



**Australian Government**

**Department of the Environment and Heritage  
Australian Greenhouse Office**

# **INDEPENDENT VERIFICATION GUIDELINES**

## **Generator Efficiency Standards**



**Australian Greenhouse Office  
Department of the Environment and Heritage**

**December 2006  
Version 1.0**

Published by the Australian Greenhouse Office in the Department of the Environment and Heritage.

© Commonwealth of Australia 2006

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from the Commonwealth, available from the Department of the Environment and Heritage. Requests and inquiries concerning reproduction and rights should be addressed to:

Assistant Secretary

Industry Partnerships Branch

Department of the Environment and Heritage

GPO Box 787

Canberra ACT 2601

ISBN: 978 1 921297 41 0

This document is available electronically at:

<http://www.greenhouse.gov.au/challenge/members/independentverification.html>

The views and opinions expressed in this publication are those of the authors and do not necessarily reflect those of the Australian Government or the Minister for the Environment and Heritage.

While reasonable efforts have been made to ensure that the contents of this publication are factually correct, the Commonwealth does not accept responsibility for the accuracy or completeness of the contents, and shall not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on, the contents of this publication.

## CONTENTS

<b>1. INTRODUCTION</b>	<b>2</b>
1.1 Background and Purpose	2
1.2 Objective and Scope of GES Verification Activities	2
1.3 Roles and Responsibilities	3
1.3.1 Australian Greenhouse Office	3
1.3.2 Verification Administrator	3
1.3.3 Independent Verifiers	3
1.3.4 GES participant	4
1.4 Confidentiality	4
1.5 Verification Report Disclosure	4
<b>2.1 VERIFICATION PRINCIPLES</b>	<b>5</b>
2.1.1 Principles for the Development of Participants' Plans and Reports	5
2.1.2 Principles for Verifiers	6
2.2 Verification Standards	6
2.2.1 Materiality	6
2.2.2 Uncertainty	7
2.2.3 Conflict of Interest	8
2.2.4 Level of Assurance	9
2.2.5 Test of Reasonableness	10
2.2.6 Professional Judgment	10
2.2.7 Reporting Boundaries	11
2.2.8 Emissions Factors	11
2.3 Verification Process	13
2.3.1 Introduction	13
2.3.2 Selection of participants	14
2.3.3 Verifier Selection	14
2.3.4 Verification Planning	15
2.3.5 Core Verification Activities	16
2.3.6 Site Visits	16
2.3.7 Evaluation of the Greenhouse Gas Assertion	17
2.3.8 Verification Report Template	17
2.3.9 Management of Discrepancies	18
2.3.10 Verification Records	19
2.3.11 Facts Discovered After the Verification	19
2.3.12 Feedback	19
2.3.13 Disputes	19
2.3.14 Outsourcing and Contractors	20
<b>ANNEX A VERIFICATION ISSUES</b>	<b>21</b>
Verification of Expected Abatement from Potential Actions	23
Verification of Achieved Abatement	25
Verification of a participant's Record-keeping Practices	26
<b>ANNEX B VERIFIER SELECTION</b>	<b>27</b>
<b>GLOSSARY</b>	<b>30</b>
<b>REFERENCES</b>	<b>33</b>



# 1. INTRODUCTION

## 1.1 Background and Purpose

The *Greenhouse Challenge Plus* programme is a cooperative partnership between industry and the Australian Government that aims to reduce greenhouse gas emissions, improve energy efficiency, integrate greenhouse issues into business decision-making, and deliver consistent reporting of greenhouse gas emissions levels. The programme builds on the success of Greenhouse Challenge and incorporates two other industry-focused measures – Greenhouse Friendly™ and Generator Efficiency Standards (GES). Central to all three measures is Independent Verification which aims to ensure Greenhouse Challenge Plus is based on accurate information in relation to greenhouse gas emissions and other elements of the programme. Where applicable, if participants are Greenhouse Challenge Plus members, a Greenhouse Challenge Plus verification will be undertaken at the same time as the GES verification.

Members of *Greenhouse Challenge Plus*, including GES participants, are encouraged to demonstrate a strong corporate commitment to reducing greenhouse emissions. As part of the *Greenhouse Challenge Plus* programme, GES aims to reduce the greenhouse intensity of electricity supply. GES provides participants with the opportunity to work with Government to undertake identified efficiency measures that will move their operations towards best practice in fossil fuelled electricity generation.

Independent verification assists Members to continuously improve the information on which they base decisions about the management and reporting of greenhouse gas emissions. Independent verification also strengthens the credibility of *Greenhouse Challenge Plus*.

These guidelines detail the verification issues specific to GES and complements the Greenhouse Challenge Plus Independent Verification Guidelines which outline independent verification issues for Members not involved in GES.

## 1.2 Objective and Scope of GES Verification Activities

In accordance with a Deed of Agreement between each GES participant and the Department of the Environment and Heritage (DEH), participants agree to have their GES plans and reports verified once over the life of their 5-year Deed. The plans and reports are the Strategic Plan, Action Plan and the Annual Reports.

The objective of GES independent verification is to determine whether:

- Participants' plans and reports have been prepared in accordance with the GES Technical Guidelines;
- Statements made about actual greenhouse intensity and the abatement expected from potential actions in participants' plans and annual reports are free from material discrepancy; and
- Statements made about reference greenhouse intensity, abatement achieved and abatement actions that are not implemented in participants' plans and reports are reasonable.

GES independent verifications involve assessing a participant's reported greenhouse intensity and greenhouse-related actions based on the participant's Strategic Plan, Action Plan and Annual Report. Usually the most recent Annual Report would be examined, although previous Annual Reports may also be referred to during the verification. The verification process is intended to confirm the material completeness, consistency, accuracy, transparency and relevance of the data in the reports being verified.

Specific tasks undertaken during GES verification are identified in an 'Initial Scope of Work' developed for each individual engagement and should include verification of:

1. The actual greenhouse intensity reported in the Strategic Plan and the actual greenhouse intensity reported in the Annual Report to determine, to a moderate level of assurance, whether the values reported are free from material discrepancy;
2. Potential abatement from a sample of individual actions reported in the Action Plan to determine, to a



moderate level of assurance, whether the potential quantity of abatement reported is free from material discrepancy. The actions to be verified will be selected by the Verification Administrator;

3. The reference greenhouse intensity reported in the Strategic Plan to determine whether the values reported are reasonable;
4. Achieved abatement from a sample of individual actions reported in the Annual Report to determine whether the quantity of abatement reported is reasonable. The actions to be verified will be selected by the Verification Administrator; and
5. The feasibility of a sample of potential abatement actions, reported in the Action Plan, that the participant decided not to undertake to determine whether the justification given for not carrying out the actions are reasonable. The non-actions to be verified will be selected by the Verification Administrator.

## 1.3 Roles and Responsibilities

### 1.3.1 Australian Greenhouse Office

The Australian Greenhouse Office (AGO) has overall responsibility for GES verification policy, as part of its broader Greenhouse Challenge Plus policy responsibilities, and will oversee all verification activities. The AGO selects participants for verification and authorises Verifiers to undertake GES engagements. The AGO may also review verification reports. However, to preserve the independence of the verification process the Verification Administrator is ultimately responsible for approving and finalising all independent verification reports.

Individual verification reports of GES participants are confidential and will not be publicly disclosed. The AGO will publish an annual report on aggregate GES verification findings.

### 1.3.2 Verification Administrator

A third party Verification Administrator coordinates independent verification on behalf of the AGO. The Verification Administrator is the first point of contact for GES participants regarding the verification process.

The Verification Administrator will:

- Match Verifiers to participants;
- Prepare an Initial Scope of Work and request a Detailed Scope of Work (DSW) from Verifiers;
- Appoint Verifiers to undertake engagements;
- Coordinate the timing of verifications;
- Ensure verification reports are completed and returned;
- Review and approve verification reports;
- Work with participants to rectify material discrepancies;
- Assist the participant and the verifier to prepare a public statement on the verification outcome;
- Prepare summary and recommendation reports to the AGO;
- Review and manage the performance of Verifiers; and
- Manage Verifier submission of invoices to the AGO.

