning percentages are now used with equation 10 to apportion the facility's NGER emissions between the production variables. This results in 727 $ktCO_2$-e being apportioned to zinc production, and 34 $ktCO_2$-e being apportioned to lead production.

Equation 10: E_1 = 95.5% x 761 $ktCO_2$-e

E_1 = 727 $ktCO_2$-e (apportioned to zinc)

E_2 = 4.5% x 761 $ktCO_2$-e

E_2 = 34 $ktCO_2$-e (apportioned to lead)

Equation 8 is now used to calculate the baseline emissions intensity for each production variable. The emissions intensity for zinc in 2013-14 is 3.63 tCO_2-e/tonne of zinc, and the emissions intensity for lead is 1.37 $ktCO_2$-e/tonne of lead. The same set of calculations is also undertaken for the other years in the baseline period, showing that the emissions intensities in 2013-14 are the lowest over the period. So 2013-14 is deemed to be the *baseline year* and these intensities are the *baseline emissions intensities* for the production variables.

Equation 8: $I_1 = 727\ ktCO_2\text{-e} \ / \ 200\ kt\ of\ zinc$

$I_1 = 3.63\ tCO_2\text{-e/tonne of zinc}$

$I_2 = 34\ ktCO_2\text{-e} \ / \ 25\ kt\ of\ lead$

$I_2 = 1.37\ ktCO_2\text{-e/tonne of lead}$

Integrated lead and zinc facility – calculated values for 2013-14

Parameter	Equation term	Number	Units	Source
Total baseline NGER emissions	$E_{NGER,b}$	760,896	tCO_2-e	*Equation 9*
Industry average scope 1 emissions intensity of zinc	$I_{S1,1}$	3.07	tCO_2-e/tonne zinc	*Schedule 1 Clause 1*
Industry average electricity intensity of zinc	$I_{EI,1}$	0.82	MWh/tonne zinc	*Schedule 1 Clause 1*
Industry average emissions intensity of zinc	M_1	3.78	tCO_2-e/tonne zinc	*Equation 13*
Industry average scope 1 emissions intensity of lead (99.97% concentration)*	$I_{S1,2}$	1.12	tCO_2-e/tonne lead	*Schedule 1 Clause 1*
Industry average electricity intensity of lead (99.97% concentration)	$I_{EI,2}$	0.355	MWh/tonne lead	*Schedule 1 Clause 1*
Industry average emissions intensity of lead (99.97% concentration)	M_2	1.43	tCO_2-e/tonne lead	*Equation 13*
Apportioning percentage for zinc	AD_1	95.5	Per cent	*Equation 11*
Apportioning percentage for lead (99.97%)	AD_2	4.5	Per cent	*Equation 11*
NGER emissions apportioned to zinc	E_1	726,605	tCO_2-e	*Equation 10*
NGER emissions apportioned to lead (99.97%)	E_2	34,291	tCO_2-e	*Equation 10*
Baseline emissions intensity of zinc	I_1	3.63**	tCO_2-e/tonne zinc	*Equation 8*
Baseline emissions intensity of lead (99.97%)	I_2	1.37**	tCO_2-e/tonne lead	*Equation 8*

*This facility does not produce lead with a lower concentration than 99.97 per cent, so M_3 need not be calculated.
**Since the emissions intensities of the production variables in 2013-14 are the lowest of the four years in the baseline period, 2013-14 is the baseline year and these are the baseline emissions intensities.

Reporting year calculations

The first reporting year of the project is 2016-17. Facility data and relevant grid parameters for 2016-17 are shown in the table below.

Integrated lead and zinc facility – facility data and grid parameters for 2016-17

Parameter	Equation term	Number	Units	Source
Production of lead	$Q_{1,r}$	200,000	tonnes zinc	*Facility data*
Production of zinc	$Q_{2,r}$	30,000	tonnes lead	*Facility data*
Scope 1 emissions	E_{S1}	590,000	tCO_2-e	*Facility data*
Fugitive emissions (included in scope 1 emissions)	$E_{Fug,r}$	3,000	tCO_2-e	*Facility data*
Imported electricity	EI_r	200,000	MWh	*Facility data*
Other scope 2 emissions (from importing heat)	$E_{S2,Other}$	4,000	tCO_2-e	*Facility data*
Grid emissions intensity on the declaration date of the project	EF_{EP}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal loss factor – 2016-17	MLF_r	1.01		*Grid authority*

As in case 1, the first step is to use equation 6 to calculate the crediting baseline for producing zinc and lead, using the emissions intensity baseline and production figures for each production variable. The crediting baseline (general) for the facility in 2016-17 is 768 $ktCO_2$-e.

Equation 6: E_{CB} = (3.63 tCO_2-e/tonne zinc x 200 kt zinc) + (1.37 tCO_2-e/tonne lead x 30 kt lead)

E_{CB} = 768 $ktCO_2$-e

The NGER emissions for 2016-17 are calculated using equation 16 in the same ways as in Case 1. The NGER emissions for 2016-17 are 765 $ktCO_2$-e.

As for Case 1, the on-site facility abatement is the difference between the crediting baseline and the NGER emissions (equation 4), which is 3.0 $ktCO_2$-e. The total facility abatement (equation 3) and the project abatement for the year (equation 1) are also 3.0 $ktCO_2$-e, since there are no other facilities in the project and the facility does not export electricity. The project would be issued with 3,034 ACCUs for 2016-17.

Integrated lead and zinc facility - calculated parameters for 2016-17

Parameter	Equation term	Number	Units	Source
Baseline emissions intensity of zinc	I_1	3.63	tCO_2-e/tonne zinc	*Equation 8 (baseline year data)*
Baseline emissions intensity of lead (99.97%)	I_2	1.37	tCO_2-e/tonne lead	*Equation 8(baseline year data)*
Crediting baseline	E_{CB}	767,754	tCO_2-e	*Equation 6*
Total reporting year NGER emissions	$E_{NGER,r}$	764,720	tCO_2-e	*Equation 16*
On-site facility abatement	A_F	3,034	tCO_2-e	*Equation 4*
Total facility abatement	A_T	3,034	tCO_2-e	*Equation 3*
Project abatement*	A_P	3,034	tCO_2-e	*Equation 1*
ACCUs issued for the project	-	3,034	-	-

*Same as facility abatement since the project consists of only a single facility.

Case 3 – Brown coal power station improving efficiency

A brown coal power station, connected to the grid, undertakes a project to improve the efficiency of its existing generating units. The project will commence on 1 July 2016. The facility has exported electricity, without any major changes, from 2012-13 to 2015-16 (*the baseline period*) and has reported facility-level NGER data for all four years. The relevant facility data for the facility for 2015-16 is shown in the table below. For the purpose of simplicity, it is assumed that the project proponent has identified 2015-16 as the baseline year. Note that the facility only has scope 1 emissions, no fugitive emissions, and does not import any electricity from the grid.

Brown coal power station – facility data and grid parameters for 2015-16

Parameter	Equation term	Number	Units	Source
Electricity generated at the facility and exported from the facility	$Q_{Exist,b}$	10,000,000	MWh	*Facility data*
Scope 1 emissions	E_{S1}	15,236,182	tCO_2-e	*Facility data*
Efficiency of electricity generation within the facility	$e_{E,B}$	22	Per cent	*Facility data*
Marginal loss factor – 2015-16	MLF_b	0.96		*Grid authority*

Baseline calculations

Since the only product produced by the facility is electricity, the crediting baseline (electricity) (***$E_{CB,Elec}$***) will be calculated in each reporting year using equation 7. The crediting baseline (general) is not required.

Equation 7: $$E_{CB,Elec} = \left[I_{Exist,b} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{Rep} \times Q_{Rep/New} \right] \times MLF_r$$

During each year of the baseline period, the facility will calculate its emissions intensity of electricity generated and exported from the facility (***$I_{Exist,b}$***) using equation 23, the quotient of emissions from the facility attributed to the generation and export of electricity from the facility (***$E_{Exist,b}$***) and the electricity generated using existing generating units and exported from the facility (***$Q_{Exist,b}$***).

Equation 23: $$I_{Exist,b} = \frac{E_{Exist,b}}{Q_{Exist,b} \times MLF_b}$$

If the facility had produced products other than electricity, then the facility would need to apportion its emissions between the different production variables, similar to the approach described in Case 2 (albeit the facility may need to use a *facility specific apportioning metric* to apportion the emissions). In this case, all the NGER emissions are attributed to electricity generation (that is, ***$E_{Exist,b} = E_{NGER,b}$***). As with Cases 1 and 2, equation 9 is used to calculate total baseline NGER emissions (***$E_{NGER,b}$***), which in this case equals the facility's scope 1 emissions (***$E_{S1,b}$***), which are 15.2 $MtCO_2$-e in 2015-16.

The baseline emissions intensity for exported electricity is then calculated using equation 23, which comes to 1.59 tCO_2-e/MWh in 2015-16. Since this is the lowest emissions intensity for the four years of the baseline period, 2015-16 is deemed the *baseline year* and 1.59 tCO_2-e/MWh is the *baseline emissions intensity* to be used to calculate the crediting baseline (electricity) in each reporting year.

Equation 23: $I_{Exist,\ b} = 15.2\ MtCO_2\text{-}e\ /\ (10{,}000\ GWh \times 0.96)$

$I_{Exist,b} = 1.59\ tCO_2\text{-}e/MWh$

Brown coal power station – calculated values for 2015-16

Parameter	Equation term	Number	Units	Source
Total baseline NGER emissions	$E_{NGER,b}$	15,236,182	tCO_2-e	*Equation 9*
NGER emissions attributable to electricity generated with existing generating units and exported from the facility	$E_{Exist,b}$	15,236,182	tCO_2-e	*Section 35*
Baseline emissions intensity of electricity generated using existing electricity generating units and exported from the facility	$I_{Exist,b}$	1.587*	tCO_2-e/MWh	*Equation 23*

*Since the emissions intensity in 2015-16 is the lowest of the four years in the baseline period, 2015-16 is considered to be the baseline year and this value is the baseline emissions intensity.

Reporting year calculations

In the first reporting year of the project, 2016-17, the facility generates and exports the same amount of electricity as during the baseline year. The facility data and grid parameters are shown in the table below.

Brown coal power station – facility data and grid parameters for 2016-17

Parameter	Equation term	Number	Units	Source
Electricity generated at the facility and exported from the facility	$Q_R = Q_{Exist,r}$	10,000,000	MWh	*Facility data*
Emissions apportioned to electricity generated using existing electricity generating units at the facility and exported from the facility	$E_{Exist,r}$	15,011,017	tCO_2-e	*Facility data*
Efficiency of electricity generation within the facility	$e_{E,R}$	22.33	Per cent	*Facility data*
Grid emissions intensity on the declaration day of the project	EF_{Elec}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal loss factor – 2016-17	MLF_r	0.97		*Grid authority*

On-site facility abatement

In order to use equation 7 to calculate the crediting baseline (electricity), the amount of additional electricity unlocked by the thermal efficiency improvements of the existing generating units ($\boldsymbol{Q_{Therm}}$) must first be calculated according to equation 19. Note that the efficiency of the facility in the baseline year ($\boldsymbol{e_{E,B}}$) and the reporting year ($\boldsymbol{e_{E,R}}$) are calculated as the total electricity generated divided by the quantity of fuel consumed (both in gigajoules). In this case, the thermal efficiency improvements have unlocked 150 GWh of additional generation.

