

## **EXPLANATORY STATEMENT**

### *Carbon Credits (Carbon Farming Initiative) Act 2011*

#### *Carbon Credits (Carbon Farming Initiative—Industrial Equipment Upgrades) Methodology Determination 2018*

#### **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 by reducing or avoiding emissions or by removing carbon from the atmosphere and storing it in soil or trees.

In 2014, the Australian Parliament passed the *Carbon Farming Initiative Amendment Act 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 reduction and sequestration) from eligible projects and rules for monitoring, record keeping and reporting. These methodologies help ensure emissions reductions are genuine—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, an independent expert panel established to advise the Minister on proposals for methodology determinations. The Minister must not make or vary a methodology if the Emissions Reduction Assurance Committee advises the Minister it is inconsistent with the offsets integrity standards, set out in section 133 of the Act. The Minister will also consider any adverse environmental, economic or social impacts likely to arise as a result of projects to which the determination applies.

Offsets projects undertaken in accordance with a 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. This 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 and Energy (the Department) website at: [www.environment.gov.au/emissions-reduction-fund](http://www.environment.gov.au/emissions-reduction-fund).

## **Background: Industrial equipment upgrades**

The *Carbon Credits (Carbon Farming Initiative—Industrial Equipment Upgrades) Methodology Determination 2018* (the Determination) sets out rules for implementing and monitoring offsets projects that reduce greenhouse gas emissions associated with the consumption of electricity and/or fossil fuels by industrial and similar equipment.

Industrial operations generate direct (scope 1) greenhouse gas emissions from fuel combustion in systems such as boilers and ovens as well as indirect (scope 2) greenhouse gas emissions from electrically powered systems such as air compressors and pumps.

Savings from energy efficiency measures on industrial and similar equipment can be maximised by improving the efficiency of the whole system—such as a pumping system—through a combination of measures. The Determination provides a system-wide measurement and verification approach. It is based on measurements of baseline (i.e. pre-upgrade) and operating (i.e. post-upgrade) equipment energy consumption during representative baseline and operating measurement periods, with adjustment for energy intensity where this yields a more conservative result. The length of baseline and operating measurement periods would typically be one month, with flexibility provided for shorter or longer periods where appropriate, such as where seasonal factors apply.

The Determination provides flexibility for project proponents to undertake a broad range of energy efficiency activities and to determine what activities are most appropriate for each type of equipment. The method is designed to cover upgrades to a broad range of equipment delivering a range of industrial services as listed in subsection 8(4) of the Determination. For each individual upgrade, total energy consumption in the 12 months ending with the end of the baseline measurement period is limited to 500,000 gigajoules.

Projects may include one or more of the following activities:

- modifying, removing or replacing equipment
- installing additional equipment (e.g. waste heat recovery, pre-heating/cooling)
- changing the way existing equipment is controlled or operated (e.g. installing/upgrading control systems, sub-metering, refining control algorithms, or introducing additional feedback controls)
- changing the energy sources or mix of energy sources used.

Some activities covered by the Determination may also be eligible under the *Carbon Credits (Carbon Farming Initiative—Industrial Electricity and Fuel Efficiency) Methodology Determination 2015* or could be part of a much larger project under the *Carbon Credits (Carbon Farming Initiative—Facilities) Methodology Determination 2015*. However, the existing methods are best suited to larger emissions reductions projects. The Determination is intended to be relatively simple and enable smaller projects, while accommodating a wide range of equipment upgrade activities.

## **Application of the Determination**

The Determination sets out rules for implementing and monitoring offsets projects that reduce greenhouse gas emissions associated with the electricity and fuel consumption of industrial and similar equipment. These rules are designed to reflect the requirements of the Act's offsets integrity standards to help 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. In summary, the offsets integrity standards also require that:

- carbon abatement from projects is measurable and capable of being verified
- the methodology determinations used are supported by clear and convincing evidence
- material emissions which are a direct consequence of the project are deducted
- estimates, assumptions or projections used in the determination should be conservative.

Project proponents wishing 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), 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
- the government program requirement.

The government program requirement is provided for in the *Carbon Credits (Carbon Farming Initiative) Rule 2015*. Subsection 27(4A) of the Act provides that a methodology determination may specify requirements in lieu of the newness requirement or the regulatory additionality requirement. The Determination does not specify any requirements in lieu of the newness requirement or the regulatory additionality requirement, and the general requirements apply to industrial equipment upgrade projects.

### **Public consultation**

The Determination has been developed in collaboration with the Regulator and a technical working group of experts from the industrial and energy efficiency sectors. The technical working group held a meeting in March 2016 to review a scoping paper and reviewed an earlier Determination in late August 2016. All significant issues identified through these consultations were effectively resolved in the Determination. For example, the Determination was amended to cover additional equipment types and the proposed limit on equipment power ratings was replaced with an annual energy consumption limit. In addition, energy boundary and measurement requirements were amended to accommodate a wider range of site conditions.

### **Determination details**

The Determination is a legislative instrument within the meaning of the *Legislation Act 2003*.

Details of the Determination are at [Attachment A](#).

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

### **Authority for incorporation of documents**

Under section 106(8) of the Act, a methodology determination may make provision in relation to a matter by applying, adopting or incorporating, with or without modification, a matter contained in an instrument or writing:

- (a) as in force or existing at a particular time; or
- (b) as in force or existing from time to time.

The manner of incorporation for each incorporated document is outlined in Attachment A.

### **Note on this explanatory statement**

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.

## Details of the Methodology Determination

### Part 1 Preliminary

#### 1 Name

The full name of the Determination is the *Carbon Credits (Carbon Farming Initiative—Industrial Equipment Upgrades) Methodology Determination 2018*.

#### 2 Commencement

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

#### 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 provides that the Determination is in force from its commencement (as provided for in section 2) until the day before it would otherwise be repealed under subsection 50(1) of the *Legislation Act 2003*. Instruments are repealed under that provision on the first of April or the first of October following the tenth anniversary of registration of an instrument on the Federal Register of Legislation.

The Determination, once made, remains in force for the duration set out in this section unless revoked in accordance with section 123 of the Act or section 42 of the *Legislation Act 2003*.

If the Determination expires in accordance with section 122 of the Act or is revoked under section 123 of the Act during a crediting period for a project to which the Determination applies, the Determination continues 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 Emissions Reduction Assurance Committee may also suspend the processing of applications under a methodology determination if there is reasonable evidence that the determination does not comply with one or more of the offsets integrity standards. This does not affect applications for declaration already received by the Regulator before such a suspension, or declared eligible offset projects which apply the Determination.

#### 5 Definitions

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

Generally, where terms are not defined in the Determination but are defined in section 5 of the Act, they have the meaning given by the Act.

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. Key definitions in section 5 of the Determination include those set out below. Most critical new concepts are dealt with under other sections.

**biomass** means organic matter other than:

- fossil fuel, for example coal, lignite, petroleum or natural gas; and
- biofuel, for example ethanol or biodiesel.

**commissioning period**, following an IE upgrade, means the period ending when:

- any equipment performance testing, calibration or similar activity required to demonstrate that the upgraded unit operates as intended has been completed; and
- any action, or installation of equipment, required for the upgraded unit to perform its functions in the normal operation of the relevant system of equipment has been completed.

**declaration day** means the day that an IEU project was declared an eligible offsets project by the Regulator under section 27 of the Act. The term ‘declaration day’ is not related to the declarations by a MVP that are referred to in Division 4.

**eligible renewable energy source** means an eligible renewable energy source for the purposes of the *Renewable Energy (Electricity) Act 2000*.

**excisable interval** means a period of time not suitable for inclusion in the measurement period or reference period, as detailed in subsection 22(8).

**government supported renewable energy** for an IE unit during a period, means electricity used by the IE unit that was generated at the site served by the unit, from renewable sources, using equipment that:

- was installed at the site after the start of the baseline period (see section 22); and
- under the legislative rules (if any) made for subparagraph 27(4A)(c)(ii) of the Act, must not be included in an eligible offsets project.