### 1.3.3 Independent Verifiers

Independent verifiers are appropriately qualified members of a panel established by the AGO. The Panel will be periodically renewed. Verifiers will:

- Conduct verifications as directed by the Verification Administrator and in accordance with these



Guidelines; and

→ Provide technical advice to GES participants and the AGO as required.

### 1.3.4 GES participant

GES participants have a key role to play in ensuring that the verification is efficient and effective.

Responsibilities of the participant include:

- Cooperating with the Verification Administrator;
- Providing input into the verifier selection process as outlined below, and the development of the Initial Scope of Work;
- Maintain records for as long as documents are in place, and then for five years after the document ceases to be current;
- Being available for discussions with verifiers when they are developing Detailed Scopes of Work;
- Supporting and assisting the verifier during verification;
- Committing the resources necessary to achieve planned verification outcomes, including making available all relevant staff and clearly defining their roles and responsibilities during the verification;
- Providing the verifier with timely access to all records necessary to allow the verification to proceed, including during the onsite verification; and
- Alerting the Verification Administrator, during the development of the Initial Scope of Work, to any other relevant verification activities that the participant has previously initiated and wishes to have considered.

## 1.4 Confidentiality

Independent verification is conducted in a manner that preserves the confidentiality of participants' information. Data provided to the AGO through this programme is treated as confidential unless otherwise indicated by the participant. Confidential information is managed in accordance with the Greenhouse Challenge Plus information security protocol.

The Verification Administrator and individual verifiers are bound by Confidentiality Deeds with the Commonwealth. A copy of this Deed is available from the AGO upon request. Participants may also request that verifiers, and the Verification Administrator, sign a confidentiality agreement directly with them. However, participants are encouraged to rely on the comprehensive agreements that are already in place between verifiers, the Verification Administrator, and the Australian Government.

## 1.5 Verification Report Disclosure

One of the objectives of independent verification is to improve confidence in reporting by GES participants. To this end, the AGO will report publicly on the broad findings from the verification process. The AGO reporting will be based on regular summaries of GES verification activities prepared by the Verification Administrator. This reporting will be at an aggregated level, with outcomes of individual verifications remaining strictly confidential. Amongst other things, the AGO will report on the types of material discrepancies identified, and actions taken to address these discrepancies, in order to enhance awareness among participants and other stakeholders of issues associated with reporting greenhouse gas emissions.



## 2. VERIFICATION FRAMEWORK

### 2.1 Verification Principles

The professional judgement of verifiers under GES is guided by the principles described below. These consist of principles that GES participants should ideally apply in developing their action plans and annual reports, and principles that apply specifically to the performance of independent verification<sup>1</sup>.

#### 2.1.1 Principles for the Development of Participants' Plans and Reports

Verifiers must assess participant plans and reports against the following principles.

##### 2.1.1.1 Completeness

A GES participant should report on all relevant greenhouse gas emissions and abatement within the reporting boundaries established under the participant's Deed of Agreement and the GES Programme and Technical Guidelines. Participant reports should also include all relevant information to support any greenhouse gas-related assertions.

##### 2.1.1.2 Consistency

Participant reports should enable meaningful comparisons of greenhouse gas-related information across reporting periods.

Participants should aim to use consistent calculation methodologies over time. Should these methodologies change the participant must identify and provide a rationale for such changes, as well as indicate the implications on reported values.

##### 2.1.1.3 Accuracy

Accuracy refers to the closeness of a measured quantity to its real or true value. Participant reports should be accurate, and should reduce bias and uncertainty as far as practical.

The GES Technical Guidelines specify the levels of accuracy required of measurements in reporting, e.g. fuel masses and properties. For example, section 7.1.1 of the GES Technical Guidelines specifies the maximum permissible errors for coal weighing equipment. In some cases concessions may have been negotiated between the AGO and the participant where these advisory levels of accuracy cannot be achieved, and verifiers should be made aware when this is the case.

The information used in the determination of relevant quantities (e.g. greenhouse intensity) should be obtained from appropriate sources, e.g. fuel measurements, on-line plant monitoring systems, AGO Factors and Methods Workbook available at: [www.greenhouse.gov.au/workbook/](http://www.greenhouse.gov.au/workbook/).

##### 2.1.1.4 Transparency

Participant reports should disclose sufficient and appropriate greenhouse gas-related information to allow intended users (e.g. the AGO, verifiers and the participant's management) to make greenhouse gas-related decisions with reasonable confidence.

All of a participant's reports should be developed in a clear, factual, neutral, and understandable manner, based on documented and archived information. Specific exclusions or inclusions need to be identified and justified, assumptions disclosed, and appropriate references provided for the methodologies applied and the data sources used.

---

<sup>1</sup> The principles are drawn from ISO/DIS14064 Parts 1-3, with clarifying notes based on text from the WRI/WBCSD Greenhouse Gas Protocol and the Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions.



A discrepancy is material if a decision based on a greenhouse gas assertion would change if the discrepancy was corrected. When undertaking a verification Verifiers must determine what represents a material discrepancy using their own professional judgment and taking into account the unique characteristics and circumstances of the GES participant being verified.

#### 2.1.1.5 Relevance

Participants should identify plant/system inefficiencies and abatement actions that are consistent with GES requirements and that assist them to manage greenhouse intensity. The identification of actions and the assessment of abatement outcomes and changes in greenhouse intensity should relate to a particular process, the particular fuels used and assessment methodologies that are consistent with the requirements of GES.

#### 2.1.1.6 Conservativeness

Participants should use conservative assumptions, estimated values and procedures to ensure that improvements in greenhouse intensity and reductions in emissions from abatement actions are not overestimated.

### 2.1.2 Principles for Verifiers

Verifiers must adopt the following principles when performing independent verifications.

#### 2.1.2.1 Independence

The verifier must remain independent of the activity being verified and free from bias and conflict of interest. The verifier must maintain objectivity throughout the verification to ensure that the findings and conclusions are based only on objective evidence generated during the verification.

#### 2.1.2.2 Ethical Conduct

The verifier must demonstrate ethical conduct, integrity, confidentiality and discretion throughout the verification process.

#### 2.1.2.3 Fair Presentation

The verifier must reflect verification activities, findings, conclusions and reports truthfully and accurately. The verifier must report significant obstacles encountered during the verification process and any unresolved or divergent opinions among the verification team and the GES participant.

#### 2.1.2.4 Due Professional Care

The verifier must exercise due professional care and judgement, taking into account the voluntary nature of GES, the strategic importance of the programme to the Australian Government, and the confidence placed by participants and intended users in the verification report. The verifier must have the necessary skills and competencies to undertake the verification and must disclose to the Verification Administrator any gaps in skills or competence that may compromise a verification task.

## 2.2 Verification Standards

The following standards are intended to guide verifiers in completing verification engagements, ensuring that they are of a consistently high quality and meet the objectives of independent verification under GES and Greenhouse Challenge Plus more broadly.

### 2.2.1 Materiality

Materiality refers to the relative significance of a discrepancy, error, omission or misrepresentation, in a



participant's greenhouse gas assertion. A discrepancy is material if a decision, based on a greenhouse gas assertion, will change if the discrepancy is corrected. A material discrepancy has the potential to influence decisions about the allocation of resources made by the user of the report, or to affect the level of accountability of the management or governing body of the participant. For example, material discrepancies could affect decisions regarding the need or urgency to implement efficiency measures that could improve the overall performance of a power plant.

A material discrepancy can arise as a result of an error in calculation, use of an incorrect emission factor, or any other error or omission which results in an error within the greenhouse gas assertion reported. However, a lack of information supporting some aspect of a participant's report may result in a qualified opinion or an inability to form an opinion being stated by a verifier, rather than a material discrepancy being reported, see section 2.2.5.