Equation 19: $$Q_{Therm} = \left[\left(\frac{e_{E,R}}{e_{E,B}} \right) - 1 \right] \times Q_{Exist,r}$$

Q_{Therm} = [(22.33% / 22%) – 1] x 10,000 GWh

Q_{Therm} = 150 GWh

The crediting baseline (electricity) can now be calculated using equation 7. Note that $\boldsymbol{I_{Rep}}$ and $\boldsymbol{Q_{Rep/New}}$ are both zero since there were no generating units replaced at this facility. The crediting baseline (electricity) for the facility in 2016-17 is 15.2 $MtCO_2$-e.

Equation 7: $E_{CB,Elec}$ = [(1.59 tCO_2-e/MWh x (10,000 GWh – 150 GWh) + 0 x 0] x 0.97

$E_{CB,Elec}$ = 15.2 $MtCO_2$-e

The amount of abatement from the facility will be the difference between the crediting baseline and the NGER emissions from electricity ($\boldsymbol{E_{Elec,NGER,r}}$), worked out using equation 17.

Equation 17: $$E_{Elec,NGER,r} = \left[I_{Exist,r} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{New} \times Q_{Rep/New} \right] \times MLF_r$$

$$E_{Elec,NGER,r} = \left[I_{Exist,r} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{New,r} \times Q_{Rep/New} \right] \times MLF_r$$

The NGER emissions from electricity are calculated using the emissions intensity of electricity generated by existing generating units and exported from the facility ($\boldsymbol{I_{Exist,r}}$), worked out using equation 24. Since the only product produced by the facility is electricity, and there is no new generating units, all the emissions from the facility are attributed to generation and export of electricity from existing units ($\boldsymbol{E_{Exist,r}}$).

Equation 24: $$I_{Exist,r} = \frac{E_{Exist,r}}{Q_{Exist,r} \times MLF_r}$$

$I_{Exist,r}$ = 15.0 $MtCO_2$-e / (10,000 GWh x 0.97)

$I_{Exist,r}$ = 1.55 tCO_2-e/MWh

Now the NGER emissions (electricity) ($\boldsymbol{E_{Elec,NGER,r}}$) are calculated using equation 17 to be 14.8 $MtCO_2$-e for 2016-17.

Equation 17: $E_{Elec,NGER,r}$ = [1.55 tCO_2-e/MWh x (10,000 GWh – 150 GWh) + (0 x 0)] x 0.97

$E_{Elec,NGER,r}$ = 14.8 $MtCO_2$-e

On-site facility abatement is then calculated using equation 4 as the difference between the crediting baseline and NGER emissions; in this case 378 $ktCO_2$-e.

Equation 4: A_F = 15.2 $MtCO_2$-e – 14.8 $MtCO_2$-e

A_F = 378 $ktCO_2$-e

Displacement calculations

As a result of the thermal efficiency improvements from the project, the facility is exporting 150 GWh of additional electricity to the grid in 2016-17 (Q_{Therm} calculated above using equation 19). This additional electricity is displacing other electricity on the grid, which has an impact on net emissions from the project. Since the emissions intensity of this facility is higher than the grid average intensity, the additional electricity serves to increase emissions. *Electricity adjustment A* (A_E) accounts for the impact of this displacement, and is worked out using equation 18. In this case, the additional electricity exported to the grid reduces abatement from the facility by 100 $ktCO_2$-e.

Equation 18: $$A_E = \left(EF_{Elec} - I_{Exist,r} \right) \times Q_{Therm} \times MLF_r$$

A_E = (0.86 tCO_2-e/MWh – 1.55 tCO_2-e/MWh) x 150 GWh x 0.97

A_E = -100 $ktCO_2$-e

Total abatement from the facility is then calculated using equation 3 to be the sum of the on-site facility abatement and the displacement adjustment, which is 278 $ktCO_2$-e. This is also the value of the project abatement, since the project involves a single facility (equation 1). So the project would be issued with 278,060 ACCUs.

Equation 3: A_P = 380 $ktCO_2$-e – 100 $ktCO_2$-e

A_P = 278 $ktCO_2$-e

Brown coal power station calculated values for 2016-17

Parameter	Equation term	Number	Units	Source
Additional electricity exported as a result of project abatement activities that improve the thermal efficiency of existing electricity generating units	Q_{Therm}	150,000	MWh	*Equation 19*
Crediting baseline (electricity)	$E_{CB,Elec}$	15,163,969	tCO2-e	*Equation 7*
Baseline emissions intensity of electricity generated using existing generating units and exported from the facility	$I_{Exist,b}$	1.587*	tCO2-e/MWh	*Equation 23 (baseline year data)*
Emissions intensity of electricity generated using existing generating units at the facility and exported from the facility	$I_{Exist,r}$	1.548	tCO2-e/MWh	*Equation 24*
NGER emissions (electricity)	$E_{Elec,NGER,r}$	14,785,851	tCO2-e	*Equation 17*
On-site facility abatement	A_F	378,095	tCO2-e	*Equation 4*
Electricity abatement adjustment A	A_E	-100,035	tCO2-e	*Equation 18*
Total facility abatement	A_T	278,060	tCO2-e	*Equation 3*
Project abatement	A_P	278,060	tCO2-e	*Equation 1*
ACCUs issued for the project	-	278,060		-

Case 4 Brown coal power station adding new gas-fired generating unit

This scenario is the same as Case 3, except that as well as improving the efficiency of their existing generating units, the power station also adds a new gas-fired generating unit.

Baseline calculations

The baseline facility data and calculations are identical to Case 3.

Reporting year calculations

In 2016-17, the facility exports to the grid 1,250 GWh from the gas-fired generating unit, on top of the 10,000 GWh exported by the existing generating units. All the previously existing brown coal generating units continue to operate, so no generating units are considered to be replaced. The new facility data for 2016-17 is shown in the table below. All other facility data is as per Case 3.

Brown coal power station with new gas turbine – facility data for 2016-17

Parameter	Equation term	Number	Units	Source
Electricity generated at the facility and exported from the facility	Q_R	11,250,000	MWh	*Facility data*
Electricity generated using existing generating units and exported from the facility	$Q_{Exist,r}$	10,000,000	MWh	*Facility data*
Electricity generated using new generating units and exported from the facility	Q_{New}	1,250,000	MWh	*Facility data*
Electricity using replaced generating units and exported from the facility in the baseline year	Q_{Rep}	0	MWh	*Facility data*
Emissions apportioned to electricity generated using new electricity generating units at the facility and exported from the facility	E_{New}	659,957	tCO_2-e	*Facility data (apportioned according to section 59)*

Since no generating units have been replaced, the facility abatement calculations and electricity adjustment A are both identical to Case 3. The only new calculation is *electricity adjustment B* to account for the impact of the electricity from the gas turbine being exported to the grid. Since the new gas turbine is of lower emissions intensity than the grid average, the impact of this adjustment would be to increase abatement from the project. Electricity adjustment B (A_R) is worked out using equation 20.

Equation 20: $$A_R = \left(EF_{Elec} - I_{New} \right) \times Q_{New,net} \times MLF_r$$

The net quantity of electricity from new generating units that is exported to the grid ($Q_{New,net}$) is worked out using equation 22. Since no generating units were replaced, this is equivalent to Q_{New}, that is 1,250 GWh of electricity exported.

Equation 22: $$Q_{New,net} = Q_R - Q_{Exist,r} - Q_{Rep}$$

$$Q_{New,net} = 11{,}250 \text{ GWh} - 10{,}000 \text{ GWh} - 0$$

$$Q_{New,net} = 1{,}250 \text{ GWh}$$

The emissions intensity of electricity from the new generating unit that is exported to the grid (***I_{New}***) is worked out using equation 21, as the emissions attributed to the electricity exported from the new generating unit (***E_{New}***) divided by the quantity of electricity exported from the new generating unit (***Q_{New}***). Emissions from electricity generation must be apportioned to the existing and new generating units following the conditions in section 59 of the determination. In this case, 660 $ktCO_2$-e were attributed to the new generating unit. So the emissions intensity of the new generating unit is 0.544 tCO_2-e/MWh.

Equation 21: $$I_{New} = \frac{E_{New}}{Q_{New} \times MLF_r}$$

I_{New} = 660 $ktCO_2$-e / (1,250 GWh x 0.97)

I_{New} = 0.544 tCO_2-e/MWh

Equation 20 is then used to calculate electricity adjustment B, resulting in 380 $ktCO_2$-e of abatement from the new gas-fired generating unit displacing other electricity from the grid.

Equation 20: A_R = (0.86 tCO_2-e/MWh – 0.544 tCO_2-e/MWh) x 1,250 GWh x 0.97

A_R = 380 $ktCO_2$-e

Total facility abatement for 2016-17 (***A_T***) is calculated with equation 3 as 661 $ktCO_2$-e. Since the project only involves one facility, project abatement (***A_P***) also equals 661 $ktCO_2$-e and the project would receive 660,810 ACCUs in 2016-17.

Equation 3: A_T = 380 $ktCO_2$-e – 100 $ktCO_2$-e + 380 $ktCO_2$-e

A_T = 661 $ktCO_2$-

Brown coal power station with new gas generation – calculated data for 2016-17

Parameter	Equation term	Number	Units	Source
Net quantity of electricity generated using new generating units at the facility and exported from the facility	$Q_{New,net}$	1,250,000	MWh	*Equation 22*
Emissions intensity of electricity generated using new generating units and exported from the facility	I_{New}	0.544	tCO2-e/MWh	*Equation 21*
Electricity abatement adjustment B	A_R	382,750	tCO2-e	*Equation 20*
Total facility abatement	A_T	660,810	tCO_2-e	*Equation 3*
Project abatement	A_P	660,810	tCO2-e	*Equation 1*
ACCUs issued for the project	-	660,810		-

Case 5 Facility producing a multi-component, elaborately transformed product changes output to a materially similar product

A facility manufactures a single product, a widget, where the production process involves assembling the widget from a number of components that have been manufactured elsewhere. The components are made of a variety of substances, including plastic and steel.

The project proponents wish to undertake an abatement project to improve the efficiency of the facility. The facility has submitted NGER reports for the four consecutive years preceding the commencement of the project, and there have been no significant changes in that period.