Subparagraph 27(4A)(c)(ii) relates to the government program requirement, one of the additionality requirements under the Act. The rules identify energy production that receives a subsidy under another government program. This energy is treated as if it were non-renewable for the purposes of calculating emissions.

**HVAC heating/cooling ventilation fan** means a fan that:

- services the space heating, space cooling or ventilation systems of a building; and
- is designed or configured to operate only when the space heating or space cooling applications are heating or cooling the spaces enclosed by the building envelope.

**industrial cooling** means refrigerant-based cooling services associated with the production, handling and storage of goods and materials, either to maintain the performance of equipment or to provide appropriate temperatures for inputs or products e.g. refrigeration services for food processing, mine shaft cooling, refrigerant or cold water loops used to cool equipment that is used to process or handle products, and associated chillers.

**NGA Factors document** means the document entitled “National Greenhouse Accounts Factors”, published by the Department that is in force from time to time.

**NGER (Measurement) Determination** means the *National Greenhouse and Energy Reporting (Measurement) Determination 2008*, available from [www.legislation.gov.au](http://www.legislation.gov.au).

**output representativeness criterion** means the requirement that the annualised output of the sub-unit during a period of measurement must be within 15 per cent of the reference output, as detailed in subsection 23.

**RET energy source** means an eligible renewable energy source for the purposes of the *Renewable Energy (Electricity) Act 2000*.

## 6 Factors and parameters from external sources

The calculation of the net abatement amount in the Determination includes factors and parameters determined from other sources, such as the **NGER (Measurement) Determination**.

Section 6 specifies that such factors or parameters should be determined by using the version of the external source that is current at the end of the reporting period, unless:

- the Determination specifies otherwise, or
- it is not possible to define or calculate the factor or parameter by reference to the instrument or writing as in force at the end of the reporting period.

For example, the NGER (Measurement) Determination has been updated annually, which means that any emissions factors or energy content factors used in baseline calculations may need to be re-worked from one reporting period to another, as necessary.

It is not expected that paragraph 6(2)(b) would apply under this Determination – i.e. it is unlikely that it will not be possible to define or calculate the factor or parameter by reference to the relevant external source in force at the end of the reporting period. However, if paragraph 6(2)(b) does apply, project proponents would use the version of legislative instruments in force at the time at which monitoring or other actions were conducted. (See section 10 of the *Acts Interpretation Act 1901* and section 13 of the *Legislation Act 2003* which operate such that references to external documents which are legislative instruments relate to the most relevant versions of those instruments).

Subsection 36(4) sets out reporting requirements to be followed when paragraph 6(2)(b) applies.

## 7 Definitions in other instruments relating to optimised equipment

Section 7 specifies that definitions in the Determination that reference a standard should be determined by using the version of the standard that is current on the date on which the upgraded unit is commissioned, unless the Determination specifies otherwise.

## Part 2 IEU projects

### 8 IEU projects

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

In conjunction with subsection 8(10), subsection 8(1) defines an IE project (industrial equipment project) as an offsets project that applies upgrades to one or more IE units (industrial equipment unit) and that are reasonably expected to result in eligible carbon abatement by increasing the energy conversion efficiency, by reducing the energy intensity or energy consumption of the IE unit, or changing energy sources.

#### *Concepts relating to an IE unit*

Subsection 8(2) defines a system of equipment as a system of industrial equipment:

- that includes at least one item of ***energy-consuming equipment***
- whose elements are connected to each other, either directly or by means of other elements of the system such as dedicated transport mechanisms, or, where not physically connected, work together to produce a common service
- such that the system as a whole can be treated as providing a particular service or services to the user in the context in which it is used.

This subsection permits equipment that is not physically connected to other parts of the system to be part of an IE unit. This allows proponents to include energy-using equipment that is required to be included in the energy boundary under section 11. For example, a dryer that supplies a solid fuel to a furnace that is being upgraded, but is not directly connected to the furnace, can be regarded as interconnected if there is a conveyor used solely to supply solid fuel to the furnace.

Another example of an eligible system incorporating energy-consuming equipment connected to non-energy consuming items is a boiler connected to pipes, valves, heat exchangers and heat recovery tubing. Compressed air storage and piping are examples of items that could be included in a compressed air system as they are connected, although they do not consume fuel or electricity themselves.

One example of equipment that works together to produce a common service but may not be directly connected is a bank of pumps that jointly supply water to the same reservoir, via parallel pipes. Similarly, a pump and fan feeding water and combustion air to a boiler are not directly connected, yet both work together to produce steam, in conjunction with the boiler. An IE unit energy boundary may need to include equipment that works together to ensure that all the equipment that materially impact on emissions from project activities is included (section 11).

Subsection 8(3) defines the outputs of a system of equipment as the services that it provides to the user of an industrial plant or similar site. Outputs may or may not be IE services.

The Determination restricts eligibility to defined IE services outlined in subsection 8(4) as the following:

- a pumping or gas compression service
- delivery of compressed air
- ventilation by means of ducted or partition ventilation fans, other than HVAC heating/cooling ventilation fans



- an industrial fan or industrial low pressure air blowing service
- processing or handling of materials, including, for example:
  - (i) a crushing or grinding circuit
  - (ii) mechanical processing, such as shredding or pulping
  - (iii) separation, mixing or sorting of materials
- a vacuum generation service
- refrigeration or industrial cooling (not including HVAC cooling)
- process heating, including:
  - (i) heating or preheating of boilers
  - (ii) heating or preheating of kilns, ovens, roasters, furnaces or similar equipment
- any other heating service, other than HVAC heating, that uses heat, including waste heat, generated through the provision of an IE service listed above.

Heating and cooling that forms part of HVAC systems are excluded because these systems are subject to significant climatic effects that cannot be accounted for under the method. Proponents of such projects may use the ERF Industrial Electricity and Fuel Efficiency method.<sup>1</sup>

*What an IE unit is*

Subsection 8(5) sets out the requirements that a system of equipment must meet in order to be classified as an IE unit.

There will often be a choice as to what industrial or related equipment should constitute an IE unit for a project. The project proponent will need to choose systems in such a way that each of them:

- includes all equipment within an energy boundary (section 11); and
- has an associated IE upgrade that satisfies paragraph 8(1)(b) and is not excluded by section 10; and
- has appropriate output indicators (section 14).

For example, if the main energy consuming equipment is a pumping service, and the intended upgrade will improve the efficiency of the pumps, the proponent might choose to define the IE unit as consisting of the pumps themselves, and use the fluid flow from the pumps as the output indicator.

However, if the intended upgrade will affect the pumping system energy consumption by improving the efficiency of equipment such as pipes and valves supplied by the pumping system, the proponent might choose to define the IE unit to include that equipment.

The proponent may then use a broader output indicator such as the output of the site as a whole. This approach may be appropriate if pump flow measurements are not available.

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<sup>1</sup> As set out in the *Carbon Credits (Carbon Farming Initiative—Industrial Electricity and Fuel Efficiency) Methodology Determination 2015*.

Paragraph 8(5)(a) sets out that a system of equipment that forms an IE unit must be either at one location, or at locations connected by a dedicated transport mechanism that is part of the system (as explained under subsection 8(2) above).

#### *IE upgrades*

Subsection 8(6) defines an IE upgrade as doing one or more of the following to an IE unit, other than as maintenance:

- modifying, removing or replacing equipment of the unit
- installing additional equipment in the unit
- changing the way existing equipment of the unit is controlled or operated
- changing the energy sources or mix of energy sources used by the unit.

Changing the energy sources or mix of energy sources used by the unit, commonly called fuel switching, may require environmental approval from State governments. Under section 28 of the Act, proponents will be required to obtain any required regulatory approvals for a project before the end of the first reporting period.

Subsection 8(7) sets out that in subsection 8(6), an action is done as maintenance if it is no more than is required to maintain the performance and reliability of the equipment in the IE unit, or is required or recommended by the manufacturer or equipment supplier. Similarly, the activities must do more than undertake non-ongoing maintenance of equipment.