Verifiers must use their professional judgement, taking into account the unique circumstances and characteristics of the GES participant, to determine whether there are material discrepancies in a participant's report. That is, when verifiers are deciding whether a discrepancy is material or not, they must determine whether the discrepancy could affect a decision that is based on the participant's greenhouse gas assertion.

In forming a professional judgement on materiality, verifiers may be guided by the following discretionary materiality thresholds greater than:

- 5% of the actual greenhouse intensity value reported in the participant's Strategic Plan and Annual Report; and
- 5% or 10 000 tonnes CO<sub>2</sub>-e<sup>2</sup>, whichever is smaller, of the quantity of potential abatement from a sample of individual actions reported in the participant's Action Plan.

It is important to note that the discretionary materiality thresholds are simply a guide, and are not mandatory. The thresholds must not be applied indiscriminately, without consideration of the impact of discrepancies on decisions.

Verifiers also need to consider the nature of the discrepancy in relation to the participant's operations. In some circumstances a discrepancy of 3% could be considered material if that discrepancy could cause the management of the power plant to come to a different decision regarding operational or maintenance improvements – likewise, in some circumstances a 7% discrepancy may not be considered material.

For example, if a 3% discrepancy in the calculation of greenhouse intensity would effectively move a GES participant out of the best practice performance range, then a verifier may assess this as being material. Conversely, if a 7% discrepancy in the calculation of greenhouse intensity would still leave a participant well within the best practice performance range, then this may result in the verifier not considering the discrepancy as material.

In considering materiality, verifiers must:

- Take account of any documented provisions and concessions relating to facilities, practices and operations, including commitments to improve these;
- Take account of situations where participants have identified limitations in their calculation methodologies for reasons of cost, complexity of measurement, or an intention to include emissions when a reliable reporting methodology is established. Such limitations are to be noted in the verification report; and
- Report all identified discrepancies in greenhouse intensity/tonnes of CO<sub>2</sub>-e, and as a percentage of the corrected total.

## 2.2.2 Uncertainty

Despite using the same equipment and technique different measurements of the same physical quantity can result in different measured values. The concept of uncertainty expresses the range or dispersion of these

---

<sup>2</sup> A discretionary materiality threshold of 10 000 tonnes of CO<sub>2</sub> is based on an appreciation of the impacts of larger abatement actions. For example, if a 2500 MW power plant implemented a major turbine upgrade that improved plant efficiency by 1%, this would result in abatement of approximately 310 000 tonnes of CO<sub>2</sub>. The 5% materiality threshold would equate to 15 500 tonnes, so in this case the limit of 10 000 tonnes would apply instead.



different measured values. Accuracy expresses how close the measured values are to the true or actual value. Dispersion is often expressed as a percentage range with a given level of confidence. For example,  $x \pm y$  with a 95% confidence means that  $x$  is the nominated true value, and that 95% of all measurements are expected to be within  $\pm y$  of  $x$ .

Reducing uncertainty and increasing accuracy often involves increased costs. There is an optimum point where the value of improved data is balanced by the increased cost of enhanced measurement. It is for participants and the AGO to have negotiated this point of balance prior to the commencement of reporting under GES.

The GES Technical Guidelines specify the measurement uncertainties allowable in participants' reports. For example, section 4.1 of the Guidelines sets down an expected maximum error or uncertainty in the estimation of greenhouse intensity of  $\pm 1.5\%$  for power stations producing electricity only or  $\pm 3\%$  for cogeneration plants. It should be noted that this error or uncertainty in estimating greenhouse intensity needs to be assessed in the context of participants having used the methodologies outlined in the guidelines, as well as having adhered to the accuracy requirements for specific metering and weighing equipment. The measurement uncertainties applied by participants need to be independently verified.

Management of conflicts of interest is critical to maintaining the credibility and integrity of the independent verification process. When considering potential conflicts of interest, Verifiers should consider the activities and relationships of other parts of their organisation, as well as the verification team.

### 2.2.3 Conflict of Interest

Effective management of actual or perceived conflicts of interest that verifiers may have with the participant being verified is critical to maintaining the credibility and integrity of the independent verification process.

The verifier must work in a credible, independent, non-discriminatory and transparent manner. If the verifier is part of a larger organisation, the verifier must consider the links with other parts of the verifier's organisation when attesting that no conflict of interests exists.

A conflict of interest is any threat to impartiality from sources of bias that may compromise, or may reasonably be expected to compromise, a verifier's ability to make unbiased decisions.

A conflict of interest is deemed to have occurred if:

- The verification company, or members of the verification team, have assisted the participant to record or develop information contained in any GES Deed of Agreement, plans or reports;
- Members of the verification team are engaged in providing other fee-paying services to the participant during the course of the verification;
- The verification company, or members of the verification team, have provided greenhouse gas-related fee-paying services, other than third party greenhouse verifications, to the participant during the previous three years;
- Individuals in the approved verification team are included in proposals to undertake work for the participant during the following twelve months; or
- The verification company has a strong business relationship with the participant, e.g. a large proportion of the verification company's income is generated from other engagements with the participant.

Potential for conflicts of interest also exist where any members of the verification team have a close personal relationship with the participant's GES contact, if the verifier has an ongoing working relationship with a direct competitor of the participant, or if in the following 12 months the verification company has any current or planned work with the participant relevant to GES. If any of the above situations exist, participants and verifiers should disclose the circumstances to the Verification Administrator for consideration. If the verifier has an



ongoing working relationship with a direct competitor of the participant, the Verification Administrator will forward this information to the participant for consideration.

The Verification Administrator will assess conflicts of interest on a case-by-case basis. There is no time limit that conflicts of interest will be deemed to have lapsed in relation to a verifier's involvement in the development of GES Deeds of Agreement, plans or reports.

## 2.2.4 Level of Assurance

Verifications of actual greenhouse intensity reported in the participant's Strategic Plan and Annual Report, as well as potential abatement reported in the participant's Action Plan, are performed to a moderate level of assurance. A moderate assurance engagement means that the verifier performs a restricted range of verification procedures that results in a statement that no evidence has been found to indicate that a greenhouse gas assertion is not as claimed.

By comparison, under a high level of assurance, such as for Greenhouse Challenge Plus verifications of emission inventories and offsets reported in Progress Reports, the verifier performs sufficient evidence gathering and evaluation to allow the verifier to state at the completion of the engagement that a greenhouse gas assertion is as claimed.

When conducting GES verification, verifiers should choose a sampling approach that enables them to provide a moderate level of assurance (see section 2.3).

Ultimately, verifiers must state their professional opinion on a participant's greenhouse intensity and abatement actions. Verifiers can report four types of formal verification opinions, as described below.

### 2.2.4.1 Unqualified Opinion – No Material Discrepancies

Verifiers should report an unqualified opinion when they are satisfied that there are no material discrepancies in the greenhouse intensity and abatement actions contained within a participant's Strategic Plan, Action Plan and Annual Report.

### 2.2.4.2 Qualified Opinion – No Material Discrepancies but Some Information Gaps

Verifiers should report a qualified opinion when they cannot obtain all the evidence needed to form an unqualified opinion but the lack of information is not so material as to prevent an opinion being formed. That is, a qualified opinion is reported when the verifier has confidence in the majority of the data, but cannot verify a minor data issue that is assessed as not being material.

### 2.2.4.3 Adverse Opinion – Material Discrepancies

Verifiers should report an adverse opinion when there is a material discrepancy in the Greenhouse Intensity and/or abatement actions contained within a participant's Strategic Plan, Action Plan and Annual Report.

### 2.2.4.4 Inability to Form an Opinion – Major Information Gaps

Inability to form an opinion should be reported when there is a limitation on the scope of the verifier's work when:

- Sufficient evidence to resolve the uncertainty cannot be reasonably obtained; and
- Possible effects of the adjustment that might have been required had the uncertainty been resolved, are of such a magnitude or are so fundamental, that the verifier is unable to express an opinion on the complete scope item, i.e. the magnitude of such an adjustment is likely to cause a material discrepancy.