As part of their application to undertake the project, the proponents must choose and describe the production variable in accordance with sections 16 or 17 of the Determination. Since the facility has a single output, widget, this is chosen to be the production variable, measured in tonnes. If the facility were to meet the requirements of section 17 it may have had the option of choosing a single input or intermediate product instead.

Since the widget is a multi-component, elaborately transformed product, the project proponents are not required to identify a key substance of value for the output variable (see section 18).

The crediting baseline and abatement calculations are as per Case 1 (a facility with a single production variable).

Two years after the commencement of the project, the facility owners decide to change the design of the widget in response to market demand. In the context of the abatement project, this redesigned widget is considered to be a *new output variable*. The project proponents must now determine whether this constitutes a *significant output variable change* (see subsection 12(2)).

In considering this, the proponents must determine whether the change has a material effect on project abatement for the NGER reporting year (a material effect is at least a 5 per cent or 25,000 tCO_2-e impact, whichever is less), and whether the new product and the original product can be considered *similar output variables* under subsection 16(2).

The project proponents determine that the average emissions intensity for producing the original product is 0.50 tCO_2-e/tonne of widget. The emissions intensity of producing the new product is 0.48 tCO_2-e/tonne of widget. Since the difference is less than 5 per cent, these two widgets can be considered materially similar (see subsection 16(3)). As such, the new product can be considered to be a similar output variable, and the project can continue to generate abatement, using the widget (now redesigned) as the production variable in the crediting baseline calculations.

However, if the difference in emissions intensity was greater than 5 per cent (say the emissions intensity of the new product was 0.45 tCO_2-e/tonne of product), then the products could not be considered similar output variables. If the effect on project abatement was greater than 5 per cent or greater than 25,000 tCO_2-e, then this would constitute a significant output variable change. In that circumstance, facility abatement from the facility would be zero for the NGER reporting year in which the new product is first produced, and for all subsequent NGER reporting years (see subsection 27(4)).

Case 6 – Installation of a CHP plant at a crude oil facility

A facility produces crude oil using fuel combusted on-site, electricity imported from the grid, and imported heat. The facility undertakes a project, using the facilities method, to install a CHP plant to fulfil its heating needs, which are currently met by an on-site gas boiler, as well as generate sufficient electricity to meet its requirements, exporting the remainder to the grid. The project will begin on 1 July 2016. NGER facility data is available for the preceding four years. For the purpose of simplicity, it is assumed that the project proponent has identified 2013-14 as the baseline year. The facilities data and calculation parameters for the year 2013-14 are shown in the table below.

Crude oil facility – facility data and grid parameters for 2013-14

Parameter	Equation term	Number	Units	Source
Quantity of crude oil processed	Q_b	11,000,000	Bbl	*Facility data*
		1,519,860	tonnes	*Facility data*
Scope 1 emissions	$E_{S1,b}$	60,000	tCO_2-e	*Facility data*
Fugitive emissions	$E_{Fug,b}$	30,000	tCO_2-e	*Facility data*
Imported Electricity	EI_b	131,400	MWh	*Facility data*
Other Scope 2 emissions (imported heat)	$E_{S2,Other,b}$	700,800	tCO_2-e	*Facility data*
Grid emissions intensity on the declaration date of the project	EF_{EP}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal Loss Factor 2013-14	MLF_b	1.02		*Grid Authority*

As in the previous cases, equation 1 will be used to calculate the total abatement from the project each year. During the baseline period, no electricity was exported to the grid, so electricity is not a production variable for the project. However, the new CHP plant will produce enough electricity to enable the excess to be exported to the grid during the reporting period. This means that abatement will need to be adjusted for the impact of displacing grid electricity, using *electricity adjustment B*.

Baseline Calculations

Calculations for the crediting baseline (general) follow the approach in Case 1, with the baseline NGER emissions being calculated as follows using equation 9.

Equation 9: $$E_{NGER,b} = E_{S1,b} + \left(EI_b \times EF_{EP} \times MLF_b \right) + E_{S2,Other,b} - E_{Fug,b}$$

$$E_{NGER,b} = 60\ ktCO_2\text{-e} + (131GWh \times 0.86\ tCO_2\text{-e/MWh} \times 1.02) + 700\ ktCO_2\text{-e} - 30ktCO_2\text{-e}$$

$$E_{NGER,b} = 846\ ktCO_2\text{-e}$$

The baseline emissions intensity for the production of crude oil in 2013-14 is then calculated, using equation 8, as 0.557 tCO_2-e/tonne of crude oil.

Equation 8: $I = 0.85\ MtCO_2\text{-e} / 1.5\ Mt\ crude\ oil$

$I = 0.557\ tCO_2\text{-e/t crude oil}$

Similar calculations would be undertaken for all four years in the baseline period. In this case, the emissions intensity in 2013-14 is the lowest of the four years. So 2013-14 is deemed to be the *baseline year*, and 0.557 tCO_2-e/tonne of crude oil is the *baseline emissions intensity* for the production variable.

Crude oil facility – calculated values for 2013-14

Parameter	Equation term	Number	Units	Source
Total baseline NGER emissions	$E_{NGER,b}$	846,064	tCO_2-e	*Equation 9*
Baseline emissions intensity of crude oil	I	0.557	tCO_2-e/t crude oil	*Equation 8*

Reporting year calculations

The abatement project involves installing a CHP plant to provide heat for the facility. It generates enough heat and electricity to fully meet on-site requirements, and export excess electricity to the grid. The relevant facility data for 2016-17 is shown in the table below.

Crude oil facility – facility data and grid parameters for 2016-17

Parameter	Equation term	Number	Units	Source
Production of crude oil	Q_r	11,000,000	Bbl	*Facility data*
		1,519,860	tonnes	*Facility data*
Scope 1 emissions (including emissions from the CHP plant)	$E_{S1,r}$	737,097	tCO_2-e	*Facility data*
Fugitive emissions	$E_{Fug,r}$	30,000	tCO_2-e	*Facility data*
Imported electricity	EI_r	0	MWh	*Facility data*
Other Scope 2 emissions (imported heat)	$E_{S2,Other,r}$	0	tCO_2-e	*Facility data*
Electricity generated by the CHP plant	$Q_{E,p}$	350,400	MWh	*Facility data*
Electricity generated and exported from the facility	$Q_{New} = Q_{New,net}$	219,000	MWh	*Facility data*
Steam output (annual)	m_{SO}	8,760,000,000	kg	*Facility Data*
Feedwater input (annual)	m_{SI}	10,950,000,000	kg	*Facility Data*
Steam enthalpy	h_{SO}	2,004	kJ/kg	*Facility Data*
Feedwater enthalpy	h_{SI}	293	kJ/kg	*Facility Data*

Thermal efficiency of electricity generation by CHP plant	$e_{E,p}$	30%	percentage	*Facility Data (worked out in accordance with section 62)*
Thermal efficiency of heat generation by CHP plant	$e_{H,p}$	85%	percentage	*Facility Data (worked out in accordance with section 62)*
Grid emissions intensity on the declaration date of the project	EF_{EP}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal Loss Factor 2016-17	MLF_r	1.02		*Grid Authority*
Factor to convert MWh to GJ	$F_{MWh \rightarrow GJ}$	3.6	GJ/MWh	*Constant*

On-site facility abatement

The crediting baseline for the facility is calculated using equation 6. Since production levels are unchanged from the baseline year, the crediting baseline is equal to NGER baseline emissions in that year, namely 846 $ktCO_2$-e.

Equation 6: $E_{CB} = 0.56\ tCO_2\text{-e/tonne crude oil} \times 1.5\ Mt\ crude\ oil$

$E_{CB} = 846\ ktCO_2\text{-e}$

NGER emissions (general) for the facility are the calculated using equation 16:

Equation 16: $$E_{NGER,r} = E_{S1,r} + \left(EI_r \times EF_{EP} \times MLF_r \right) + E_{S2,Other,r} - E_{Fug,r} - E_{Elec,r} - E_{HC,r}$$

Since no heating or cooling is exported from the facility, $\boldsymbol{E_{HC,r}}$ is zero. However, electricity is now exported from the facility, so equation 26 is used to calculate the emissions associated with the exported electricity ($\boldsymbol{E_{Elec,r}}$).

Equation 26: $$E_{Elec,r} = \left(I_{Exist,r} \times Q_{Exist,r} \times MLF_r \right) + E_{New}$$

There was no electricity generation during the baseline year, so the quantity of electricity generated and exported using existing generating units ($\boldsymbol{Q_{Exist,r}}$) is zero. The emissions apportioned to electricity generated and exported using new generating units ($\boldsymbol{E_{New}}$) is worked out in accordance with section 59 of the determination.

Since the new generating unit is a CHP plant, emissions must be apportioned to electricity generated by the CHP plant using equation 27.

Equation 27:

$$E_{E,p} = \left[\frac{\left(Q_{E,p} \times F_{MWh \to GJ} \right) / e_{E,p}}{\left(\left(Q_{E,p} \times F_{MWh \to GJ} \right) / e_{E,p} \right) + \left(Q_{H,p} / e_{H,p} \right) + \left(Q_{C,p} / e_{C,p} \right)} \right] \times E_{T,p}$$

Since this CHP plant does not generate cooling, $\boldsymbol{Q_{C,p}}$ is zero. However, the quantity of heat produced by the CHP plant ($\boldsymbol{Q_{H,p}}$) is calculated using equation 28 as below.

Equation 28:

$$Q_{H,p} = \frac{\left(m_{SO} \times h_{SO} \right) - \left(m_{SI} \times h_{SI} \right)}{1\,000\,000}$$

$Q_{H,p} = (8.7 \times 10^9 \text{ kg} \times 2{,}004 \text{ kJ/kg} - 1.1 \times 10^{10} \text{ kg} \times 293 \text{ kJ/kg}) / 1{,}000{,}000$

$Q_{H,p} = 1.4 \times 10^7 \text{ GJ}$

Equation 27 is then used to calculate the total emissions to be attributed to the electricity generated by the CHP plant, 135 $ktCO_{2\text{-}e}$.

Equation 27: $E_{E,p} = [(350{,}400 \text{ MWh} \times 3.6 \text{ GJ/MWh} / 0.3)$

$/ ((350{,}400 \text{ MWh} \times 3.6 \text{ GJ/MWh} / 0.3) + (1.4 \times 10^7 \text{ GJ} / 0.8))] \times 677 \text{ ktCO}_2\text{-e}$

$E_{E,p} = 135 \text{ ktCO}_2\text{-e}$

These emissions then need to be apportioned between electricity used within the facility and electricity exported from the facility. There is no specific equation for this in the method, but in this case the emissions are apportioned in proportion to the amount of electricity exported from the facility.

$E_{New} = (219{,}000 \text{ MWh} / 350{,}400 \text{ MWh}) \times 135 \text{ ktCO}_2\text{-e}$

$E_{New} = 85 \text{ ktCO}_2\text{-e}$

This value can then be used in equation 26 to show that emissions from electricity generated and exported from the facility ($\boldsymbol{E_{Elec,r}}$) are 85 $ktCO_2$-e.