The intent of this provision is to credit only replacement and maintenance activities providing additional energy efficiency improvement than would occur in the ordinary course of business. The method is intended to credit early upgrading of equipment in working order to improve energy efficiency more than the standard 'like for like' replacement that might be done to maintain reliability. If equipment is upgraded towards the end of its life, the upgrade should provide a higher energy efficiency level than the typical direct replacement in the market. This means that any minimum energy performance standards for the equipment would need to be exceeded.

An example of a normal replacement activity that would not be eligible is replacing worn-out flat-bladed pump impellers with higher-performing curved blade impellers that have replaced the original blades as replacement parts for that pump.

An example of non-ongoing maintenance is a compressed air survey to identify and repair leaks at a point in time. The leak survey could still potentially be done as part of undertaking eligible activities such as correctly resizing a compressor or replacing other system components (e.g. compressed air storage tanks). However, subsection 22(3) limits maintenance and other work concurrent with upgrade to ensure that the method does not credit activities that would occur in the ordinary course of business, while encouraging sound maintenance practices.

Subsection 8(8) defines the original unit as the IE unit in its form before the IE upgrade, while subsection 8(9) defines the upgraded unit as the IE unit in its form after the IE upgrade.

#### *Transmission of fuel or electricity*

Subsection 8(11) sets out that if a system of equipment includes equipment that distributes some of the fuel or electricity that enters it to equipment outside the system, the fuel or electricity distributed (the transmitted fuel or electricity) is not treated as energy consumed by the system of equipment. This applies, for example, to shared wiring or piping that distributes energy to equipment that is included in the unit, and also to equipment that is outside the unit.

## **Part 3 Project requirements**

### 9 Operation of this Part

Under paragraph 106(1)(b) of the Act, a methodology determination must set out requirements 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.

Part 3 of the Determination specifies requirements for a project to be an eligible offsets project.

### 10 IE units that cannot be included in an eligible offsets project

Section 10 defines a range of exclusions from an IE project, including the types of activities, equipment and circumstances that cannot form part of an eligible project.

#### *Limit on energy consumption*

Subsection 10(1) sets out that an eligible offsets project cannot include a particular IE unit if the annualised energy consumption of the IE unit, calculated with reference to the baseline period, is greater than 500,000 gigajoules. This refers to the total energy consumption within the energy boundary, which can be described as the energy used by the unit to produce the IE services mentioned in subsection 8(4) for all the sub-units. This limit on the energy consumption of the IE unit is to ensure that the IEU method is used for equipment and activities that are relatively self-contained, for which the simple measurement-based approach in the method is appropriate. In some instances the energy boundary may be defined more tightly to avoid the energy consumption limit, provided that the unit meets the energy boundary requirements in section 11. The 500,000 gigajoule limit applies regardless of whether the unit is broken up into sub-units.

By allowing for up to 500,000 gigajoules of energy consumption for an IE unit, the project proponent is able to include all substitutable equipment within the energy boundary. This allows the method to be used for a wide range of industrial projects, and allows proponents to upgrade some components of a larger system. Prior to an upgrade, the 500,000 gigajoule threshold should be estimated using energy content factors for fuels from the NGER (Measurement) Determination. NGER reporting data can be used for this purpose where available. Alternatively, energy consumption for the unit can be estimated using equipment power ratings and estimated load profiles. Subsection 10(1) sets out that an IE unit cannot be included in an eligible offsets project if the annualised energy consumption calculated using the specified equation is greater than 500,000 gigajoules.

The ERF Industrial Electricity and Fuel Efficiency method can apply to larger items of equipment where a more complex modelling approach is warranted for more accurate emissions estimation. Proponents have the flexibility to establish the minimum size of equipment that is cost effective to include in their industrial equipment upgrades projects.

Division 4 requires a measurement and verification professional (MVP) to confirm, in both the pre- and post-upgrade declarations, that this energy consumption limit is met.

#### *Upgrade must be more than the normal course of business*

Subsection 10(2) provides that an IE unit cannot be included in an eligible offsets project unless its IE upgrade is recommended in a report:

- from a Type 2 or Type 3 energy audit conducted in accordance with *AS/NZS3598.2:2014* or *AS/NZS3598.1:2014* as applicable, or

- produced by an independent professional energy services contractor or consultant that is competent to identify and evaluate the opportunities for energy savings.

The report must be written no more than two years before the project application. Energy audits conducted to the applicable Australian Standard must conform with either Type 2 (detailed audit) or Type 3 (precision subsystem audit) requirements, and the IE unit should be included within the scope of the audit. The versions of these standards published in October 2014 apply for the purposes of subsection 10(2). Australian Standards can be found via the Standards Australia website, [www.standards.org.au](http://www.standards.org.au). Energy service providers who perform energy audits to these standards would be expected to already have copies of these Australian Standards.

The report mentioned in subsection 10(2) must be included in the pre-upgrade MVP declaration (section 24). To ensure independence, energy savings reports must not be produced by a MVP used for the project or a person with a financial interest in the project at the time when the report was produced.

*Units not operating before the upgrade excluded*

Subsection 10(3) excludes any IE unit that was not operating prior to the upgrade from an eligible offsets project. This subsection also excludes new installations where there was no equipment in operation and providing the same output in the baseline period. These exclusions are necessary because the calculations require baseline energy consumption data and require output indicators to be applicable to both the baseline data (the original unit) and the operating project data (the upgraded unit).

*Irregularly or intermittently operating units excluded*

Subsection 10(4) excludes from eligible projects any IE unit that operates only as a reserve, back-up or emergency system. It is not possible to establish representative measurement periods when the operation of the equipment is irregular and unpredictable because it does not contribute to output during normal operation. Examples include fire safety pumps that are occasionally tested, or largely redundant equipment that only operates when other equipment is undergoing maintenance. On mine sites, dewatering pumps that are only operated due to flooding or unusually heavy rains are also excluded by this provision.

*Substantial change to capacity excluded*

Subsection 10(5) excludes from eligible projects any IE unit that undergoes a substantial change in capacity if it meets all of the following conditions:

- a) The IE upgrade involves replacing existing items of equipment, or installing additional items of equipment.
- b) The replacement or additional items add directly to the rated power of the original IE unit, rather than indirectly.
- c) The additional rated power is more than 20 per cent of the rated power of the original unit.

An example is an IE system consisting of a boiler that serves a number of other pieces of equipment, where the capacity of the boiler is a constraint on the capacity of the system. Adding a second boiler would add to the capacity of the unit directly by changing the rated output of the unit, and is restricted under paragraph (c). Adding other pieces of equipment relating to the boilers, such as more efficient heat exchangers or reducing heat losses, might

add to the effective capacity of the unit indirectly (by making fuller use of the boiler), and would be permitted by paragraph (b).

Subsection 10(5) of the method allows a 20 per cent increase in the rated power of the unit as a design contingency. Subsection 10(8) sets out that the rated power means the rated output power of the relevant equipment as specified by the manufacturer or, if the specifications are not known, then the input or output power determined by testing the equipment consistently before and after the upgrade.

It is common practice in engineering project design to incorporate a contingency factor in case the required loads have been miscalculated, and to accommodate some future growth. This contingency reflects common engineering practice and is typically in the region of 20 per cent of the design load. As the method requires baseline and project emissions to be measured at comparable loads that reflect annual output rates, the method verifies the improvement in efficiency even if equipment capacity moderately increases.

#### *Excluded vehicles*

Subsection 10(6) excludes from eligible projects any original or upgraded units involving upgrades to a vehicle that could be covered by a land and sea transport project under the *Carbon Credits (Carbon Farming Initiative—Land and Sea Transport) Methodology Determination 2015*.

This exclusion applies because the Determination is intended to be applied to systems that operate at a single site, and is not suited to transport equipment.