Verifiers must use their professional judgment to determine when a qualified opinion or an inability to form an opinion should be stated. In general, an opinion is qualified if the impact of a lack of supporting information, as it relates to a greenhouse gas assertion, is not considered to be material. An inability to form an opinion is stated if the impact of a lack of supporting information, as it relates to a greenhouse gas assertion, is considered to be material. Verifiers are encouraged to discuss these situations as they arise with the Verification Administrator to determine whether they can be resolved.

### 2.2.4.5 Verification Opinion Templates

GES verifications use standard templates for each type of opinion as set out below.



**Unqualified Opinion:** In our opinion the [insert where appropriate the actual greenhouse intensity reported in the participants Strategic Plan, the actual greenhouse intensity reported in the participants Annual Report, the potential abatement estimates reported in the participants Action Plan] is/are free from material discrepancy and presented in accordance with the requirements of GES.

**Qualified Opinion:** In our opinion, except for the effects on [insert where appropriate the actual greenhouse intensity reported in the participants Strategic Plan, the actual greenhouse intensity reported in the participants Annual Report, the potential abatement estimates reported in the participants Action Plan] of the matter referred to in the qualification paragraph, the participant's [Insert where appropriate Strategic Plan, Action Plan, Annual Report] is/are presented in accordance with the requirements of GES.

**Adverse Opinion:** In our opinion [insert where appropriate the actual greenhouse intensity reported in the participants Strategic Plan, the actual greenhouse intensity reported in the participants Annual Report, the potential abatement estimates reported in the participants Action Plan] is/are not presented in accordance with the requirements of GES because of the material discrepancy referred to in the qualification statement.

**Inability to Form an Opinion:** In our opinion, because of the existence of the limitation on the scope of our work, as described in the qualification paragraph, we are unable to and do not express an opinion as to whether [insert where appropriate the actual greenhouse intensity reported in the participants Strategic Plan, the actual greenhouse intensity reported in the participants Annual Report, the potential abatement estimates reported in the participants Action Plan] is/are presented in accordance with the requirements of GES.

Where a verifier reports an 'adverse', 'qualified' or an 'unable to be verified' opinion, the verifier should also report a qualification statement clearly describing the reasons for providing this opinion, and where possible, a quantification of the effects of the qualification on the relevant component of the participant's report. The qualification statement should precede the opinion.

Guidance on the key issues to address in verifying the GES scope items requiring a moderate level of assurance opinion is provided in Annex A.

### 2.2.5 Test of Reasonableness

For GES independent verifications, verifiers must provide an assessment of the reasonableness of the:

- Reference greenhouse intensity reported in the Strategic Plan;
- Achieved abatement reported in the Annual Report; and
- Justification for not carrying out abatement actions provided in the Action Plan.

The above assessments are reported in the findings of the verifier's report. Verifiers are not required to provide a formal moderate level assurance opinion over these items. They are required to provide a statement on the reasonableness of the items.

Assess whether the participant's record keeping practices are consistent with the general principles outlined in these guidelines in section 2.1.

Guidance on the key issues to address in verifying the GES scope items requiring an assessment of reasonableness is provided in Annex A.

### 2.2.6 Professional Judgment

Professional judgement is the ability to draw meaningful and accurate conclusions, give opinions and make interpretations based on observations, knowledge, experience, literature and other sources of information. Professional judgement is based on facts and objective evidence, as well as experience, which includes some subjectivity.

Verifiers use their professional judgement to determine, on the basis of the evidence gathered and sampled, whether a participant's greenhouse gas assertions are either free from material discrepancy or are reasonable, depending on whether the assertion requires an assurance opinion or assessment of reasonableness – see sections 2.2.4 and 2.2.5 above.

When making a professional judgement verifiers should consider the:

- Nature of the information being verified and the risk that it could be significantly misstated;



- Internal control environment, for example, whether the participant has a recognised quality assurance system;
- Materiality of the information;
- Results of verification procedures; and
- Source and reliability of supporting information.

### 2.2.7 Reporting Boundaries

The scope of a GES independent verification is restricted to information that falls within the reporting boundary of a participant.

The reporting boundary is defined by the facilities listed in a participant's Deed of Agreement. This basic boundary is then refined by information provided in the GES Technical Guidelines:

- Greenhouse efficiency is measured in terms of greenhouse intensity from fuel burning (section 4.1 of the GES Technical Guidelines);
- Reporting by a GES participant is limited to the “applicable gases” – i.e. carbon dioxide, methane and nitrous oxide (section 4.2 of the GES Technical Guidelines);
- Fugitive emissions such as methane from coal stockpiles are excluded (section 4.1 of the GES Technical Guidelines);
- Non-start up electricity and fuel consumed while offline and in a state of readiness for rapid start-up are excluded (section 4.3.2.6 of the GES Technical Guidelines); and
- Emissions resulting from mining and primary fuel preparation are not covered under GES. The only emissions considered in GES are from the combustion of fuel in a power plant and power plant maintenance.

The GES Technical Guidelines also provide guidance that is relevant to calculating a power plant's greenhouse intensity, including:

- Greenhouse intensity should be calculated as the average greenhouse intensity for each measurement period (e.g. 12 x 1 month intervals) weighted on the basis of the MWh sent out for the measurement period (section 10.2 of the GES Technical Guidelines);
- While all fuels used in the maintenance of the power plant need to be included in calculating greenhouse intensity, the fuel used in plant vehicles is not included (section 10.2 of the GES Technical Guidelines);
- Greenhouse intensity should be expressed in terms of sent-out electricity. Sent out electricity is the gross electricity generation as measured at the generator terminals less all auxiliary energy consumed by the electricity generating plant and all losses between the generator terminals and the point at which electricity is dispatched for transmission or distribution to consumers (section 8 of the GES Technical Guidelines); and
- Specific guidance for determining the greenhouse intensity of cogeneration plants is provided in section 9 of the GES Technical Guidelines.

Where it is known that a particular emission source of a participant is likely to cause confusion amongst verifiers prior to the verification commencing, the Verification Administrator will work with the AGO to provide clarifying text in the verifier's Initial Scope of Works.

### 2.2.8 Emissions Factors

Emissions are determined from calculation methodologies set out in the GES Technical Guidelines. In most cases emission factors will be specified in those guidelines, but there may be some recourse to the most recent AGO Australian Methodology for the Estimation of Greenhouse Gas Emissions and Sinks: Energy (Stationary

In some circumstances, the AGO may approve the use of an alternative emission factor by a Member. Where a Verifier encounters the use of an alternative emission factor, they should verify this against the participant's records.

Sources), available at: [www.greenhouse.gov.au/inventory/methodology/index.html](http://www.greenhouse.gov.au/inventory/methodology/index.html).