The calculated values can now be used in equation 16 to calculate NGER emissions (general) for the facility.

Equation 16: $E_{NGER,r} = 737 \text{ ktCO}_2\text{-e} + 0 + 0 - 30 \text{ ktCO}_2\text{-e} - 85 \text{ ktCO}_{2\text{-}e} - 0$

$E_{NGER,r} = 623 \text{ ktCO}_2\text{-e}$

On-site facility abatement is now calculated using equation 4 as the difference between the crediting baseline and NGER emissions (general), which results in 224 $ktCO_2$-e abatement.

Equation 4: $A_F = 846 \text{ MtCO}_2\text{-e} - 623 \text{ ktCO}_2\text{-e}$

$A_F = 224 \text{ ktCO}_2\text{-e}$

Displacement calculations

Since this facility is now generating an excess of electricity, and is exporting it, the abatement caused by the displaced grid emissions must be calculated using *electricity abatement adjustment B* (equation 20).

Equation 20: $$A_R = \left(EF_{Elec} - I_{New} \right) \times Q_{New,net} \times MLF_r$$

The emissions intensity of electricity generated using new generating units and exported from the facility is calculated using equation 21 to be 0.39 tCO_2-e/MWh.

Equation 21: $$I_{New} = \frac{E_{New}}{Q_{New} \times MLF_r}$$

I_{New} = 85 $ktCO_2$-e / (219 GWh x 1.02)

I_{New} = 0.38 tCO_2-e/MWh

Electricity abatement adjustment B is then found with equation 20.

Equation 20: A_R = (0.86 tCO_2-e/MWh – 0.38 tCO_2-e/MWh) x 219 GWh x 1.02

A_R = 108 $ktCO_2$-e

So the total abatement for the facility, and also for the project, is given by equation 3 as 331 $ktCO_2$-e. The project would be issued with 331,073 ACCUs for the year.

Equation 3: A_T = 223 $ktCO_2$-e + 0 + 108 $ktCO_2$-e

A_T = 331 $ktCO_2$-e

Crude oil facility – calculated values for 2016-17

Parameter	Equation term	Number	Units	Source
Crediting baseline (general)	E_{CB}	846,064	tCO_2-e	*Equation 6*
Heat generated by CHP plant	$Q_{H.p}$	14,346,690	GJ	*Equation 28*
Emissions apportioned to electricity generated by the CHP plant	$E_{E,p}$	135,391	tCO_2-e	*Equation 27*
Emissions apportioned to electricity generated and exported from the facility	$E_{Elec,r}$	84,619	tCO_2-e	*Apportioned in accordance with section 59*
Total reporting year emissions	$E_{NGER,r}$	622,477	tCO_2-e	*Equation 16*
On-site facility abatement	A_F	223,586	tCO_2-e	*Equation 4*
Emissions intensity of electricity generated and exported using new generating units	I_{New}	0.379	tCO_2-e/MWh	*Equation 21*
Electricity abatement adjustment B	A_R	107,487	tCO_2-e	*Equation 20*
Total facility abatement	A_T	331,073	tCO_2-e	*Equation 3*
Project abatement	A_P	331,073	tCO_2-e	*Equation 1*
ACCUs issued for the project	-	331,073		-

Case 7: A mine undertakes an abatement project but must account for a change of input purity

This case provides an example of how a facility might recalculate its emissions intensity baseline to account for a change of input purity.

For a gold mine and processing facility, the input purity changes based on the amount of gold contained in the ore mined. For example, if the content of gold contained in the ore changed from 1g gold/tonne ore to 2.5g/tonne, then the facility could expect a significant increase in gold production with a similar amount of processing, and therefore little change in emissions.

In this scenario, the facility undertakes a project that is expected to reduce emissions by 5 per cent. However, the mine strikes a vein of ore with an increased purity of the key substance for production (gold), and so the baseline emissions intensity must be recalculated to take account of the change of input purity.

The relevant baseline data is shown in the table below.

Gold processing facility – data for 2012-13 – before abatement project, ore purity of 0.1%

Parameter	Symbol	Number	Units
Gold content of input ore	IP_b	0.001%	
Purity of output gold	OP_b	100%	
Total gold output	Q_b	200	tonnes
Emissions	$E_{NGER,b}$	190,000	tCO_2-e
Baseline emissions intensity	I	950	tCO_2-e/tonne

The facility undertakes a project that is expected to improve its energy efficiency. However, the ore they are processing has a higher concentration of gold, so the facility produces more gold due to the higher gold content of the ore. The facility data for the reporting year is shown in the table below.

Gold processing facility – data for 2016-17 – input Purity increases

Parameter	Symbol	Number	Units
Gold content of input ore	IP_r	0.0025%	
Purity of output gold	OP_r	100%	
Total gold output	Q_r	475	tonnes
Emissions	$E_{NGER,r}$	170,000	tCO_2-e

If no change were made to the baseline emissions intensity, then the crediting baseline for the NGER reporting year would be calculated to be 451 $ktCO_2$-e, using equation 6.

Equation 6: $E_{CB} = 950\ tCO_2\text{-e/t Au} \times 475\ t\ Au$

$E_{CB} = 451\ ktCO_2\text{-e}$

However, since the input purity has changed significantly, the facility must recalculate its baseline emissions intensity to account for the change.

As described in section 41, the facility must use historical information from the facility to determine the impact of input purity on emissions intensity. The facility must calculate a change in processing factor for gold production (***P***). This factor is then used in equation 15 to adjust the baseline emissions from the baseline year, and then recalculate the baseline emissions intensity.

Equation 15: $E_{Adj,n} = E_{n,b} \times P_n$

Historical data from the facility suggests that emissions intensity is directly proportional to input purity. Output purity remains unchanged from the baseline period, and can be set to be 100 per cent. So the facility determines to use the equation below to calculate ***P***.

Applying the equation: $$P = \frac{\left(\frac{IP_b}{OP_b}\right)}{\left(\frac{IP_r}{OP_r}\right)}$$

P = (0.001% / 100%) ÷ (0.0025% / 100%)

P = 0.4

Applying this factor to the baseline emissions using equation 15, the adjusted emissions are calculated to be 76 $ktCO_2$-e.

Equation 15: E_{Adj} = 0.4 x 190 $ktCO_2$-e

E_{Adj} = 76 $ktCO_2$-e

The baseline emissions intensity is then recalculated with the adjusted baseline emissions, using equation 8.

Equation 8: I = 76 $ktCO_2$-e / 200 t Au

I = 380 tCO_2-e

The crediting baseline for the NGER reporting year is now calculated using the new emissions intensity baseline.

Equation 6: E_{CB} = 475 t Au x 380 tCO_2-e

E_{CB} = 181 $ktCO_2$-e

The on-site facility abatement is calculated using equation 4 as 10.5 $ktCO_2$-e. This is also the project abatement for the year.

Equation 4: A_F = 180,500 tCO_2-e – 170,000 tCO_2-e

A_F = 10,500 tCO_2-e

Note that, while the mine continues to access this rich vein of gold, proponents continue to use the recalculated baseline emissions intensity. However, if the mine were to access a new source of ore with materially different purity, it would need to undertake similar calculations again in subsequent years. Also note that the Determination sets the maximum change in processing factor at 1.5 (see subsection 41(2)).

Adjusted baseline parameters 2016-17

Parameter	Symbol	Number	Units
Change of processing factor	P	0.4	
Adjusted baseline emissions	E_{Adj}	76,000	tCO_2-e
Adjusted emissions intensity baseline	I	380	tCO_2-e/t Au
Crediting baseline	E_{CB}	180,500	tCO_2-e
On-site facility abatement	A_F	10,500	tCO_2-e
Total facility abatement	A_T	10,500	tCO_2-e
Project abatement	A_P	10,500	tCO_2-e
ACCUs issued for the project	-	10,500	

Note that the approach described in this example is specific to the facility in question. Individual facilities will need to develop their own method for recalculating emissions intensity baselines in the case of input or output purity changes.

Case 8: Upgrade of a single generating unit at a gas-fired power station

Case 8 concerns a gas-fired power station with two gas-fired generating units (Generating Units 1 and 2) and a Heat Recovery Steam Generator (HRSG). The project involves replacing essential components of the HRSG to improve its efficiency and increase its capacity. The two gas-fired generating units remain unchanged. The project will commence on 1 July 2016. The facility has exported electricity, without any major changes, from 2012-13 to 2015-16 (the baseline period) and has reported facility-level NGER data for all four years. The relevant facility data for the facility for 2015-16 is shown in the table below. For the purpose of simplicity, it is assumed that the project proponent has identified 2015-16 as the baseline year. Note that the facility only has scope 1 emissions, no fugitive emissions, and does not import any electricity from the grid.

Gas-fired power station – facility data and grid parameters for 2015-16

Parameter	Equation term	Number	Units	Source
Total electricity generated at the facility and exported from the facility		250,000	MWh	*Facility data*
Electricity apportioned to Generating Unit 1		100,000	MWh	*Facility data*
Electricity apportioned to Generating Unit 2		100,000	MWh	*Facility data*
Electricity apportioned to HRSG		50,000	MWh	*Facility data*
Total Scope 1 emissions	$E_{S1,b}$	101,000	tCO_2-e	*Facility data*
Emissions apportioned to Generating Unit 1		48,000	tCO_2-e	*Facility data*
Emissions apportioned to Generating Unit 2		47,000	tCO_2-e	*Facility data*
Emissions apportioned to HRSG		6,000	tCO_2-e	*Facility data*
Grid Average Emissions Intensity	EF_{Elec}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal Loss Factor	MLF_b	1.0		*Grid authority*

Baseline calculations

Similar to Case 3, the only product produced by the facility is electricity, so the crediting baseline (electricity) ($\boldsymbol{E_{CB,Elec}}$) will be calculated in each reporting year using equation 7.

Since essential components of the HRSG have been replaced, the HRSG, as it operated during the baseline period, is considered to be a ***replaced generating unit***. Once the essential components have been replaced during the reporting period, the HRSG is considered to be a ***new generating unit*** for the purpose of reporting year calculations. Since they undergo no changes, Generating Units 1 and 2 are treated as ***existing generating units***. Note that in the case that the upgrade instead occurred in one of the gas-fired generating units, that generating unit would be considered *new*, while the remaining generating unit and the HRSG would be considered *existing*.

During the baseline period, the facility will calculate the emissions intensity of electricity generated and exported from the facility by existing generating units ($\boldsymbol{I_{Exist,b}}$) using equation 23. This calculation only considers electricity and emissions apportioned to Generating Units 1 and 2.

The baseline emissions intensity for exported electricity from existing generating units is calculated to be 0.48 tCO_2-e/MWh in 2015-16.