#### *Biomass may be used as an energy source only if it is a RET energy source*

Paragraph 10(7)(a) excludes activities that directly involve the use of **biomass** as an energy source unless the biomass is an eligible renewable energy source for the purposes of the *Renewable Energy (Electricity) Act 2000* (defined as a **RET energy source**). For example, an activity involving changing the fuel source for a furnace from coal to biomass that is not a RET energy source is not covered by the Determination.

Similarly, paragraph 10(7)(b) excludes IE units for which emissions would be reduced by moving from, for example, a gas-generated heat source to the capture and utilisation of waste heat from a device that consumes biomass that is not classified as a RET energy source.

Subparagraph 10(7)(c)(i) excludes activities that relate to energy-consuming equipment if the equipment utilises, as an energy source, a form of biomass that is not a RET energy source. For example, an activity that improves the efficiency of a furnace or boiler fuelled by biomass that is not a RET energy source is not an eligible activity under the Determination.

Subparagraph 10(7)(c)(ii) excludes activities that relate to the use of off-grid electricity, heat, steam or cooling that is produced using biomass that is not a RET energy source. This paragraph also excludes IE units for which crediting is sought for a reduction in emissions derived from switching from electricity, heat, steam or cooling that is generated from one source, to off-grid electricity, heat, steam or cooling that is generated from biomass that is not a RET energy source. For example, a project proponent could not establish an activity that involves switching from natural gas to biomass that is not a RET energy source.

In this Determination, off-grid electricity means the supply of electricity through a dedicated power line as opposed to the supply of electricity through an interconnected network of generators that are governed by the ordinary market arrangements of the major grids. Off-grid electricity is intended to cover electricity sourced directly from a generator even if there are

other users of the electricity. For example, electricity would be considered off-grid electricity if it were produced at the site of the implementation or at a nearby site.

The exclusions in subsection 10(8) align the Determination's coverage of biomass with the Renewable Energy Target (RET) scheme. The RET scheme covers a number of forms of biomass, and applies several tests and constraints to limit the risk of adverse impacts in relation to their use.

## 11 IE unit must include all equipment within an energy boundary

Section 11 sets out the requirements for defining an energy boundary for an IE unit. Also known as a 'measurement boundary', the energy boundary is a theoretical boundary or limit around the IE unit.

Subsection 11(1) sets out that the energy boundary requirements apply to both the original and the upgraded units. Subsections 11(2) and 11(3) set out what must be included in an energy boundary to ensure that all energy flows that materially affect the energy consumption of the equipment related to the project activities are included in abatement calculations. The effect of subsection 11(3) is to include any equipment that could affect the abatement from the project activities, whether or not it is upgraded. For example, a grinding circuit upgrade may need to include the prior crushing process if the inputs from the crushing process vary enough to affect grinding circuit emissions.

Subsection 11(4) sets out that an energy boundary must not include any equipment that is also included in another IE unit of the project (shared equipment) unless the shared equipment is not subject to the IE upgrade, and the amount of energy consumed by the shared equipment is expected to be less than five per cent of the energy used by each of the IE units served by it. Any shared equipment must not transfer materials or energy between any of the IE units served by it. Shared equipment must be within the energy boundary for an IE unit for both the baseline period and the project measurement period. As the baseline and project emissions cancel out in the calculations, this requirement prevents double-counting of shared equipment. Notes to the paragraph provide examples.

Subsection 11(4) limits sharing of equipment between IE units. In some cases equipment shared between two upgrades may not meet the requirements of subsection 11(4). This might occur, for example, if the shared equipment is part of more than one upgrade. To accommodate all the upgrades involving the shared equipment, the energy boundary can be defined to include all the upgraded systems that use the shared equipment. The different upgrades may be defined as sub-units if they do not have a common output indicator.

Subsection 11(5) sets out that a unit must not include any equipment that does not contribute to the output of the unit unless the equipment is part of a partly independent sub-system specified under section 12, or the inclusion of that equipment has only a minor or trivial effect on abatement for the unit.

Subsection 11(6) states that each IE unit must not draw useful energy from outside the IE unit apart from fuel or electricity with emissions factors listed in the NGER (Measurement) Determination. This allows all energy consumption for the unit to be converted into emissions using consistent emissions factors.

Subsection 11(7) defines useful energy as fuel, electricity, heat, steam, cooling or useful physical work. Physical work is considered ‘useful’ if it changes the energy consumption of the equipment in an IE unit that is upgraded. For example, if water is supplied to a pump station at high speed (e.g. from a storage reservoir at higher elevation) and this kinetic energy is dissipated in a storage tank, this kinetic energy would not need to be included in the boundary. On the other hand, consider two air compressors being used in sequence, with the first compressor boosting the inlet pressure for the second. Since the power requirements for a compressor depend on the pressure that the compressor needs to generate, if the second compressor is upgraded the electricity consumption by the first compressor must also be included in the energy boundary.

Viewed as a whole, section 11 and the definition of an IE project in section 8 are intended to accommodate activities involving a range of energy efficiency improvements to self-contained energy consuming systems. This architecture enables upgrades to a range of different components, including heat recovery and improvements to equipment such as heat exchangers that only consume energy indirectly. At the same time, the Determination ensures that abatement is genuine because all energy flows related to the project are accounted for, and all interactive effects are included within the energy boundary.

Notes to section 11 clarify that proponents may include equipment not subject to the upgrade within the energy boundary in order to exploit existing metering. Project proponents are not required to select the smallest possible energy boundary for an IE unit. A wider energy boundary may be chosen, for example, to use existing metering or to allow the use of a more accurate output indicator. The intent is that where applicable, the energy consumption of separately metered equipment may be deducted from a larger boundary to achieve a more accurate energy boundary.

The original unit and the upgraded unit are not required to have the same energy boundary. However, since the outputs and output indicators must remain unchanged following an upgrade, the energy boundary can only change to the extent that the IE unit is changed by the upgrade, e.g. excluding removed equipment and including any installed equipment or components.

## 12 Partly independent sub-system of an IE unit

Section 12 allows for the exclusion of fuel or electricity that is attributable to an energy output that is not consumed by the unit. If an IE unit has a partly independent sub-system that draws fuel or electricity and provides steam, heat, cooling or compressed air partly to other parts of the IE unit and partly to external equipment, this provision allows the fuel or electricity consumed outside the unit to be excluded from the abatement calculations.

A sub-system may be partly independent if the sub-system does not consume useful energy from outside the sub-system other than fuel or electricity with NGER emissions factors, and does not supply useful energy to the rest of the IE unit apart from its output. Outputs for a partly independent subsystem are steam, heated or cooled fluids, or compressed air. The energy content of the internal and external outputs must be able to be monitored in accordance with section 38.

Subsections 12(2) to 12(3) specify the fuel or electricity consumed by the unit must be attributed based on the measured proportion of the energy output consumed within the unit, and must be net of the energy content of any lower grade energy being returned to the partly independent subsystem. For example, if a boiler supplies two thirds of its steam output (by energy content) to the IE unit, then one third of the steam output of the boiler can be excluded

from the boundary. As any energy returned to the partly independent subsystem must be netted out, the method requires measurement of the energy returned in accordance with section 38.

Energy returned to the system is lower grade if it has a lower useful energy content, such as lower temperature steam, or lower pressure compressed air. In cooling applications, a fluid with a higher temperature may be considered lower grade.

Due to the requirements in section 11, an independent subsystem can only be included in one IE unit. Rather than being separate units, any overlapping subsystems should be combined into a single unit.

### 13 Dividing an IE unit into sub-units

Section 13 allows the project proponent to divide an IE unit into **sub-units**—subsystems of industrial or commercial equipment that form part of an IE unit. These sub-units are used as the basis for abatement calculations, enabling the transfer of energy (e.g. as heat) to sub-units that have different output indicators from other sub-units within the energy boundary for an IE unit. This approach also gives proponents the flexibility to make use of existing sub-metering.