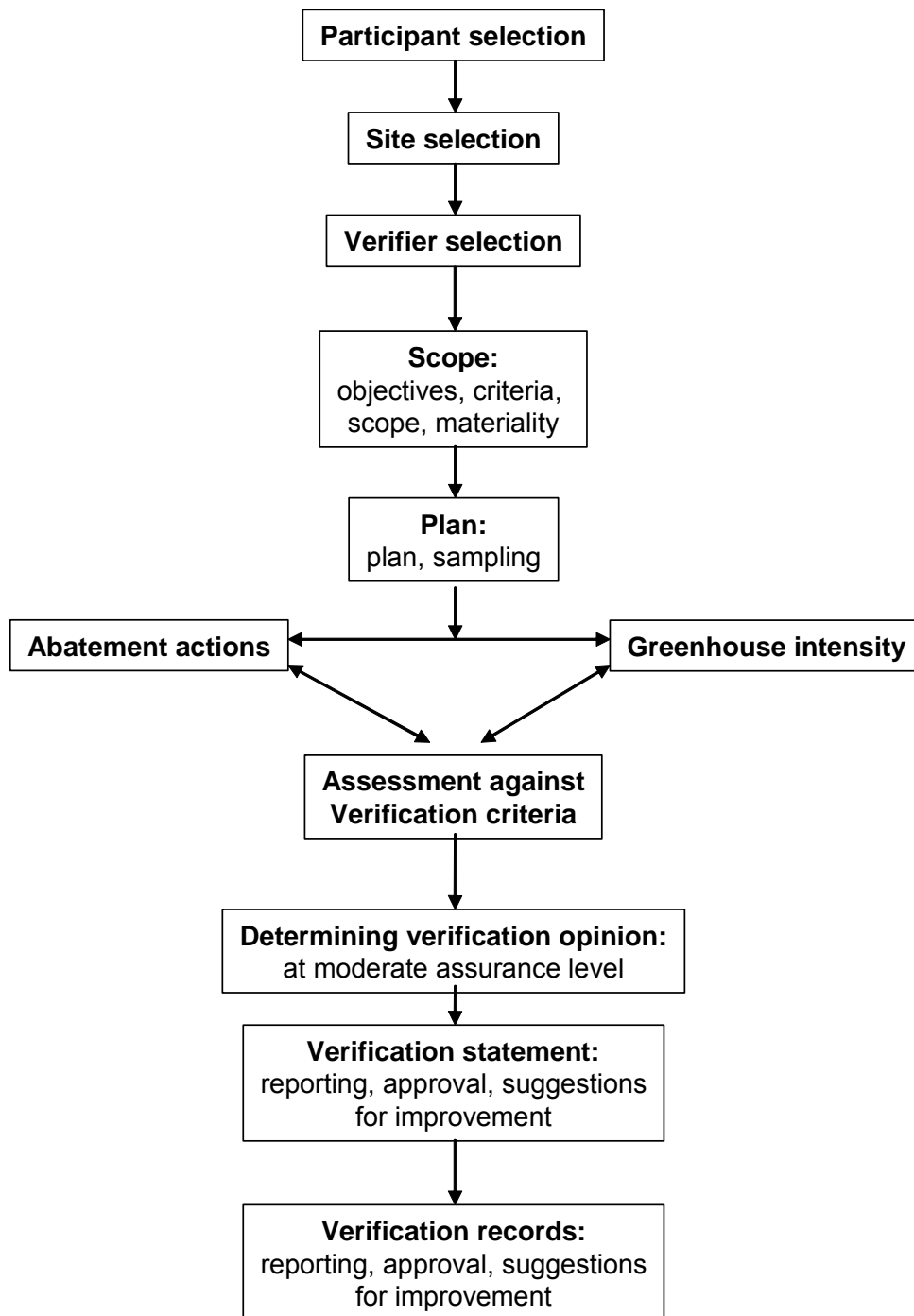


## 2.3 Verification Process

### 2.3.1 Introduction

Figure 1 provides an illustration of the GES independent verification process for participants' Strategic Plans, Action Plans and Annual Reports.

Figure 1: GES Verification process



Annex A identifies key issues relevant to the GES independent verification process and identifies the key issues to address in completing verifications. It includes information about calculations required and records to



review taking into account the major variables of different power plants (i.e. plant age and size, fuel type, operating conditions).

### 2.3.2 Selection of participants

The objective of the selection process is to select participants for verification who are at an appropriate stage of their five-year Deed of Agreement.

#### 2.3.2.1 Basis for Selection

If the relevant reports are not completed within this time participants will be classified as 'unable to be verified'. All participants will be verified at some stage during their five-year Deed of Agreement.

Once a participant has been through a verification process they will not be selected again during that Deed of Agreement period.

The cost of the independent verifier undertaking the verification is paid for by the AGO.

### 2.3.3 Verifier Selection

Verifier selection is described in Annex B.

The Verification Administrator will submit an annual compliance report to the AGO, which will include an analysis of the spread of verification work offered to, and completed by, individual verifiers.

#### 2.3.3.1 Initial Scope of Work

The Verification Administrator, with input from the participant, will develop an Initial Scope of Work that covers the scope and material necessary to achieve the objectives of the verification.

The Initial Scope of Work for verification of a participant's Strategic Plan, Action Plan and Annual Report will address the following issues:

- Level of assurance;
- Participant details, including copies of the Deed of Agreement, Strategic Plan, Action Plan and the most recent Annual Report, and any specific issues pertaining to the verification;
- GES objectives; and
- Independent verification objectives and scope as defined in Section 1.2.

The Initial Scope of Work will be provided to the nominated verifier(s) following a review of their competency to complete the engagement and confirmation that no conflict of interest exists. Conflict of interest statements must be sent to and signed by verifiers before they are provided with copies of participant's data.

#### 2.3.3.2 Detailed Scope of Work

The nominated verifier(s) must develop a Detailed Scope of Work based on their review of the Initial Scope of Work, their assessment of the verification risks, and their proposed high level approach for control of these risks. The Detailed Scope of Work must be, in the professional judgement of the verifier, able to support a verification opinion to a moderate level of assurance over the actual greenhouse intensity reported in the participant's Strategic Plan and Annual Report and the quantity of potential abatement using a sample of individual actions reported in the participant's Action Plan.

Verifier(s) may contact the participant to confirm or discuss details of the participant's report(s). Participants should make themselves available for these discussions and are required to provide consistent information to all verifiers.

The essential elements of a Detailed Scope of Work are:

- An assessment of the main perceived risks in completing the engagement;
- Details of the proposed verification practices selected to control the engagement risks, such as the sample of key plant records and potential abatement actions identified for verification, the sample of abatement actions implemented and not implemented for assessment, and the sample of power plant sites selected for on-site verification activities when verifying a multi-site participant;



- Details of the verification team;
- Confirmation of no conflict of interest; and
- The fee proposed for the verification activity.

The Detailed Scope of Work completed by the selected verifier, excluding verification costs, will be provided to the participant for information.

Verifiers must take care in developing the Detailed Scope of Work, as variations will only be approved by the Verification Administrator when circumstances arise which could not have been anticipated during the planning phase. Verifiers can neither qualify a verification opinion on the grounds that application for an extension of scope was refused because of inadequate planning, nor claim that the proposed fee was underestimated.

### 2.3.3.3 Multi-site Selection

Some participants' reports relate to multiple sites (i.e. power plants). In these cases verification is achieved by reviewing an appropriate sample of the sites covered in the report(s). Sites are selected to ensure that a cost effective, risk-based verification of the participant is achieved to a moderate level of assurance.

Further consideration can be given to selection of a sample of sites should be guided by:

- Size of greenhouse gas emissions at different sites;
- Coverage of all technology types including coal fired, gas turbine, combined cycle and cogeneration;
- Coverage of different levels of operational control;
- Geographical/cultural coverage;
- New acquisitions;
- Substantial changes in greenhouse gas emissions; and
- Initial controls review (e.g. the existence of a recognised quality assurance system may reduce sample size).

As a general principle, international practice is for the minimum sample size to approximate the square root of the number of sites that a participant reports for.

### 2.3.3.4 Recognition of Other Verification Activities

A participant may have had aspects of their reports and plans verified by other organisations for reasons not related to GES, such as the independent audit of greenhouse intensity, greenhouse gas emissions, or emission reductions in public sustainability reports or for other purposes. Where the participant wishes to claim recognition for other verification activities, this will be identified in the Initial Scope of Work. The verifier must consider and justify how this other work will affect the Detailed Scope of Work, and the Verification Administrator will review this assessment. For other verification activities to be considered, a copy of third party verification reports should be provided to the Verification Administrator at the start of the verification process.

As a general principle, other verification activities can only be recognised if the verification was performed to a moderate or high level of assurance. The verifier should undertake selective cross-checks of source information, and of calculations, to confirm the verification opinion.

The participant should assist the Verification Administrator through the early identification of additional, relevant verification activities during the development of the Initial Scope of Work.

## 2.3.4 Verification Planning

On engagement the selected verifier should prepare a detailed verification plan as an internal planning tool. This plan is not reviewed by the Verification Administrator or participant.