Equation 23: $I_{Exist,b}$ = (48,000 + 47,000) tCO_2-e / ((100,000 + 100,000) MWh x 1.0)

$I_{Exist,b}$ = 0.48 tCO_2-e/MWh

The emissions intensity of the replaced generating unit (the HRSG) during the baseline year is calculated using equation 25 to be 0.12 tCO_2-e /MWh.

Equation 25: $$I_{Rep} = \frac{E_{Rep}}{Q_{Rep} \times MLF_b}$$

I_{Rep} = (6,000 tCO_2-e) / (50,000 MWh x 1.0)

I_{Rep} = 0.12 tCO_2-e /MWh

Gas-fired power station – calculated values for 2015-16

Parameter	Equation term	Number	Units	Source
NGER emissions attributable to electricity generated with existing generating units and exported from the facility	$E_{Exist,b}$	95,000	tCO_2-e	*Section 35 (emissions apportioned to Generating Units 1 and 2)*
Electricity generated using existing generating units at the facility and exported from the facility during the baseline year	$Q_{Exist,b}$	200,000	MWh	*Facility data (electricity from Generating Units 1 and 2)*
Baseline emissions intensity of electricity generated using existing generating units and exported from the facility	$I_{Exist,b}$	0.475	tCO_2-e/MWh	*Equation 23*
NGER emissions attributable to electricity generated with replaced generating units and exported from the facility	E_{Rep}	6,000	tCO_2-e	*Section 35 (emissions apportioned to the HRSG)*
Electricity generated using replaced generating units at the facility and exported from the facility during the baseline year	Q_{Rep}	50,000	MWh	*Facility data (electricity from the HRSG)*
Baseline emissions intensity of electricity generated using existing generating units and exported from the facility	I_{Rep}	0.12	tCO_2-e/MWh	*Equation 25*

Reporting year calculations

In the first reporting year of the project, 2016-17, the project replaces essential components of the HRSG, thereby improving the efficiency of the generating unit, and increasing the amount of electricity generated and exported by the facility when compared to the baseline year. The facility data and grid parameters are shown in the table below.

Gas fired power station – facility data and grid parameters for 2016-17

Parameter	Equation term	Number	Units	Source
Electricity generated at the facility and exported from the facility		257,200	MWh	*Facility data*
Electricity apportioned to Generating Unit 1		100,000	MWh	*Facility data*
Electricity apportioned to Generating Unit 2		100,000	MWh	*Facility data*
Electricity apportioned to HRSG	Q_{New}	57,200	MWh	*Facility data*
Total scope 1 emissions	$E_{S1,r}$	100,000	tCO_2-e	*Facility data*
Emissions apportioned to Generating Unit 1		48,000	tCO_2-e	*Facility data*
Emissions apportioned to Generating Unit 2		47,000	tCO_2-e	*Facility data*
Emissions apportioned to HRSG	E_{New}	5,000	tCO_2-e	*Facility data*
Grid average emissions intensity on the declaration day of the project	EF_{Elec}	0.86	tCO_2-e/MWh	*NGA Factors*
Marginal loss factor – 2016-17	MLF_r	1.0		*Grid authority*

On-site facility abatement

This case classifies only one part of the facility as being replaced, in this case the HRSG unit, – meaning that $\boldsymbol{Q_{New}}$ only applies to the generation from that unit in the reporting year, and $\boldsymbol{Q_{Rep}}$ is the quantity of electricity generated by that unit in the baseline year. In this situation, the generation by the two gas–fired generating units, which were not part of the abatement activity, is considered to be $\boldsymbol{Q_{Exist,r}}$ in the reporting year.

The emission intensity of electricity from the new generating unit that is exported to the grid ($\boldsymbol{I_{New}}$) is worked out using equation 21. Emissions from electricity generation must be apportioned between the existing and new generating units following the conditions in section 59 of the Determination. In this case, 5,000 tCO_2-e were attributed to the new generating unit. So the emissions intensity of the new generating unit is 0.09 tCO_2-e/MWh.

Equation 21: $I_{New} = 5{,}000\ tCO_2\text{-e} / (57{,}200\ GWh \times 1.0)$

$I_{New} = 0.09\ tCO_2\text{-e/MWh}$

The crediting baseline (electricity) is then calculated using equation 7. Since there is no change to existing generating units, $\boldsymbol{Q_{Therm}}$ is zero. Since $\boldsymbol{I_{New}}$ is less than the grid average emissions intensity, I_{Rep} takes the value of 0.12 tCO_2-e/MWh. And since HRSG generates less electricity during the baseline year than the reporting year, $\boldsymbol{Q_{Rep/New}}$ takes the value of 50,000 MWh.

Equation 7: $$E_{CB,Elec} = \left[I_{Exist,b} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{Rep} \times Q_{Rep/New} \right] \times MLF_r$$

$$E_{CB,Elec} = [0.48\ tCO_2\text{-}e \times 200{,}000\ MWh + 0.12\ tCO_2\text{-}e \times 50{,}000\ MWh] \times 1.0$$

$$E_{CB,Elec} = 101{,}000\ tCO_2\text{-}e$$

The NGER emissions (electricity) are then calculated using equation 17. Since the existing generating units have remained unchanged, the emissions intensity of existing generating units in the reporting year is identical to during the baseline year, 0.48 tCO_2-e/MWh.

Equation 17: $$E_{Elec,NGER,r} = \left[I_{Exist,r} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{New} \times Q_{Rep/New} \right] \times MLF_r$$

$$E_{Elec,NGER,r} = \left[I_{Exist,r} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{New,r} \times Q_{Rep/New} \right] \times MLF_r$$

$$E_{Elec,NGER,r} = [0.48\ tCO_2\text{-}e \times 200{,}000\ MWh + 0.09\ tCO_2\text{-}e/MWh \times 50{,}000\ MWh] \times 1.0$$

$$E_{Elec,NGER,r} = 99{,}400\ tCO_2\text{-}e$$

So the on-site facility abatement is then calculated using equation 4.

Equation 4: $$A_F = 101\ ktCO_2\text{-}e - 99\ ktCO_2\text{-}e$$

$$A_F = 1{,}600\ tCO_2\text{-}e$$

Displacement calculations

The net quantity of electricity from new generating unit that is exported to the grid (***$Q_{New,net}$***) is worked out using equation 22 to be 7,200 MWh.

Equation 22: $$Q_{New,net} = Q_R - Q_{Exist,r} - Q_{Rep}$$

$$Q_{New,net,r} = 257{,}200\ MWh - 200{,}000\ MWh - 50{,}000\ MWh$$

$$Q_{New,net,r} = 7{,}200\ MWh$$

As with Case 4, we calculate electricity abatement adjustment B for the increased generation by the 'new' generator according to equation 20.

Equation 20: $$A_R = \left(EF_{Elec} - I_{New} \right) \times Q_{New,net} \times MLF_r$$

$$A_R = (0.86 - 0.09)\ tCO_2\text{-}e/MWh \times 7{,}200\ MWh \times 1.0$$

$$A_R = 5{,}600\ tCO_2\text{-}e$$

So the total facility abatement for 2016-17 is calculated with equation 3 as 7,143 tCO_2-e. This is also the project abatement, and the project would receive 7,143 ACCUs in 2016-17.

Equation 1: $$A_P = 1{,}600\ tCO_2\text{-}e + 5{,}600\ tCO_2\text{-}e$$

$$A_P = 7,\ 200\ tCO_2\text{-}e$$

Gas fired turbine power station with new gas generation – calculated data for 2016-17

Parameter	Equation term	Number	Units	Source
NGER emissions attributable to electricity generated with existing generating units and exported from the facility	$E_{Exist,r}$	95,000	tCO_2-e	*Section 59 (emissions apportioned to Generating Units 1 and 2*
Electricity generated using existing generating units at the facility and exported from the facility	$Q_{Exist,r}$	200,000	MWh	*Facility data (electricity from Generating Units 1 and 2)*
Emissions intensity of electricity generated using existing generating units and exported from the facility	$I_{Exist,r}$	0.48	tCO_2-e/MWh	*Equation 24*
Net quantity of electricity generated using new electricity generating units at the facility and exported from the facility	$Q_{New,net}$	7,200	MWh	*Equation 22*
Emissions intensity of electricity generated using new generating units and exported from the facility	I_{New}	0.088	tCO2-e/MWh	*Equation 21*
Crediting baseline (electricity)	$E_{CB,Elec}$	101,000	tCO2-e	*Equation 7*
NGER emissions (electricity)	$E_{Elec,NGER,r}$	99,375	tCO2-e	*Equation 17*
On-site facility abatement	A_F	1,625	tCO2-e	*Equation 4*
Electricity abatement adjustment B	A_R	5,518	tCO2-e	*Equation 20*
Total facility abatement	A_T	7,143	tCO_2-e	*Equation 3*
Project abatement	A_P	7,143	tCO2-e	*Equation 1*
ACCUs issued for the project		7,143		-

Attachment D

List of formulas and equations

Eq'n No. & Section	Subject	Equation	Terms
1 **s25(1)**	**Project abatement**	$A_P = \sum_f A_{T,f}$	A_P means the project abatement for the NGER reporting year, in tonnes CO_2-e. AT,f means the total facility abatement for facility f for the NGER reporting year, in tonnes CO2-e, worked out in accordance with section 26.
2 **s25(2)**	**Project abatement for part year**	$A_P = \frac{D_{CP}}{D_{NGER}} \times \sum_f A_{T,f}$	A_P means the project abatement for the final NGER reporting year, in tonnes CO2-e. D_{CP} means the number of days in the final NGER reporting year that fall within the crediting period. D_{NGER} means the number of day in the final NGER reporting year. $A_{T,f}$ means the total facility abatement for facility f for the NGER reporting year, in tonnes CO2-e, worked out in accordance with section 26.
3 **s26(1)**	**Total facility abatement**	$A_{T,f} = A_{F,f} + A_{E,f} + A_{R,f}$	$A_{T,f}$ means the total facility abatement, in tonnes CO2-e. $A_{F,f}$ means: (a) if the on-site facility abatement for facility f must be adjusted under section 28 for the NGER reporting year—the adjusted on-site facility abatement, in tonnes CO2-e, worked out in accordance with that section; or (b) otherwise—the on-site facility abatement for facility f for the NGER reporting year, in tonnes CO2-e, worked out in accordance with section 27.