If the IE unit is not divided into sub-units, the whole of the unit is taken to be the **sub-unit** for calculation purposes. Where all potential sub-units have the same overall output indicator, using the complete IE unit will simplify the calculations.

A sub-unit may consist of equipment that is not directly affected by any part of the upgrade. It must draw at least some energy from outside the IE unit so that the abatement calculations can be made. However, this energy could be supplementary to the energy provided by other sub-units, e.g. recovered heat.

### 14 IE unit must have output indicators

Section 14 sets out that the project proponent must specify a set of outputs and an appropriate output indicator for each sub-unit. This includes specifying the reference output indicator for use in subsection 23(2). The reference output indicator is used to establish that the output in the measurement period is representative of normal operation.

Notes to the section clarify that this indicator would be expected to be the same as the output indicator in section 14, unless data relating to the latter is not available for the whole of the 12 month period that ends at the end of the baseline period. In that case, the proponent may use another indicator for which data is available for the section 23 test. This clarification ensures that proponents can use detailed site metering data (e.g. for a month) where available to make baseline and operating measurements even if the meters are not connected to a data historian.

#### *Output indicator required for the IE unit, or for each sub-unit*

Subsection 14(1) sets out for each IE unit of the project, the information the project proponent must specify in relation to each IEU sub-unit.

#### *Requirements for outputs and output indicators*

Subsection 14(2) sets out that the IE unit must physically and directly contribute to generating the output. For example, if steam from an upgraded boiler is used in a dryer to produce an output of powdered milk, the steam physically contributes to the output. In practice, this means that omitting the IE unit would prevent the generation of the outputs, or significantly



reduce the available range or rate of output. The choice of output indicator will depend on where the boundary of the unit is drawn—e.g. if the boundary of a unit consisting of a pumping system is drawn at the outlet of the pumps, the output may be a pumping service; if it is drawn around equipment served by the pumps, it is the service delivered by that equipment.

Subsection 14(3) specifies that an output indicator for an IE unit must be either a directly measurable primary parameter or a derived indicator that combines two or more primary parameters and verifiable standard constants or measures. Expressed as mathematical formulae, indicators may be derived from data including physical constants, material properties or other verifiable stipulated data that do not diminish the precision of the calculation. Data is ‘verifiable’ if it is documented by a suitable source, such as engineering handbooks, in Australian or ISO standards, or similar sources.

By allowing the output indicator to be a derived indicator, the Determination recognises that not all data can be measured directly. For example, the Determination may allow for the use of standardised temperatures and pressures to normalise compressed air flow measurements, or may allow the use of steam property tables if steam is an output.

Derived indicators can also account for some more complex circumstances. For example, a combined indicator for a boiler producing steam at high and low temperatures might be a weighted average of the tonnage of the two steam outputs. In this case, steam output levels should be weighted according to the energy content of the two steam outputs in order to provide accurate results.

Subsection 14(4) sets out that an output indicator must be appropriate for the sub-unit both before and after the upgrade—e.g. if a refrigeration system upgrade coincides with a change in storage temperature, such as changing from storing dairy products to storing bananas, the output indicator would need to be able to account for the differences in storage temperatures for the two products.

Subsection 14(5) sets out that output indicators are appropriate if they are measurable quantities, or functions of measurable quantities, that are reasonable measures, or proxies for, the outputs. Output indicators must be measurable in units that comply with the *National Measurement Act 1960*. Indicators can be very straightforward—e.g. litres of water pumped, or tonnes of ore moved on a conveyor belt. However, it may be necessary to use indicators that are more complex or less direct, such as tonnes of product of the site served by the IE unit.

The output indicator or reference output indicator may be specified so as to combine measurements from two or more distinct outputs where the outputs require similar energy consumption. Energy consumption requirements are sufficiently similar if the equipment is used for similar times and loads to produce each output. In addition, if thermal processes are involved—each output is produced at similar temperatures. An example of a similar output could be a production line producing both frozen cauliflower and frozen broccoli.

Where outputs are not similar, measurements for each distinct output must separately satisfy the **output representativeness criterion** in section 23. That is, the rate of production of each output must be comparable to the annual rate for each distinct output.

Subsection 14(6) sets out that, for an IE unit, a primary parameter means a measurable quantity relating to an input, internal transfer or intermediate or final product of the facility served by the IE unit. Derived indicators may be calculated from data including physical constants, material properties or other verifiable stipulated data that do not diminish the precision of the calculation.

Outputs can be grouped together and treated as a single output if an output indicator can be found that is appropriate for them together. A project proponent may need to divide a unit into several sub-units to be able to provide appropriate output indicators (see above).

#### 15 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 an offsets project as an eligible offsets project.

Section 15 of the Determination sets out the information required in an application for declaration of an IE project.

#### 16 Disposal of equipment and other components

Subsection 16(1) requires that if equipment is removed from a site as part of a project, or in association with a project, and is replaced by equipment that is:

- of the same type
- of similar capacity, and
- materially more efficient than the existing equipment at its best efficiency point,

then the removed equipment must be disposed of and not refurbished or re-used.

An example is replacing energy-consuming appliances with more efficient models. This clause ensures compliance with the offsets integrity standard that requires any increase in emissions resulting from the project to be accounted for.

Subsection 16(2) explains that in subparagraph 16(1)(b)(i) the **type** of a piece of equipment refers to the function it performs in the IE unit and the way it performs it.

Subsection 16(3) explains that in subparagraph 16(1)(b)(ii) the **capacity** of a piece of equipment means the appropriate measurable capacity in relation to its function, such as the power output of a motor. Two items of equipment are of similar capacity if the difference between their measures of capacity is no more than five per cent of the smaller capacity.

Subsection 16(4) sets out that for paragraph 16(1)(b)(iii), a replacement item of equipment is materially more efficient than the existing equipment if its energy efficiency or energy intensity at the best efficiency point is more than five per cent greater. For example, a boiler with a maximum efficiency of 85 per cent would be materially more efficient than a boiler with an efficiency of conversion of fuel into steam energy (enthalpy) of 79 per cent.

An item of energy consuming equipment or a component that is removed may be broken down into components and recycled, provided that recycled components are not used in an application with the same primary purpose as the original energy consuming equipment.

Notes to section 16 clarify that disposal is not required where the item is replaced by one that is substantially different to the original, not merely more efficient. This includes, for example, replacing a motor with a less powerful one that is still adequate for the job, or replacing an air compressor or pump with a different type that has better part-load performance. In this way, the Determination allows for equipment that is reasonably efficient to be used as spare parts, or used in a more appropriate application. It does not restrict proponents from on-selling equipment that is not fundamentally inefficient. In this way the method allows users to reconfigure equipment in the unit to better match the load profile of the site—the type of measure identified through a detailed energy audit according to *AS/NZS3598.2:2014*.

Where disposal is required under subsection 16(1), the project proponent may comply with this clause by:

- rendering any components that have been removed not usable or refurbishable before disposal, or
- selling or otherwise transferring removed components to a third party such as a scrap dealer or recycling business if they receive an assurance that the components will not be refurbished or re-used.

Under subsection 36(2) of the Determination, project proponents are further required to keep a record of the disposal of equipment, including evidence that the disposal was conducted in accordance with any other applicable legislative requirements.

## Part 4 Net abatement amount

### Division 1 Preliminary

#### 17 Operation of this Part

Paragraph 106(1)(c) of the Act provides that a methodology determination must specify how to calculate the carbon dioxide equivalent (CO<sub>2</sub>-e) net abatement amount for an industrial equipment upgrade project in relation to a reporting period. Part 4 sets out this calculation.