### 2.3.4.1 Verification Plan

The level of detail of the verification plan should be commensurate with the complexity and risk associated with the participant's operations, and of the requirements necessary to form an opinion to a moderate level of assurance.



The verification sampling plan should be based on an evaluation of the processes, equipment and methods used by the participant for the calculation of greenhouse intensity and abatement, and should be developed in consultation with the participant.

A risk based approach is fundamental to the performance of effective onsite verification. This means that the areas with the highest risk of discrepancy receive the highest level of scrutiny. Review of GES documents, preliminary discussions with the participant regarding plant systems, and the verifier's knowledge and understanding of greenhouse monitoring and reporting systems provide the basis for the risk assessment. The assessment gives the verifier a clear understanding of the main areas of system and reporting risk, and of the type and nature of the verification procedures required to provide a moderate level of assurance.

#### 2.3.4.2 Preparing for Verification

Once the Verification Administrator has engaged the verifier, the verifier must contact the participant to organise an initial meeting to identify a timeline for the verification. This meeting will be held in person or by teleconference as appropriate. The Verification Administrator or AGO officers may participate in this meeting. The verifier may need to arrange further meetings to complete verification planning activities where the participant's operations and reporting practices are especially complex.

The verification should involve a visit to the participant's head office or other point of coordination for GES reporting, and at least one operational site. The participant and the verifier should discuss and agree the best schedule for these visits during the initial meeting.

During the initial meeting verifiers may request information additional to that in the participant's plans and reports, such as calculation spreadsheets, record keeping procedures, or details of the participant's greenhouse gas management strategy, including personnel roles and responsibilities. Participants should respond promptly and completely to these requests for additional information. The verifier must make these requests in sufficient time to allow all necessary planning and preliminary work to be completed prior to undertaking a site visit.

#### 2.3.5 Core Verification Activities

Verification is conducted in accordance with the verification plan and the approved Detailed Scope of Work.

There are three core activities in the verification process. These are:

1. **Assessment of the greenhouse gas information system, and the information system controls:** robust information systems and information system controls enhance confidence in the information included in participant reports.
2. **Assessment against verification criteria:** assessment of the greenhouse gas information and report against the reporting principles and verification standards, see sections 2.1 and 2.2.
3. **Assessment of greenhouse gas data and information:** assessment of the quality of the information, based on the risk assessment undertaken during the planning phase, modified as necessary during the verification. This will involve verification practices selected using the verifier's professional judgement and include detailed testing of material sources and areas with insufficient risk control.

Verifiers should refer to ISO 14064-3 for comprehensive guidance on the verification process (see glossary and references).

Guidance on the key issues to address in undertaking GES verification is provided in Annex A.

#### 2.3.6 Site Visits

Onsite assessments are required for all verifications and typically include the following activities:

- **Opening meeting:** confirmation of the participant's expectations, reporting requirements and confidentiality. The verifier should meet key staff and establish the scope and methodology of the verification process;
- **Review information and undertake verification activities:** verify that the greenhouse gas assertion is free from material discrepancy. The verifier is not expected to review every piece of data from its source through to what is presented in the participant's plans and reports. However, it is necessary to do sufficient checks of operational records, plant systems and/or abatement projects to be able to form an



opinion to a moderate level of assurance or assessment of reasonableness (as required). In addition to viewing documents, databases and calculation spreadsheets, the verifier must also have the opportunity to speak with key operational staff and management; and

- **Closing meeting:** confirmation with the participant of the key findings, and the reporting requirements and any suggestions for improvement.

Officers of the AGO or Verification Administrator may participate in onsite assessments. All parties attending site visits are required to comply with site-specific safety requirements, including necessary induction training. Verifiers should ensure that sufficient time is allowed for this activity.

### 2.3.7 Evaluation of the Greenhouse Gas Assertion

The verifier must exercise their professional judgement to determine whether a participant's greenhouse gas assertions are supported. The verifier must form an opinion, to a moderate level of assurance, as to whether the greenhouse gas assertions are free from material discrepancy. This involves verification of the actual greenhouse intensity reported in a participant's Strategic Plan and Annual Report and the expected abatement from potential actions reported in a participant's Action Plan. The full range of verification opinions that can be formed are described in section 2.2.4.

Verifiers must also use their professional judgment to provide findings regarding:

- The reasonableness of the reference greenhouse intensity (as reported in a Strategic Plan);
- The reasonableness of abatement achieved from actions implemented (as reported in an Annual Report);
- The reasonableness of decisions not to implement abatement actions (as reported in an Action Plan); and
- Whether the participant is reasonably engaged in GES and the participant's record keeping practices are consistent with the general principles outlined in these guidelines.

More detail on the key issues involved in a GES verification is provided in Annex A.

### 2.3.8 Verification Report Template

Pro-forma verification reports must be used by verifiers when completing GES verification engagements. Separate pro-forma verification reports have been developed for GES, Greenhouse Challenge and Greenhouse Friendly™ verifications. The reports streamline the verification process and maintain consistent reporting standards.

The verification report template includes:

- A verification opinion on greenhouse intensity and expected abatement from potential actions;
- A statement of key verification findings on the Strategic Plan, Action Plan and Annual Report, including on the reasonableness of abatement achieved from actions implemented, decisions not to implement abatement actions, and the participant's record keeping practices and level of engagement in the GES initiative;
- Detailed information on the nature and magnitude of any material discrepancy;
- Detailed information on the nature and magnitude of any non-material discrepancy, which are in the verifier's professional judgement of sufficient significance to be included in the report; and
- Suggestions for improvement to assist the participant in correcting identified discrepancies.



If significant discrepancies are found in a participant's Strategic Plan, Action Plan or Annual Report, they will be required to address the discrepancy by re-submitting an Annual Report which includes a statement correcting the discrepancy.

### 2.3.8.1 Report Approval

The approval process for verification reports is as follows:

- The participant accepts the verification findings and the general content of the verification report. This may occur during the site visit, closing meeting, or at a later date after the verifier has had time to assess the participant's information and prepare a draft report;
- The verifier submits a draft report to the Verification Administrator for review;
- The Verification Administrator returns the draft report to the verifier with comments for amendment;
- Once the verifier has made the required amendments, the Verification Administrator provides the verification report to the participant for comment. The Verification Administrator, the verifier and the participant then discuss any specific issues or comments raised by the participant. The verifier may make changes to the report following these discussions;
- The verification report is signed by the verifier and the participant;
- The Verification Administrator approves the report and sends the final report to the AGO; and
- The AGO may review and comment on the report.

If there are disputes in relation to the report approval process, or other elements of the verification process, refer to the Disputes part of these guidelines in section 2.3.13.

### 2.3.8.2 Confidential and Public Reports

Independent verification reports for individual participants are confidential. At the request of the participant a public statement on the general outcome of a verification may be prepared in consultation with the AGO, the verifier and the Verification Administrator. This will include the entire verification opinion as stated by the verifier in the final verification report.

The Verification Administrator will submit an annual report on GES verification findings and recommendations to the AGO. The AGO will publish an annual report on aggregate GES verification findings based on the Verification Administrator's annual report.

## 2.3.9 Management of Discrepancies

Participants must manage discrepancies resulting from GES independent verifications according to the requirements outlined below.

### 2.3.9.1 Material Discrepancies or Unreasonable Abatement Estimates and Justifications

Where a verifier identifies a material discrepancy in relation to greenhouse intensity or potential abatement, an unreasonable estimate of achieved abatement from actions implemented, or an unreasonable justification for not implementing an abatement action, the participant must work with the Verification Administrator to rectify these issues. The participant has three months from the finalisation of the verification report to address these issues and re-submit a corrected Strategic Plan, Action Plan or Annual Report to the AGO for approval.

If the Verification Administrator determines that the material discrepancy or unreasonable abatement estimate/justification is difficult to correct, the participant must work with their AGO GES contact to address it. The participant has until the due date of their next Annual Report, or at least a period of three months, to submit an updated report to the AGO.