			$A_{E,f}$ means: (a) if Subdivision A of Division 7 applies to facility f for the NGER reporting year—electricity abatement adjustment A for the facility during the NGER reporting year, in tonnes CO2-e, worked out in using equation 18; or (b) otherwise—zero. $A_{R,f}$ means: (a) if Subdivision B of Division 7 applies to facility f for the NGER reporting year—electricity abatement adjustment B for the facility during the NGER reporting year, in tonnes CO2-e, worked out in using equation 20; or (b) otherwise—zero. If: (a)the amount worked out in equation 3 for a facility for an NGER reporting year is more than 100 000 tonnes CO2-e; and (b) a *statement of abatement activity intent* for the facility, that is signed by the chief financial officer (however described) of the person that has operational control over the facility, has not been given to the Regulator; the total facility abatement for the facility for the NGER reporting year is taken to be 100 000 tonnes CO2-e.
4 **s27(1)**	**On-site facility abatement**	$A_F = \left(E_{CB} - E_{NGER,r}\right) + \left(E_{CB,Elec} - E_{Elec,\ NGER,r}\right)$	A_F means the on-site facility abatement, in tonnes CO_2-e. E_{CB} means: (a) if the crediting baseline (general) for the facility must be worked out under section 30 for the NGER reporting year—the crediting baseline (general), in tonnes CO_2-e, worked out using equation 6; or (b) otherwise—zero. $E_{NGER,r}$ means: (a) if the NGER emissions (general) for the facility must be worked out under section 44 for the NGER reporting year—the NGER emissions (general), in tonnes CO_2-e, worked out using equation 16; or (b) otherwise—zero. $E_{CB,Elec}$ means: (a) if the crediting baseline (electricity) for the facility must be

			worked out under section 31 for the NGER reporting year—the crediting baseline (electricity), in tonnes CO_2-e, worked out using equation 7; or (b) otherwise—zero. $E_{Elec,NGER,r}$ means: (a) if the NGER emissions (electricity) for the facility must be worked out under section 45 for the NGER reporting year—the NGER emissions (electricity), in tonnes CO_2-e, worked out using equation 17; or (b) otherwise—zero.
5 **s28(2)**	**Adjusted on-site facility abatement**	$$A_A = A_F - \sum_a E_{NA}$$	A_A means the adjusted on-site abatement, in tonnes CO_2-e. A_F means the on-site facility abatement for the facility for the NGER reporting year, in tonnes CO_2-e, worked out in accordance with section 27. E_{NA} means: (a) if the activity was not in operation at the facility for any part of the baseline year—the amount of abatement associated with the activity for the NGER reporting year, in tonnes CO_2-e, worked out in accordance with whichever of section 28 subsection (4) or (5) applies; or (b) if the activity was in operation at the facility for only part of the baseline year—the amount of abatement associated with the activity for the NGER reporting year, in tonnes CO_2-e, worked out as follows: (i) work out the amount of the abatement in accordance with whichever of section 28 subsection (4) or (5) applies; and (ii) adjust that amount on a pro rata basis by reference to the number of days in the baseline year on which the activity was in operation at the facility. (c) if an ineligible abatement activity was in operation at the facility for the whole of the baseline year and there is an increase (of a kind mentioned in subparagraph 8(1)(b)(iii)) in abatement from the activity during the NGER reporting year—the amount of the increase in abatement from the activity during the NGER reporting year, worked out using an appropriate abatement estimation approach for the activity.

6 **s30(2)**	**Crediting baseline (general)**	$$E_{CB} = \sum_{n} \left(I_n \times Q_{n,r} \right)$$	***E*$_{CB}$** means the crediting baseline (general), in tonnes CO_2-e. ***I*$_n$** means the baseline emissions intensity of production variable n during the baseline year, in tonnes CO_2-e per unit of the variable produced or processed, worked out in accordance with Division 5. ***Q*$_{n,r}$** means the quantity of production variable n produced or processed by the facility during the NGER reporting year, worked out using production variable data. ***n*** means a production variable for the facility other than electricity.
7 **s31(2)**	**Crediting baseline (electricity)**	$$E_{CB,Elec} = \left[I_{Exist,b} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{Rep} \times Q_{Rep/New} \right] \times MLF_r$$	***E*$_{CB,Elec}$** means the crediting baseline (electricity), in tonnes CO_2-e. ***I*$_{Exist,b}$** means the baseline emissions intensity of electricity generated using existing electricity generating units at the facility and exported from the facility, in tonnes CO_2-e per megawatt hour of electricity exported, worked out using equation 23. ***Q*$_{Exist,r}$** means the quantity of electricity generated using existing electricity generating units at the facility and exported from the facility during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity. ***Q*$_{Therm}$** means the quantity of additional electricity exported from the facility during the NGER reporting year as a result of project abatement activities that improve the thermal efficiency of existing electricity generating units at the facility, in megawatt hours, worked out using equation 19. ***I*$_{Rep}$** means: (a) if the value of INew for the NGER reporting year (worked out using equation 21) multiplied by MLFr (within the meaning of subsection 52(1)) is less than the value of EFElec (within the meaning of subsection 52(1))—the emissions intensity of electricity generated using replaced generating units at the facility and exported from the facility during the baseline year, in tonnes CO2-e per megawatt hour of electricity exported, worked out using equation 25; or (b) otherwise—zero. ***Q*$_{Rep/New}$** means the smaller of the following: (a) the value of ***Q*$_{Rep}$** (within the meaning of subsection 54(1); (b) the value of ***Q*$_{New}$** (within the meaning of section 53) for the NGER reporting year. **MLF$_r$** means the marginal loss factor for the facility for the NGER

			reporting year, which is: (a) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a distribution network—taken to be 1; or (b) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a transmission network—the relevant factor published by the Australian Energy Market Operator Limited (ACN 072 010 327) that is valid at the end of the NGER reporting year; or (c) if neither paragraph (a) nor (b) applies, and a relevant authority of the State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year——the factor determined by the relevant authority; or (d) in any other case—taken to be 1.
8 **s34**	**Emissions intensity of production variable**	$$I_n = \frac{E_n}{Q_{n,b}}$$	***I_n*** means the emissions intensity of production variable n, in tonnes CO_2-e per unit of the variable produced or processed. ***E_n*** means the baseline NGER emissions attributable to production variable n for the NGER reporting year, in tonnes CO_2-e, worked out in accordance with section 35. ***$Q_{n,b}$*** means the quantity of production variable n produced or processed by the facility during the NGER reporting year, worked out using production variable data.
9 **s36**	**Total baseline NGER emissions**	$$E_{NGER,b} = E_{S1,b} + \left(EI_b \times EF_{EP} \times MLF_b \right) + E_{S2,Other,b} - E_{Fug,b}$$	***$E_{NGER,b}$*** means the total baseline NGER emissions, in tonnes CO_2-e. ***$E_{S1,b}$*** means the reported scope 1 emissions for the facility during the NGER reporting year, in tonnes CO_2-e. ***EI_b*** means the reported electricity imports for the facility during the NGER reporting year, in megawatt hours. ***EF_{EP}*** means: (a) for electricity obtained from an electricity grid that is a grid in relation to which the NGA Factors document in force on the declaration day includes an emissions factor—that factor, in kilograms CO_2-e per kilowatt hour; or (b) for electricity obtained from an electricity grid not covered

			by paragraph (a) or from a source other than an electricity grid: (i)if the supplier of the electricity is able to provide an emissions factor that reflects the emissions intensity of the electricity and is applicable on the declaration day—that factor, in kilograms CO_2-e per kilowatt hour; or (ii) otherwise—the emissions factor, in kilograms CO_2-e per kilowatt hour, for off-grid electricity included in the NGA Factors document in force on the declaration day. ***MLF$_b$*** means the marginal loss factor for the facility for the NGER reporting year, which is: (a) if, during the NGER reporting year, electricity is imported by the facility from the national electricity market and the facility is directly connected to a distribution network—taken to be 1; or (b) if, during the NGER reporting year, electricity is imported by the facility from the national electricity market and the facility is directly connected to a transmission network—the relevant factor published by the Australian Energy Market Operator Limited (ACN 072 010 327) that is valid at the end of the NGER reporting year; or (c) if neither paragraph (a) nor (b) applies, and a relevant authority of the State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year——the factor determined by the relevant authority; or (d) in any other case—taken to be 1. ***E$_{S2,Other,b}$*** means the reported scope 2 emissions from heat or cooling for the facility during the NGER reporting year, in tonnes CO_2-e. ***E$_{Fug,b}$*** means any excluded NGER fugitive emissions for the facility during the NGER reporting year, in tonnes CO_2-e, as reported to the Regulator in an NGER report.
10 **s37(1)**	**NGER emissions apportioned to each production variable**	$$E_n = AD_n \times E_{NGER,b}$$	***E$_n$*** means the emissions apportioned to production variable n, in tonnes CO_2-e. ***AD$_n$*** means the apportioning percentage for production variable n, worked out using equation 11. ***E$_{NGER,b}$*** means the total baseline NGER emissions for the NGER reporting

			year, in tonnes CO_2-e, worked out using equation 9.
11 **s37(2)**	**Apportioning percentage for each production variable**	$$AD_n = \frac{M_n \times Q_{n,b}}{\sum_n \left(M_n \times Q_{n,b} \right)}$$	***AD_n*** means the apportioning percentage for production variable n. ***M_n*** means: (a) if the project proponent provided, or has access to, data about the facility that was used to establish baselines for the Jobs and Competitiveness Program—the weighted average emissions intensity of production variable n for the financial years beginning on 1 July 2006 and 1 July 2007, worked out using equation 12; or (b) if paragraph (a) does not apply and production variable n is covered by an item in the table in clause 1 of Schedule 1—the industry average emissions intensity of production variable n, in tonnes CO_2-e per unit of the variable, worked out using equation 13; or (c) if neither paragraph (a) nor (b) applies—the facility-specific apportioning metric for production variable n. ***$Q_{n,b}$*** means the quantity of production variable n produced or processed by the facility during the NGER reporting year, worked out using production variable data.
12 **s37(3)**	**Weighted average emissions intensity for production variable**	$$M_n = \frac{\left(E_{n,2006\text{-}07} + \left(TC_{Elec,n,2006\text{-}07} \times EF_{EP}\right)\right) + \left(E_{n,2007\text{-}08} + \left(TC_{Elec,n,2007\text{-}08} \times EF_{EP}\right)\right)}{Q_{n,2006\text{-}07} + Q_{n,2007\text{-}08}}$$	***M_n*** means the weighted average emissions intensity of production variable n. ***$E_{n,2006\text{-}07}$*** means the total direct emissions data for the period 1 July 2006 to 30 June 2007, in tonnes CO_2-e, that: (a) was used to establish baselines for the Jobs and Competitiveness Program; and (b) is attributable to production variable n. ***$TC_{Elec,\ n,2006\text{-}07}$*** means the total electricity consumed data for the period 1 July 2006 to 30 June 2007, in megawatt hours, that: (a) was used to establish baselines for the Jobs and Competitiveness Program; and (b) is attributable to production variable n. ***EF_{EP}*** means: (a) for electricity obtained from an electricity grid that is a grid in relation to which the NGA Factors document in force on the declaration day includes an emissions factor—that factor, in kilograms CO_2-e per kilowatt hour; or (b) for electricity obtained from an electricity grid not covered

			by paragraph (a) or from a source other than an electricity grid: (i) if the supplier of the electricity is able to provide an emissions factor that reflects the emissions intensity of the electricity and is applicable on the declaration day—that factor, in kilograms CO_2-e per kilowatt hour; or (ii) otherwise—the emissions factor, in kilograms CO_2-e per kilowatt hour, for off-grid electricity included in the NGA Factors document in force on the declaration day. $E_{n,2007\text{-}08}$ means the total direct emissions data for the period 1 July 2007 to 30 June 2008, in tonnes CO_2-e, that: (a) was used to establish baselines for the Jobs and Competitiveness Program; and (b) is attributable to production variable n. $TC_{Elec,n,2007\text{-}08}$ means the total electricity consumed data for the period 1 July 2007 to 30 June 2008, in megawatt hours, that: (a) was used to establish baselines for the Jobs and Competitiveness Program; and (b) is attributable to production variable n. $Q_{n,\ 2006\text{-}07}$ means the production data for the period 1 July 2006 to 30 June 2007, that: (a) was used to establish baselines for the Jobs and Competitiveness Program; and (b) is attributable to production variable n. $Q_{n,\ 2007\text{-}08}$ means the production data for the period 1 July 2007 to 30 June 2008, that: (a) was used to establish baselines for the Jobs and Competitiveness Program; and (b) is attributable to production variable n.