#### 18 Overview of gases accounted for in abatement calculations

Section 18 provides a summary of the emissions sources assessed in the Determination in order to determine the net abatement amount. The emissions sources which need to be taken into account when calculating abatement for the project are set out in the following table:

<b>Greenhouse gases and emissions sources</b>			
<b>Item</b>	<b>Relevant emissions calculation</b>	<b>Emissions source</b>	<b>Greenhouse gas</b>
1	Baseline emissions for an IE unit or sub-unit	Fuel consumption emissions	Carbon dioxide (CO <sub>2</sub> ) Methane (CH <sub>4</sub> ) Nitrous oxide (N <sub>2</sub> O)
2	Baseline emissions for an IE unit or sub-unit	Electricity consumption emissions	Carbon dioxide (CO <sub>2</sub> ) Methane (CH <sub>4</sub> ) Nitrous oxide (N <sub>2</sub> O)
3	Operating emissions or measured emissions for an IE unit or sub-unit	Fuel consumption emissions	Carbon dioxide (CO <sub>2</sub> ) Methane (CH <sub>4</sub> ) Nitrous oxide (N <sub>2</sub> O)
4	Operating emissions or measured emissions for an IE unit or sub-unit	Electricity consumption emissions	Carbon dioxide (CO <sub>2</sub> ) Methane (CH <sub>4</sub> ) Nitrous oxide (N <sub>2</sub> O)

The Determination covers scope 1 emissions from onsite fuel combustion and scope 2 emissions from electricity consumed onsite. It does not cover scope 3 emissions associated with the extraction and processing of fossil fuels or the manufacture, transportation, installation and disposal or decommissioning of building elements. It is an ERF scheme-wide policy to exclude scope 3 emissions from baseline and project emissions sources.

### Division 2 IE units and data to be used in calculations

#### 19 When an IE unit must be excluded from calculations

Section 19 sets out rules for when an IE unit must not be included in abatement calculations.

Subsection 19(1) sets out that an IE unit must have both pre-upgrade and post-upgrade declarations which verify the appropriateness of the measurement periods and emissions rates.

Subparagraph 19(2)(a)(i) sets out that an IE unit must not be included in abatement calculations for a reporting period if, during the reporting period or a previous reporting

period, the project proponent undertook any activity (whether or not a project activity) at the facility served by the IE unit that is excluded from eligible offsets projects under the legislative rules for subparagraph 27(4A)(c)(ii) of the Act. Subparagraph 19(2)(a)(ii) clarifies that this exclusion only applies where an activity could reasonably be expected to cause a change in the level of abatement for the IE unit in the measurement period that is not minor or trivial.

Paragraph 19(2)(b) sets out that proponents must exclude any upgraded units from abatement calculations where energy consuming equipment that forms part of those units has been decommissioned during the relevant reporting period. This provision is to prevent crediting of any abatement arising from decommissioned equipment as distinct from project activities.

Paragraph 19(2)(c) sets out that units operated only as reserve, back-up or emergency systems cannot be included in the calculations, as measurements of these systems are not representative of normal operation. Paragraphs 19(2)(d) to 19(2)(f) set out exclusions related to biomass that is not a RET energy source.

Subsection 19(3) sets out that a proponent may choose to exclude an IE unit from abatement calculations for a reporting period even if that IE unit has been included in abatement calculations for a prior reporting period. Once the project proponent excludes an IE unit from abatement calculations, it must be excluded from all subsequent reporting periods for the remainder of the crediting period.

## 20 Data sources

Section 20 sets out the data sources that a proponent may use when calculating emissions abatement. Paragraph 20(a) allows proponents to choose from one of two sources to establish the energy consumption associated with **government supported renewable energy** consumed by the IE unit or sub-unit: direct metering data in accordance with section 38, or billing data.

Paragraph 20(b) allows proponents to choose from one of two sources to establish consumption of energy that is not government supported renewable energy: data from utility bills, or metering/sub-metering data collected on-site.

Paragraph 20(c) specifies that the only allowable data sources for calculating emissions attributable to the outputs of an IE unit or sub-unit are measured primary parameters and verifiable standard constants or measures. That is, they must be measurable quantities of inputs, internal transfers or intermediate or final products of the facility served by the IE unit or sub-unit. The data sources set out in section 20 may be used to develop a derived indicator by combining two or more primary parameters (section 13).

## 21 Use of grid data for energy returned to the grid

Section 21 provides that in determining a quantity of government supported renewable energy for a period, if the proponent uses data obtained other than by monitoring in accordance with section 38, the quantity must be calculated as the difference between the total amount of renewable electricity generated by the equipment during the period and the amount of that electricity that was exported to the grid.

### **Division 3 Setting the measurement periods**

## 22 Setting the measurement periods and reference period

Subsection 22(1) sets out the requirement for a project proponent to set a baseline period before the upgrade and a project measurement period after the upgrade. These are the same

periods that must be applied for comparison with reference output data for the output representativeness criterion (see section 23).

Subsection 22(2) sets out that the entire baseline period must be included in the reference period over which the reference output is to be measured for the output representativeness criterion (section 23). The reference period must be for 365 days. Where the period includes *excisable intervals* in accordance with subsection 22(8), additional time equivalent to the length of any excisable periods must be added so that the period is exactly 365 days.

#### *Limit on maintenance and other work concurrent with upgrade*

Subsection 22(4) sets out that the baseline period and the project measurement period must be chosen so that any normal maintenance or replacement activities as set out in subsection 8(6) are either not part of the IE upgrade, or will not have a significant effect on abatement for an IE unit. Subsection 22(5) clarifies that where a numerical estimate can be made, a proportion of over 20 per cent is considered significant, based on the Pareto principle. Subsection 22(3) clarifies that the limits on these activities may be assessed based on reasonable expectations in the pre-upgrade declaration (section 24). This ensures that the MVP has not made a false declaration if unexpected maintenance issues occur which result in significant abatement.

Subsections 22(5) to 22(7) set out that measurement periods and the reference period must be a continuous block of time, excluding any intervals that are excisable under subsection 22(7). Subsection 22(8) defines the conditions for a time interval to be an excisable interval for the IE unit, for example the *commissioning period* for the unit or the period of a start-up or shut-down sequence that is not part of the normal cycle of operation.

The method allows measurement periods to include start-up periods that form part of the typical operation of an IE unit. For example, if an industrial compressed air system is restarted each day, the start-up can be included. However, it must be excluded from a one month measurement period if the system is normally only restarted every six months for maintenance purposes.

#### *Measurement periods must be close to the time of the upgrade*

To ensure that the baseline period is close enough to the IE upgrade to be representative, subsection 22(9) requires that the baseline period for an IE unit must end within 12 months of commissioning the upgraded unit. If the baseline period approved for a unit in the pre-upgrade declaration fails this provision, the project proponent may collect the necessary baseline data for a later pre-upgrade period that meets this provision, subject to documentation and approval by a MVP in the post-upgrade declaration.

Subsection 22(10) sets out that the project measurement period for an IE unit must begin within 18 months from commissioning the upgraded unit in order to limit the amount of time that elapses between baseline and project measurements. This period is long enough to accommodate metering installation during annual refurbishments, or other unexpected events affecting a unit.

Under section 69 of the Act, the crediting period of a project is required to start within 18 months of the project being registered (i.e. declared an eligible offsets project). The project measurement period could start as soon as the project is registered. As the project may receive credits for seven years, any IE units *commissioned* after this date will obtain credits for less than seven years. Proponents are able to delay the start of the crediting period for up to 18 months from registration in order to maximise the period over which the IE units in a project are credited.

### *Measurement periods must be representative*

Subsection 22(11) sets out that measurement periods and the reference period must be representative of the expected operation of the IE unit and its energy consumption over the crediting period. Specifically, each measurement period must:

- cover any normal variation in output or energy use
- cover representative parts of the different seasons or other periods, if the unit is subject to any seasonal or other periodic variations in output or energy use, and
- cover a typical range of operating conditions for the original unit.

The measurement period and reference period must account for changes in output, external factors such as climate, input or output quality and type that materially affect energy consumption, the fuel mix, operating schedules (including start-ups and shutdowns) and changes in equipment or equipment configuration.