If the participant does not address these issues in accordance with GES requirements, the dispute resolution clauses of the participant's Deed of Agreement will be invoked.



### 2.3.9.2 Non Material Discrepancies

Where a verifier identifies a non-material discrepancy or suggestion for improvement, the participant must rectify this issue or implement the improvement where appropriate through their next Annual Report or by updating their Strategic Plan or Action Plan.

### 2.3.9.3 Record Keeping

Where a verifier is unable to form a verification opinion on a participant's Annual Report, Strategic and/or Action Plans and recommends improvements to record keeping procedures, the participant must implement these suggestions and ensure that their record keeping is consistent with GES requirements. Participants must also report on the actions undertaken to improve their record keeping practices. The participant has until the due date of their next Annual Report, or at least three months, to notify the AGO of these changes.

### 2.3.10 Verification Records

The verifier should retain any documents provided by the participant that support conclusions in the report. If they support a finding of material discrepancy, these documents should be included with the verification report, and used in discussions with the participant to agree on any required rectification.

The Verification Administrator may require the verifier to provide copies of verification working papers, including the verification plan, to allow quality control assessment and review of the verification report and findings.

The verifier should retain the following records for at least six years after the verification is completed:

- Verification scope and findings;
- Information on material and non-material discrepancies;
- Deliberations, if applicable, of any decision-making mechanisms; and
- Documentation of verification statements.

### 2.3.11 Facts Discovered After the Verification

Where a verifier becomes aware, within a reasonable period of time, of facts discovered after the date of submission of the verification report, that materially affect their opinion, the verifier must:

- Consider if the verification report requires revisions; and
- Discuss the matter with the participant and the Verification Administrator.

The participant, verifier and Verification Administrator will review the information, which may result in a request to the verifier to amend and reissue the verification report. Depending on the nature of the new information an extension to the verification scope may be granted. Where the verifier is at fault the additional procedures will be at the verifier's expense.

The Verification Administrator will adjust their annual report to the AGO on verification results to take into account any changes caused from reissued verification reports, and ensure that participant plans and reports appropriately reflect the change.

### 2.3.12 Feedback

At the conclusion of the verification, the Verification Administrator will contact the participant to organise a meeting to discuss the verification process. During the meeting the participant will be invited to make specific comments regarding their experiences, and to make suggestions for improvement. These responses will be collated in an annual report by the Verification Administrator and provided to the AGO for consideration.

### 2.3.13 Disputes

The situation may arise where there is a dispute regarding the actions of verifiers, the Verification Administrator, participants or the AGO.

If the dispute is between the Commonwealth (the AGO) and the Verification Administrator, Verifier, or participant then the parties should resolve the dispute in accordance with the Agreements that are in place between the parties.



### 2.3.13.1 Disputes Between Parties with no Agreement in Place

If parties do not have an agreement in place they must initially attempt to resolve any dispute directly with each other. If the dispute can not be resolved the steps below should then be followed.

Firstly, the Party claiming that there is a dispute will send to the other Party a notice setting out the nature of the dispute;

Secondly, the Parties will have 10 Business Days after the sending of the notice to either:

- Resolve the dispute by direct negotiation;
- Submit the dispute to an independent third person who may have the authority to direct some form of resolution; or
- Submit the dispute to mediation or some other form of alternative dispute resolution procedure; and

Lastly, if:

- There is no resolution or agreement; or
- There is a submission to an independent third person, mediation or some other form of alternative dispute resolution procedure, but there is no resolution within 15 Business Days of the submission, or such extended time as the Parties may agree in writing before the expiration of the 15 Business Days,

then, either Party may commence legal proceedings.

Despite the existence of a dispute, the Service Provider must (unless requested in writing by the Department not to do so) continue to perform the Services.

Each Party will bear its own costs of resolving disputes and Parties must equally bear the cost of any third person appointed by, or on behalf of, the Parties for the purpose of resolving a dispute.

### 2.3.14 Outsourcing and Contractors

All personnel engaged on verification work must have the prior approval of the AGO. Approval will be given by the AGO on the basis of appropriate qualifications, skills and expertise after seeking advice from the Verification Administrator. Lead verifiers must be directly employed by the verification company. Other staff can be subcontractors or engaged through an outsourcing arrangement. The nominated Lead Verifier must form the final verification opinion and issue the verification statement, and the verification company retains all responsibility and liability for the opinion formed.



## ANNEX A VERIFICATION ISSUES

This section is provided to outline key issues to consider in completing the participant's verification; however, it is ultimately up to individual verifiers to use their professional judgement to undertake sufficient evaluation procedures to provide the required verification opinion or findings against the different scope items.

### Verification of Actual Greenhouse Intensity

The key issues that should be considered in the verification of a participant's actual greenhouse intensity reported in their Strategic Plan and Annual Report are described below. The process for verifying greenhouse intensity essentially involves an assessment of plant performance and efficiency and is identical irrespective of whether it is reported in a Strategic Plan or an Annual Report.

As explained in sections 1.2, 2.2.5 and 2.3.8, verification of actual greenhouse intensity in Strategic Plans and Annual Reports must be performed to a moderate level of assurance. The verifier must confirm that data has been collected appropriately, that calculations have been carried out to a sufficient level of detail, and that the inputs used in the calculations are based on the data collected. The verifier must then ensure that the resulting values reported by the participant are consistent with basic check calculations.

For example, when verifying fuel consumption records to a moderate level assurance, the verifier must ensure that the participant maintains records and that the data has been accurately used in the participant's calculations.

### Consideration of Error in Measurements and Calculations

All greenhouse intensity and other plant efficiency calculations will contain a certain level of error due to measurement errors and statistical/sampling errors, which can be quantified with appropriate analysis. Verifiers are not required to assess the extent of these errors and should assume the participants' inputs and calculations are of sufficient accuracy for the purposes of GES reporting.

### Key Technical Issues for Verification of Greenhouse Intensity

The following sections provide an outline of the key items a verifier should assess when verifying a participant's actual greenhouse intensity to a moderate level of assurance.

#### *Age of Plant*

The verifier should identify if the plant is existing, refurbished or new. This decision will affect the methods used to determine the plant's greenhouse intensity.

#### *Review of Records of Ambient Conditions*

The verifier should review records of the ambient conditions at the time of the performance test. This may include records such as:

- Atmospheric pressure;
- Dry bulb temperature; and
- Relative humidity and/or wet bulb temperature.

The verifier should confirm that the data provided by the participant is representative of the actual operating plant conditions.

Key issues and questions that verifiers should address in regard to ambient conditions include:

- Have the conditions changed significantly from the original performance test? If so, has an adjustment been made where required?
- Are the values averaged over the period of the report or single measurements taken at time of test?
- Have any items of plant resumed service or been taken out of service for a significant amount of time during the reporting period?

The key measurement variable to consider in regard to ambient air conditions is ambient air temperature.

#### *Review of Records for All Fuels Consumed*



The verifier should review records of the fuels consumed at the time of the test, this includes records such as:

- Solid fuels
  - Proximate analysis;
  - Ultimate analysis;
  - Calorific value (gross and net); and
  - Rate of firing (if using input-output method).
- Liquid fuels
  - Ultimate analysis;
  - Calorific value (gross and net);
  - Rate of firing (if using input-output method); and
  - Temperature as delivered to burner.
- Gaseous fuels
  - Analysis of dry gas;
  - Specific heat capacity;
  - Calorific value (gross and net);
  - Moisture content;
  - Rate of firing (if using input-output method);
  - Temperature as delivered to burner; and
  - Pressure as delivered to burner.

Key issues and questions that verifiers should address in regard to fuels consumed include:

- Can fuel consumption be measured consistently and reliably and as a suitable input for an assessment of greenhouse intensity?
- Is the calorific value determined on a regular basis?
- How frequently has the plant performance been evaluated (the GES Technical Guidelines specify a minimum of quarterly)?
- Have fuels with significantly different properties been consumed during the reporting period and correctly been taken into account (e.g. coal sourced from multiple mines)?