13 **s37(4)**	**Industry average emissions intensity of production variable**	$$M_n = I_{S1,n} + \left(I_{EI,n} \times EF_{EP} \right)$$	***M_n*** means the industry average emissions intensity of production variable n, in tonnes CO_2-e per unit of the variable. ***$I_{S1,n}$*** means the scope 1 emissions intensity of production variable n, determined in accordance with the table in clause 1 of Schedule 1. ***$I_{EI,n}$*** means the electricity intensity of production variable n, determined in accordance with the table in clause 1 of Schedule 1. ***EF_{EP}*** means: (a) for electricity obtained from an electricity grid that is a grid in relation to which the NGA Factors document in force on the declaration day includes an emissions factor—that factor, in kilograms CO_2-e per kilowatt hour; or (b) for electricity obtained from an electricity grid not covered by paragraph (a) or from a source other than an electricity grid: (i) if the supplier of the electricity is able to provide an emissions factor that reflects the emissions intensity of the electricity and is applicable on the declaration day—that factor, in kilograms CO_2-e per kilowatt hour; or (ii) otherwise—the emissions factor, in kilograms CO_2-e per kilowatt hour, for off-grid electricity included in the NGA Factors document in force on the declaration day.
14 **s40(2)**	**Recalculated emissions for the production variable for the baseline year**	$$E_{P,b} = \frac{E_{P,c}}{Q_{P,c}} \times Q_{P,b}$$	***$E_{P,b}$*** means the recalculated emissions for the production variable for the baseline year, in tonnes CO_2-e. ***$E_{P,c}$*** means the emissions for the production variable for the calculation year, in tonnes CO_2-e, calculated using the NGER measurement method, measurement procedure and frequency that applied in the calculation year. ***$Q_{P,c}$*** means the quantity of the production variable produced or processed by the facility during the calculation year, measured using the NGER measurement method, measurement procedure and frequency that applied in the calculation year. ***$Q_{P,b}$*** means the quantity of the production variable produced or processed by the facility during the baseline year, measured using the NGER measurement method, measurement procedure and frequency that applied in the baseline year.

15 **s41(2)**	**Adjusted emissions apportioned to production variable**	$$E_{Adj,n} = E_{n,b} \times P_n$$	***$E_{Adj,n}$*** means the adjusted emissions apportioned to production variable n during the baseline year, in tonnes CO_2-e. ***$E_{n,b}$*** means the emissions apportioned to production variable n during the baseline year, in tonnes CO_2-e, worked out using equation 10. ***P_n*** means the lesser of: (a) the change in processing factor for production variable n during the baseline year, worked out in accordance with section 41 (3); and (b) 1.5.
16 **s44(2)**	**NGER emissions (general) for the facility for the reporting year**	$$E_{NGER,r} = E_{S1,r} + \left(EI_r \times EF_{EP} \times MLF_r \right) + E_{S2,Other,r} - E_{Fug,r} - E_{Elec,r} - E_{HC,r}$$	***$E_{NGER,r}$*** means the NGER emissions (general), in tonnes CO_2-e. ***$E_{S1,r}$*** means the reported scope 1 emissions for the facility during the NGER reporting year, in tonnes CO_2-e. ***EI_r*** means the reported electricity imports for the facility during the NGER reporting year, in megawatt hours. ***EF_{EP}*** means: (a) for electricity obtained from an electricity grid that is a grid in relation to which the NGA Factors document in force on the declaration day includes an emissions factor—that factor, in kilograms CO_2-e per kilowatt hour; or (b) for electricity obtained from an electricity grid not covered by paragraph (a) or from a source other than an electricity grid: (i) if the supplier of the electricity is able to provide an emissions factor that reflects the emissions intensity of the electricity and is applicable on the declaration day—that factor, in kilograms CO_2-e per kilowatt hour; or (ii) otherwise—the emissions factor, in kilograms CO_2-e per kilowatt hour, for off-grid electricity included in the NGA Factors document in force on the declaration day. ***MLF_r*** means the marginal loss factor for the facility for the NGER reporting year, which is: (a) if, during the NGER reporting year, electricity is imported by the facility from the national electricity market and the facility is directly connected to a distribution network—taken

			to be 1; or (b) if, during the NGER reporting year, electricity is imported by the facility from the national electricity market and the facility is directly connected to a transmission network—the relevant factor published by the Australian Energy Market Operator Limited (ACN 072 010 327) that is valid at the end of the NGER reporting year; or (c) if neither paragraph (a) nor (b) applies, and a relevant authority of the State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year——the factor determined by the relevant authority; or (d) in any other case—taken to be 1. $E_{S2,Other,r}$ means the reported scope 2 emissions from heat or cooling for the facility during the NGER reporting year, in tonnes CO_2-e. $E_{Fug,r}$ means the excluded NGER fugitive emissions for the facility during the NGER reporting year, in tonnes CO_2-e, as reported to the Regulator: (a) in an NGER report; or (b) in an offsets report in accordance with section 68. $E_{Elec,r}$ means the total emissions from electricity exported from the facility during the NGER reporting year, in tonnes CO_2-e, worked out using equation 26. $E_{HC,r}$ means: (a) if heating or cooling is exported from the facility during the NGER reporting year (but not during the baseline year) and the emissions attributable to the heating or cooling exported are excluded heating or cooling emissions for the NGER reporting year—the emissions attributable to the heating or cooling exported, in tonnes CO_2-e, worked out using an emissions apportioning approach that is not inconsistent with the approach that applies to CHP plants under Part 4 Division 8; or (b) otherwise—zero.
17 **S45(2)**	**The NGER emissions (electricity) for the facility for the NGER reporting year**	$$E_{Elec,NGER,r} = \left[I_{Exist,r} \times \left(Q_{Exist,r} - Q_{Therm} \right) + I_{New} \times Q_{Rep/New} \right] \times MLF_r$$	$E_{Elec,NGER,r}$ means the NGER emissions (electricity), in tonnes CO_2-e. $I_{Exist,r}$ means the emissions intensity of electricity generated using existing electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e per megawatt hour of electricity exported, worked out using equation 24. $Q_{Exist,r}$ means the quantity of electricity generated using existing

			electricity generating units at the facility and exported from the facility during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity. Q_{Therm} means the quantity of additional electricity exported from the facility during the NGER reporting year as a result of project abatement activities that improve the thermal efficiency of existing electricity generating units at the facility, in megawatt hours, worked out using equation 19. I_{New} means: (a) if the emissions intensity of electricity generated using new electricity generating units at the facility and exported from the facility during the NGER reporting year (worked out using equation 21), is less than the value of EF_{Elec} (within the meaning of section 52(1))—the emissions intensity of that electricity, in tonnes CO_2-e per megawatt hour of electricity exported, worked out using equation 21; or (b) otherwise—zero. $Q_{Rep/New}$ means the smaller of the following: (a) the value of Q_{Rep} (within the meaning of subsection 54(1); (b) the value of Q_{New} (within the meaning of section 53) for the NGER reporting year. MLF_r means the marginal loss factor for the facility for the NGER reporting year, which is: (a) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a distribution network—taken to be 1; or (b) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a transmission network—the relevant factor published by the Australian Energy Market Operator Limited (ACN 072 010 327) that is valid at the end of the NGER reporting year; or (c) if neither paragraph (a) nor (b) applies, and a relevant authority of the State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year——the factor determined by the relevant authority; or (d) in any other case—taken to be 1.

18 **s48(1)**	**Electricity abatement adjustment A (for increased generation due to improved thermal efficiency)**	$$A_E = \left(EF_{Elec} - I_{Exist,r} \right) \times Q_{Therm} \times MLF_r$$	***A_E*** means electricity abatement adjustment A, in tonnes CO_2-e. ***EF_{Elec}*** means: (a) for electricity exported to an electricity grid that is a grid in relation to which the NGA Factors document in force on the declaration day includes an emissions factor—that factor, in kilograms CO_2-e per kilowatt hour; or (b) for electricity exported otherwise than in paragraph (a) (whether to a grid or not): (i) if the receiver of the electricity is able to provide an emissions factor that reflects the emissions intensity of the displaced electricity (worked out in accordance with section 48 subsection (3)) and is applicable on the declaration day—that factor, in kilograms CO_2-e per kilowatt hour; or (ii) otherwise—the emissions factor, in kilograms CO_2-e per kilowatt hour, for off-grid electricity included in the NGA Factors document in force on the declaration day. ***$I_{Exist,r}$*** means the emissions intensity of electricity generated using existing electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e per megawatt hour of electricity exported, worked out using equation 24. ***Q_{Therm}*** means the quantity of additional electricity exported from the facility during the NGER reporting year as a result of project abatement activities that improve the thermal efficiency of existing electricity generating units at the facility, in megawatt hours, worked out using equation 19. ***MLF_r*** means the marginal loss factor for the facility during an NGER reporting year (see Equation 17)
19 **s49(1)**	**Additional electricity exported from the facility due to improved thermal efficiency**	$$Q_{Therm} = \left[\left(\frac{e_{E,R}}{e_{E,B}} \right) - 1 \right] \times Q_{Exist,r}$$	***Q_{Therm}*** means the quantity of additional electricity exported from the facility as a result of project abatement activities that improve the thermal efficiency of existing electricity generation equipment at the facility, in megawatt hours. ***$e_{E,R}$*** means the efficiency of electricity generation within the facility during the NGER reporting year, worked out as follows: (a) work out the quantity of electricity generated within the facility from existing electricity generation equipment during the NGER reporting year, in gigajoules;