### 23 The output representativeness criterion

For the baseline and project measurement periods to be comparable, both periods must meet the output representativeness criterion. Subsection 23(1) sets out that a baseline period or a project measurement period in relation to an IE unit satisfies the ***output representativeness criterion*** for a sub-unit if the annualised output of the sub-unit during the period is within 15 per cent of the reference output. This requirement ensures both measurement periods coincide with normal operation while providing some margin for output to vary between the two periods due to measurement uncertainty. This level was chosen because the combined uncertainty of two relative precision (tolerance) figures of 15 per cent is under 25 per cent. This level of uncertainty is considered accurate enough to not require an accuracy factor discount under the Industrial Electricity and Fuel Efficiency ERF method or the equivalent method under the Energy Savings Scheme in New South Wales.

Subsection 23(2) defines the ***reference output*** of the sub-unit as the total output of the sub-unit in the reference period, as measured by the reference output indicator.

Subsection 23(3) defines the ***annualised output*** of the sub-unit as the total output of the unit for the period, as measured by the relevant output indicator, converted into an annualised figure.

Subsection 23(4) sets out that if a reporting period includes any excisable intervals in relation to an IE unit the project proponent must exclude these excisable intervals from the reporting period for that unit.

## **Division 4 Pre-upgrade and post-upgrade declarations**

### 24 Pre-upgrade declaration by a MVP

Section 24 sets out that proponents must gain a ***pre-upgrade declaration*** from a MVP (i.e. a measurement and verification professional who satisfies section 26) about an original unit after the end of the baseline period. MVPs may make a declaration using more than one document.

Subsection 24(4) sets out the details that must be included in a signed or electronically authenticated pre-upgrade MVP declaration in order to provide sufficient evidence for the findings in the declaration.

Subsection 24(5) states that MVPs may provide a pre-upgrade declaration only if they are satisfied that they have received all the information from the project proponent that they need to make the declaration. MVPs must also be satisfied that the information they receive is accurate and does not contain anything misleading.

To be satisfied as to the content of a declaration, a MVP may need to undertake site visits or inspections or to use monitoring equipment. Information required for the declaration is outlined in the notes following subsection 24(5).

Subsection 24(6) states that MVPs who provide the project proponent with a pre-upgrade declaration must provide at the same time written evidence supporting their statements, including the calculations, assumptions, information and inputs used.

## 25 Post-upgrade declaration by MVP

Section 25 sets out that proponents must gain a **post-upgrade declaration** from a MVP about an upgraded unit and that this declaration must be made after the end of the project measurement period, following the upgrade of the IE unit. A MVP may make a declaration using more than one document.

Subsection 25(4) sets out the details that must be included in a signed or electronically authenticated post-upgrade declaration by a MVP.

Paragraph 25(4)(h) requires the MVP to confirm they are satisfied that the amount of abatement produced by the IE upgrade is consistent with the abatement being predominantly the result of the IE upgrade rather than other factors. To make this assessment, a MVP would typically need to see some data for the two measurement periods. This assessment could be made based on the MVP's knowledge of the impact of other factors on energy consumption emissions, with simple calculations if necessary.

Subsection 25(5) sets out that a MVP may provide a post-upgrade declaration only if they are satisfied that the declaration is accurate. MVPs must also be satisfied that they have received from the project proponent any information about the IE unit that they requested in order to make the declaration and also that the information received is accurate and does not contain anything misleading. Notes to the section list information that MVPs are likely to require in order to make the declaration, and will need to request if they do not already have it from involvement in implementing or testing the upgraded IE unit.

Subsection 25(6) sets out that a MVP who provides the project proponent with a post-upgrade declaration must also provide at the same time written evidence supporting their statements, including the calculations, assumptions, information and inputs used.

## 26 Qualifications of a MVP

Section 26 sets out that pre-upgrade or post-grade declarations can only be provided by MVPs who:

- are either an independent professional energy services contractor or consultant, or are employed as a professional engineer or as a MVP; and
- are a Certified Measurement and Verification Professional; a Certified Professional Engineer or equivalent; or a professional engineer with a relevant university degree accredited for the grade of Professional Engineer by Engineers Australia and at least three years' professional engineering experience that includes energy auditing, energy measurement and verification or energy system project design, analysis and installation.



This section provides objective criteria for a MVP by incorporating external verification of qualifications, while recognising professional experience.

## **Division 5 Method for calculating net abatement amount**

### **Subdivision 1—General provisions**

#### 27 Summary

Section 27 summarises the method for calculating the net abatement amount for an IEU project. Proponents should note that some potential IE units may need to be excluded from the calculations under section 19 of the Determination.

#### 28 Net abatement amount for the project ( $A$ )

Section 28 sets out that the net abatement amount is worked out by multiplying the difference between the baseline emissions and project emissions rates by the number of days of operation for the upgraded unit during the reporting period, and by a tabulated decay coefficient. This product is summed across all sub-units for the project. Any negative abatement from previous reporting periods is then deducted.

The decay coefficient is used to account for the increasing uncertainty that the operating measurement period will be representative of output in each successive reporting period, and to account for gradual reductions in the effectiveness of the upgraded equipment or process. The coefficients are taken from the Industrial Electricity and Fuel Efficiency ERF method. The decay factor provides an incentive to measure output for the entire crediting period as it does not apply when measured output for a reporting period meets the representativeness criterion (section 23).

## **Division 6 Calculation of baseline and project emissions rates**

#### 29 Baseline emissions rate for a sub-unit ( $ER_{B,i}$ )

Section 29 sets out the calculation of the daily baseline emissions rate as the total emissions from the sub-unit's fuel and electricity consumption during the baseline period divided by the number of days in the baseline period (to provide a daily rate) and multiplied by an adjustment factor.

The adjustment factor adjusts the abatement credit based on energy intensity if this provides a more conservative result. The adjustment factor addresses the risk of gaming by proponents who reduce levels of output in the project measurement period, as compared to the baseline period, within the range permitted by the representativeness criterion in section 23.

If the rate of output during the project measurement period is lower than during the baseline period, the baseline emissions rate used in abatement calculations is the baseline emissions intensity multiplied by the output in the operating measurement period, adjusted for the length of the two periods.

The electricity emissions factor to be used refers to scope 2 emissions from the electricity grid to which the site is connected, and is to be taken from the *NGA Factors document* published on the Department's website, [www.environment.gov.au](http://www.environment.gov.au), and updated from time to time. If the site is connected to an electricity grid for which there is an emissions factor included in the NGA Factors document, then proponents would need to apply that emissions factor from the NGA Factors document, as in force on the day the project is declared an eligible offsets

project. The NGA Factors document will clearly identify the table of emissions factors relevant to this definition.

If the site is connected to a grid other than one of the electricity grids for which emissions factors are included in the NGA Factors document, or a source other than an electricity grid, then the proponent may use other sources. The proponent could apply an emissions factor provided by the supplier of the electricity that reflects the emissions intensity of the electricity on the **declaration day**, or the factor for off-grid electricity published in the NGA Factors document as in force on the day the project is declared an eligible offsets project.

### 30 Project emissions rate for a sub-unit ( $ER_{p,i}$ )

Equation 4 sets out the calculation of the daily project emissions rate as the sum of emissions for each fuel type and for electricity, divided by the number of days in the project measurement period to give a daily rate.

The emissions for each fuel type are determined as the product of measured energy consumption during the operating measurement period, converted into gigajoules using an energy content factor, and multiplied by an emissions factor, summing together the result for each type of greenhouse gas emitted by the sub-unit. Energy content factors and emissions factors must be determined in accordance with the NGER (Measurement) Determination.

## **Part 5—Reporting, notification and record-keeping requirements**

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

### Reporting periods

The Act and subordinate legislation provide for flexible reporting periods generally between six months and two years in duration (with monthly reporting available if abatement in a reporting period meets or exceeds 2000 tonnes of carbon dioxide equivalent).

### Audit requirements

The Act provides for a risk-based approach to auditing emissions reductions. Subsections 13(1) and 76(4) of the Act provide for legislative rules to be made by the Minister, specifying the level of assurance, and the frequency and scope of the audit report that must be provided with project reports for different types of projects. These can be found in the *Carbon Credits (Carbon Farming Initiative) Rule 2015*.