			(b) divide that quantity by the quantity of fuel consumed by the facility in generating that electricity, in gigajoules. $e_{E,B}$ means the efficiency of electricity generation within the facility during the baseline year, worked out as follows: (a) work out the quantity of electricity generated within the facility from existing electricity generation equipment during the baseline year, in gigajoules; (b) divide that quantity by the quantity of fuel consumed by the facility in generating that electricity, in gigajoules. $Q_{Exist,r}$ means the quantity of electricity generated using existing electricity generation equipment at the facility and exported from the facility during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity.
20 **s52(1)**	**Electricity abatement adjustment B (for electricity new generation equipment)**	$$A_R = \left(EF_{Elec} - I_{New} \right) \times Q_{New,net} \times MLF_r$$	A_R means electricity abatement adjustment B, in tonnes CO_2-e. EF_{Elec} means: (a) for electricity exported to an electricity grid that is a grid in relation to which the NGA Factors document in force on the declaration day includes an emissions factor—that factor, in kilograms CO_2-e per kilowatt hour; or (b) for electricity exported otherwise than in paragraph (a) (whether to a grid or not): (i) if the receiver of the electricity is able to provide an emissions factor that reflects the emissions intensity of the displaced electricity (worked out in accordance with section 52 subsection (3)) and is applicable on the declaration day—that factor, in kilograms CO_2-e per kilowatt hour; or (ii) otherwise—the emissions factor, in kilograms CO_2-e per kilowatt hour, for off-grid electricity included in the NGA Factors document in force on the declaration day. I_{New} means the emissions intensity of electricity generated using new electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e per megawatt hour of electricity exported, worked out using equation 21. $Q_{New,net}$ means the net quantity of electricity generated using new electricity generating units at the facility and exported from the facility during the NGER reporting year, in megawatt hours, worked out using

			equation 22. MLF_r means the marginal loss factor for the facility during an NGER reporting year (see Equation 17)
21 **s53**	**Emissions intensity of electricity generated using new electricity generation equipment**	$$I_{New} = \frac{E_{New}}{Q_{New} \times MLF_r}$$	I_{New} means the emissions intensity of electricity generated using new electricity generating units at the facility and exported from the facility, in tonnes CO_2-e per megawatt hour of electricity exported. E_{New} means the emissions apportioned to electricity generated using new electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e, worked out in accordance with section 59. Q_{New} means the quantity of electricity generated using new electricity generating units at the facility and exported from the facility during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity MLF_r means the marginal loss factor for the facility during an NGER reporting year (see Equation 17)
22 **s54(1)**	**Electricity generated using new electricity generation equipment**	$$Q_{New,net} = Q_R - Q_{Exist,r} - Q_{Rep}$$	$Q_{New,net}$ means the net quantity of electricity generated using new electricity generating units at the facility and exported from the facility, in megawatt hours. Q_R means the quantity of electricity exported from the facility during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity. $Q_{Exist,r}$ means the quantity of electricity generated using existing electricity generating units at the facility and exported from the facility during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity. Q_{Rep} means the quantity of electricity generated using replaced electricity generating units at the facility and exported from the facility during the baseline year, in megawatt hours, worked out using production variable data.
23 **s55(1)**	**Baseline emissions intensity of electricity generated using existing electricity generation**	$$I_{Exist,b} = \frac{E_{Exist,b}}{Q_{Exist,b} \times MLF_b}$$	$I_{Exist,b}$ means the baseline emissions intensity of electricity generated using existing electricity generating units at the facility and exported from the facility, in tonnes CO_2-e per megawatt hour of electricity exported. $E_{Exist,b}$ means the baseline NGER emissions attributable to electricity generated using existing electricity generating units at the facility and exported from the facility during the baseline year, in tonnes CO_2-e, worked out in accordance with section 35 as that section applies for the

	equipment		purposes of this definition (see section 55 subsection (2)). $\boldsymbol{Q_{Exist,b}}$ means the quantity of electricity generated using existing electricity generating units at the facility and exported from the facility during the baseline year, in megawatt hours, worked out using production variable data. $\boldsymbol{MLF_b}$ means the marginal loss factor for the facility for the NGER reporting year, which is: (a) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a distribution network—taken to be 1; or (b) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a transmission network—the relevant factor published by the Australian Energy Market Operator Limited (ACN 072 010 327) that is valid at the end of the NGER reporting year; or (c) if neither paragraph (a) nor (b) applies, and a relevant authority of the State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year——the factor determined by the relevant authority; or (d) in any other case—taken to be 1.
24 **s56**	**Emissions intensity of electricity generated using existing electricity generation equipment**	$$I_{Exist,r} = \frac{E_{Exist,r}}{Q_{Exist,r} \times MLF_r}$$	$\boldsymbol{I_{Exist,r}}$ means the emissions intensity of electricity generated using existing electricity generating units at the facility and exported from the facility, in tonnes CO_2-e per megawatt hour of electricity exported. $\boldsymbol{E_{Exist,r}}$ means the emissions apportioned to electricity generated using existing electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e, worked out in accordance with section 59. $\boldsymbol{Q_{Exist,r}}$ means the quantity of electricity generated using existing electricity generating units at the facility and exported from the facility during the baseline year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity. $\boldsymbol{MLF_r}$ means the marginal loss factor for the facility during an NGER reporting year (see Equation 17)

25 **s57(1)**	**Emissions intensity of electricity generated using replaced electricity generation equipment and exported from a facility**	$$I_{Rep} = \frac{E_{Rep}}{Q_{Rep} \times MLF_b}$$	***I_{Rep}*** means the emissions intensity of electricity generated using replaced electricity generating units at the facility and exported from the facility during the baseline year, in tonnes CO_2-e per megawatt hour of electricity exported. ***E_{Rep}*** means the baseline NGER emissions attributable to electricity generated using replaced electricity generating units at the facility and exported from the facility during the baseline year, in tonnes CO_2-e, worked out in accordance with section 35 as that section applies for the purposes of this definition (see section 57 subsection (2)) **Q_{Rep}** means the quantity of electricity generated using replaced electricity generating units at the facility and exported from the facility during the baseline year, in megawatt hours, worked out using production variable data. ***MLF_b*** means the marginal loss factor for the facility for the NGER reporting year, which is: (a) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a distribution network—taken to be 1; or (b) if, during the NGER reporting year, electricity is exported from the facility to the national electricity market and the facility is directly connected to a transmission network—the relevant factor published by the Australian Energy Market Operator Limited (ACN 072 010 327) that is valid at the end of the NGER reporting year; or (c) if neither paragraph (a) nor (b) applies, and a relevant authority of the State or Territory in which the facility is located has determined a factor that is valid at the end of the NGER reporting year——the factor determined by the relevant authority; or (d) in any other case—taken to be 1.
26 **s58**	**Emissions from electricity exported from the facility during the NGER reporting year**	$$E_{Elec,r} = \left(I_{Exist,r} \times Q_{Exist,r} \times MLF_r \right) + E_{New}$$	***$E_{Elec,r}$*** means the total emissions from electricity exported from the facility during the NGER reporting year, in tonnes CO_2-e. ***$I_{Exist,r}$*** means the emissions intensity of electricity generated using existing electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e per megawatt hour of electricity exported, worked out using equation 24. ***$Q_{Exist,r}$*** means the quantity of electricity generated using existing electricity generating units at the facility and exported from the facility

			during the NGER reporting year, in megawatt hours, measured in accordance with the applicable monitoring requirements for the electricity. E_{New} means the emissions apportioned to electricity generated using new electricity generating units at the facility and exported from the facility during the NGER reporting year, in tonnes CO_2-e, worked out in accordance with section 59. MLF_r means the marginal loss factor for the facility during an NGER reporting year (see Equation 17)
27 **s60(1)**	**Emissions apportioned to electricity generated by CHP plant**	$$E_{E,p} = \left[\frac{\left(Q_{E,p} \times F_{MWh \rightarrow GJ} \right) / e_{E,p}}{\left(\left(Q_{E,p} \times F_{MWh \rightarrow GJ} \right) / e_{E,p} \right) + \left(Q_{H,p} / e_{H,p} \right) + \left(Q_{C,p} / e_{C,p} \right)} \right] \times E_{T,p}$$	$E_{E,p}$ means the emissions apportioned to electricity generated by CHP plant p, in tonnes CO_2-e. $Q_{E,p}$ means the quantity of electricity generated by CHP plant p during the NGER reporting year, in megawatt hours, worked out in accordance with section 6.2 of the NGER (Measurement) Determination. $F_{MWh \rightarrow GJ}$ means 3.6, being the factor to convert megawatt hours to gigajoules. $e_{E,p}$ means the thermal efficiency of electricity generation by CHP plant p during the NGER reporting year, worked out in accordance with section 62. $Q_{H,p}$ means the quantity of heat generated by CHP plant p during the NGER reporting year, in gigajoules, worked out using equation 28. $e_{H,p}$ means the thermal efficiency of heat generation by CHP plant p during the NGER reporting year, worked out in accordance with section 62. $Q_{C,p}$ means the quantity of cooling generated by CHP plant p during the NGER reporting year, in gigajoules, worked out using equation 29. $e_{C,p}$ means the thermal efficiency of cooling generation by CHP plant p during the NGER reporting year, worked out in accordance with section 62. $E_{T,p}$ means the total emissions from CHP plant p during the NGER reporting year, worked out in accordance with Chapter 2 of the NGER (Measurement) Determination.

28 **s61(1)**	**Quantity of heat generated by CHP plant**	$$Q_{H,p} = \frac{\left(m_{SO} \times h_{SO}\right) - \left(m_{SI} \times h_{SI}\right)}{1\ 000\ 000}$$	$\boldsymbol{Q_{H,p}}$ means the quantity of heat generated by CHP plant p, in gigajoules. $\boldsymbol{m_{SO}}$ means the mass of the steam produced by the boiler, in kilograms. $\boldsymbol{h_{SO}}$ means the enthalpy of the steam produced by the boiler, in kilojoules per kilogram. $\boldsymbol{m_{SI}}$ means the mass of the boiler feedwater, in kilograms. $\boldsymbol{h_{SI}}$ means the enthalpy of the boiler feedwater, in kilojoules per kilogram.
29 **s61(2)**	**Quantity of cooling generated by CHP plant**	$$Q_{C,p} = \frac{\left(m_{WI} \times h_{WI}\right) - \left(m_{WO} \times h_{WO}\right)}{1\ 000\ 000}$$	$\boldsymbol{Q_{C,p}}$ means the quantity of cooling generated by CHP plant p, in gigajoules. $\boldsymbol{m_{WI}}$ means the mass of the return water that goes into the absorption chiller of the CHP plant, in kilograms. $\boldsymbol{h_{WI}}$ means the enthalpy of the return water that goes into the absorption chiller, in kilojoules per kilogram. $\boldsymbol{m_{WO}}$ means the mass of the cool water outflow from the absorption chiller, in kilograms. $\boldsymbol{h_{WO}}$ means the enthalpy of the cool water outflow from the absorption chiller, in kilojoules per kilogram.