### Reporting, notification and record-keeping requirements

In addition to the requirements in the Determination, the Act and the *Carbon Credits (Carbon Farming Initiative) Rule 2015* specify other reporting, notification, record-keeping, and monitoring requirements that apply to all Emissions Reduction Fund projects.

## **Division 1 Offsets report requirements**

### 31 Operation of this Division

Part 5, Division 1 sets out specified information that must be included in an offsets report about an IEU project.

### 32 Information that must be included in an offsets report

Further to requirements under the Act and subordinate legislation, section 33 sets out specific additional information that a project proponent needs to include in each offsets report for an IEU project.

Subsection 32(1) sets out the details that an offsets report must include for each IE unit in a reporting period. Subsection 32(2) states that for any IE unit that was included in calculations for an earlier reporting period but is not included in calculations for the applicable reporting period, the report must state the reason for the exclusion.

Subsection 32(3) states that in the circumstances described in paragraph 6(2)(b), then the offsets report about the IEU project must describe the reasons why it was not possible to define or calculate the factor or parameter by reference to the instrument or writing in force at the end of the reporting period.

## **Division 2 Notification requirements**

### 33 Operation of this Division

Part 5, Division 2 sets out requirements for notifying the Regulator about matters relating to an IEU project.

### 34 Notification requirements

Section 34 requires the project proponent to notify the Regulator of any safety or product performance issues with equipment installed or proposed to be installed in relation to the IEU project as soon as possible after the proponent becomes aware of any issue.

## **Division 3 Record-keeping requirements**

### 35 Operation of this Division

Part 5, Division 3 sets out record-keeping requirements for an *eligible IEU project*.

### 36 Record-keeping requirements

Subsection 36(1) states that in addition to keeping any other relevant records, the project proponent must keep records for each IE unit that identify the location of:

- all the energy-consuming equipment within the energy boundary
- equipment that measures the consumption of the energy-consuming equipment
- the supply of energy for that consumption.

Subsection 36(2) sets out that the project proponent must keep records that show that any equipment removed as part of the project was disposed of in accordance with section 16 and any other applicable legislative requirements. The requirement to keep records of the disposal of equipment only applies when the equipment is removed and disposed of as part of a project activity that has an effect on the abatement calculations that is not minor or trivial.

In addition to the above record-keeping requirements, there are general requirements under the Act and legislative rules that apply to all Emissions Reduction Fund projects. Proponents are required to keep evidence of their compliance with all project requirements and records to show that calculations have been done correctly according to the methodology.

Subsection 36(3) specifies that if, in the circumstances described in paragraph 6(2)(b), a factor or parameter is defined or calculated for a reporting period by reference to an instrument or writing as in force from time to time, the offsets report about the project for the reporting period must describe the reasons why it was not possible to define or calculate the factor or parameter by reference to the instrument or writing as in force at the end of the reporting period.

## **Division 4 Monitoring**

### 37 Operation of this Division

Part 5, Division 4 sets out requirements for monitoring an eligible IEU project.

## 38 Monitoring requirements—general

Subsection 38(1) requires that for each IE unit, the project proponent must monitor fuel and electricity consumption within the energy boundary separately to other energy use at the site during the baseline period and the project measurement period. This requirement ensures that the energy measurements used in the abatement calculations reflect changes within the energy boundary.

Subsection 38(2) requires that if the IE unit includes a partly independent sub-system then energy flows associated with the internal and external outputs of the sub-system (mentioned in section 12) must be monitored separately, including any lower grade energy that was created and returned to the partly independent subsystem. This provision allows energy flows that are consumed outside the unit to be accurately measured and excluded from the boundary.

Subsection 38(3) requires that if any fuel or electricity drawn by the unit is transmitted fuel or electricity as mentioned in subsection 8(10), the amounts transmitted must also be monitored separately. This provision allows energy flows that are distributed through the unit boundary but not consumed by the unit to be accurately measured and excluded from the boundary.

Subsection 38(4) sets a requirement to monitor the equipment that is used to monitor fuel and energy consumption, during the relevant period. This includes monitoring the verification of data and checking for any evidence of bias or drift, and assessing the integrity of any anti-tampering measures applied to the equipment.

Subsection 38(5) requires that the measurements of electricity consumption reflect the active energy consumption (also referred to as the real power consumption). Active energy consumption measures ‘real’ power by integrating active power with respect to time. The active component of electric power is what powers equipment such as motors. This requirement is consistent with the IPMVP (International protocol for measurement and verification of performance), which requires that the real power consumption be measured rather than estimated. This is because power factor can vary in the order of 10-15 per cent due to the changes in the balance between resistive, inductive and capacitive loads on the circuit over time, or if power factor correction is installed.

Subsection 38(6) provides that the quantities of electricity consumed and fuel combusted must be measured using an approach that is consistent with the NGER (Measurement) Determination or the *National Measurement Act 1960*. If this is not practicable, proponents may use an approach consistent with relevant Australian, international or industry standards.

Subsection 38(7) provides that if a parameter is measured in accordance with industry practice, the same practice must be used consistently in all future periods to prevent alterations from changing the abatement amount.

Subsection 38(8) allows the project proponent to take measurements directly or to use a proxy method that enables the value of the parameter to be reliably calculated. Subsection 38(9) sets out that proxy methods may include measuring the temperature and pressure of fluid flows to calculate energy flow using the flow rate and tabulated enthalpy (energy content) values for the fluid at these temperatures and pressures. Subsection 38(10) sets out that once a proxy value or method is chosen it must be used consistently.

### 39 Monitoring requirements— government supported renewable energy

Section 39 sets out the monitoring requirements that need to be followed if a proponent chooses to directly monitor government supported renewable energy at a site. The quantity must be monitored in kilowatt hours (annually or more frequently) in one of two ways:

- Using a meter to monitor onsite electricity generation, in accordance with the relevant electricity metering requirements of the National Measurement Institute (see *NMI M 6 Electricity Meters*). A reference to this document in the Determination is a reference to the document in force or existing from time to time. The latest version is available at <http://www.measurement.gov.au>.
- Using an inverter to monitor onsite electricity generation, in accordance with the requirements of Australian Standard AS 4777 or inclusion on the list of approved inverters that is maintained by the Clean Energy Council (at [www.solaraccreditation.com.au](http://www.solaraccreditation.com.au)).

An alternative method to determine data for subsidised renewable electricity at a site is set out in subparagraph 20(a)(ii). This method is included to reduce the compliance burden on proponents in cases where the quantity required to be measured is not separately metered. Where Section 39 refers to Australian Standard AS 4777, the version that applies is the version of AS 4777 in force or existing from time to time. Australian Standards can be found via the Standards Australia website, [www.standards.org.au](http://www.standards.org.au).

### 40 Monitoring equipment

Section 40 requires that the measuring equipment used to meet the monitoring requirements in section 38 must be calibrated by an accredited technician in accordance with the manufacturer's specifications for the equipment and must be installed and operated in accordance with the manufacturer's specifications for the equipment.

## **Part 6            Dividing an IEU project**

### 41        Division of project for reporting purposes

Section 41 allows an eligible IEU project to be sub-divided for reporting purposes into parts comprising one or more IE units.

## **Statement of Compatibility with Human Rights**

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

*The Carbon Credits (Carbon Farming Initiative—Industrial Equipment Upgrades) Methodology Determination 2018*

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—Industrial Equipment Upgrades) Methodology Determination 2018* sets out the detailed rules for implementing offsets projects that avoid greenhouse gas emissions by reducing energy consumption associated with common types of industrial equipment including boilers, pumps and process heating systems.

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 *Carbon Credits (Carbon Farming Initiative) Act 2011*. Offsets projects that are approved by the Regulator can generate Australian Carbon Credit Units.

## **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.

**Josh Frydenberg, Minister for the Environment and Energy**