The key measurement variables to consider in regard to fuels consumed are:

- Fuel mass flow rate; and
- Fuel calorific value (gross and/or net).

### *Confirm Gross Power Produced and Net Power Sent Out*

The verifier should review the processes by which the power production records are generated. A sample of data should be obtained by the verifier from the participant and used for comparison with the values entered into the participant's performance calculations.

Where possible the net meter power records should be reviewed, ensuring all auxiliary loads are correctly taken into account.

### *Confirm All Auxiliary Loads are Taken into Account*

The verifier should obtain a copy of the consumer list which details all auxiliary power items and their power rating and load. This list will be used to verify that the auxiliary loads have been correctly accounted for by the participant. Typical auxiliary loads include items such as:

- Pumps;
- Draught plant;
- Local fuel handling plant;



- Cooling systems; and
- Site lighting and power.

### Confirm Accuracy of Metering

The verifier should also complete a review of the metering used to record the data for the plant performance calculations. This typically requires the verifier to review the condition of the instrumentation, and the work procedures employed to ensure instrumentation is adequately maintained. This involves reviewing records such as:

- Testing and calibration certificates; and
- Records confirming calibration frequency.

### Input-Output Method versus Losses Method of Calculation

Two recognised methods are typically used for determining plant performance – the input-output method and the losses method.

The input-output method is generally used in situations where a reliable representation of the fuel firing rate and fuel properties are conveniently obtained. This is often the case for liquid and gaseous fuels, but can also apply to solid fuels where participants have developed suitable procedures. This method is the simpler of the two if the data is available, as it only requires accurate values for the energy input and power output to determine plant efficiency.

The losses method is utilised in situations in which the input-output method is unable to be applied. This is often the case with solid fuels in which the heat input to the plant by fuel flow must be measured and calculated by indirect methods as solid fuel characteristics may vary and flow is difficult to measure consistently by direct methods. The boiler efficiency is determined by taking measurements of fuel properties and boiler losses, which can be measured, including:

- Basic fuel analysis;
- Exit gas temperature;
- Entering air temperature;
- Exit gas analysis; and
- Ash combustible content.

Other minor heat losses are then determined (using tables provided in ASME or BS standards) as a percentage of the estimated heat input, and have very little effect on the accuracy of the calculations.

Based on the energy output of the boiler and the calculated boiler efficiency, the energy input can be determined. Plant efficiency is then calculated using the same method as the input-output method.

### *Determine Method of Calculation*

The verifier should check which method the participant has used to calculate plant performance and subsequent greenhouse intensity, and confirm that it was appropriate given the data available.

As discussed previously, there are two recognised methods for calculating plant performance – the input-output method and the losses method.

The key questions that verifiers should address in regard to the method of calculation that the participant has used to calculate plant performance include:

- Is the method appropriate?
- Is the basis for both the efficiency and fuel calorific value consistent i.e. gross/higher heating value or net/lower heating value?

### Verification of Expected Abatement from Potential Actions

The key issues that should be considered in the verification of a participant's expected abatement from potential actions reported in their Action Plan are described below.



As explained in sections 1.2, 2.2.6 and 2.3.8, verification of potential abatement actions in Action Plans must be performed to a moderate level of assurance. Using a simple example of installing variable speed drives on the boiler draught plant, verification at a moderate level of assurance would essentially involve the verifier assessing the anticipated/measured power consumption before and after the installation of the variable speed drive and confirming that this data has been accurately used in the participant's calculation of abatement.

### Selection of Potential Abatement Actions

In order to reduce the cost of verification engagements, and streamline the verification process, only a sample of potential abatement actions are verified. A sample of three abatement actions represents a suitable balance between cost and providing an adequate assessment of all the potential abatement actions implemented by a participant. It should be noted, however, that more or less actions could be included in the verification to take into account the particular circumstances of a participant if required.

Potential abatement actions are selected by the Verification Administrator on the basis of criteria such as:

- whether the action is representative of the types of actions that the participant could undertake; and
- the amount of abatement that the action has the potential to achieve.

### Key Technical Issues for Verification of Greenhouse Intensity

The following sections provide an outline of the key items a verifier should assess when verifying a participant's potential abatement actions to a moderate level of assurance.

#### *Verify Input Data*

Much of the data required to calculate the potential abatement by an action will be the same as that used for the actual greenhouse intensity. The verifier must first determine if this data has actually been used. Secondly, the verifier must determine if the abatement action affects the input energy or net power output. If the abatement action affects the input energy then a full review of the plant performance data will be required by the verifier. If the abatement action affects the net power output then the calculations of the potential abatement will be relatively simple.

#### *Method of Calculation*

The verifier should be aware that in the case of abatement actions that affect the performance of sub-systems integral to the plant, a detailed energy balance is required to determine the effects on overall plant performance.

In some cases, abatement actions will directly affect the input or output energy in which case the input-output method may be used to determine the effect of the action. This is a significantly simpler task requiring much less information and calculations than a detailed energy balance.

In situations where the input-output method is not suitable and has been used to calculate the participant's baseline or reported greenhouse intensity, additional data may be required to determine the effect of the potential abatement actions.

#### *Example 1 – Replacement of transformer with a more efficient model*

A transformer could be replaced by a model that is 1% more efficient. As there would be no changes made to the thermodynamic cycle efficiency, the relationship between gross power output and energy input would not change. In this case, the only impact would be an increase in net power output by 1%.

#### *Example 2 – Replacement of electric feedwater pumps with steam driven pumps*

If electric powered feedwater pumps were replaced with steam driven feedwater pumps, the impact on greenhouse intensity would not be simply due to the reduction in auxiliary power consumption. Less steam would be available to the turbine which would reduce the gross power output. Whether this could translate to an equivalent improvement in net power output would require a detailed assessment.

#### *Calculation of Abatement*

Taking the most suitable method of calculation into account, the verifier should review the calculations provided by the participant to determine whether the potential abatement reported is free from material discrepancy.



### *Verification of Reference Greenhouse Intensity*

As explained in sections 1.2, 2.2.6 and 2.3.8 of these guidelines, verifiers must provide an assessment of the reasonableness of the reference greenhouse intensity reported in the Strategic Plan. The verifier is required to ensure that the participant has followed the requirements of the GES Technical Guidelines, and that the resulting values for the greenhouse intensity appear reasonable, based on a consideration of the following criteria:

- Does the participant have full or summary test reports, or design calculations from which greenhouse intensity can be calculated?
- Are reports/calculations based on a recognised standard?
- Do reports/calculations include all base load fuels and support fuels?
- Are reports/calculations based upon a consideration of full and partial loads?
- Are reports/calculations based on a consistent application of calorific value and plant efficiency (i.e. gross or net)?
- Are reports/calculations based on net power output?
- Have all auxiliary loads been taken into account?
- Is the methodology used to calculate greenhouse intensity correct?
- Is the reference GI comparable to the actual GI, taking into account the age of the plant, and the abatement actions implemented and any major changes to the plant since the reference GI was calculated?

Based on the criteria above verifiers should use their professional judgement to assess the greenhouse gas intensity determined. If any of the above criteria are not met this needs to be discussed by the verifier in the verification report.

### **Verification of Achieved Abatement**

As explained in sections 1.2, 2.2.6 and 2.3.8, verifiers must provide an assessment of the reasonableness of achieved abatement from a sample of individual actions reported in the Annual Report. The abatement is regarded as reasonable if the:

- Abatement action is operational;
- Installation and maintenance inspection records exist;
- Relevant on-line data exists;
- Methodology used to calculate the abatement is correct;
- Methodology has been accurately applied;
- Level of abatement is consistent with the scale and scope of the abatement action; and
- Abatement can be sustained over time.

Based on the criteria above verifiers should use their professional judgement to assess the abatement determined and reported. If any of the above criteria are not met this needs to be discussed by the verifier in the verification report.

### **Selection of Abatement Actions Implemented**

In order to reduce the cost of verification engagements and streamline the verification process, only a sample of the abatement actions implemented by a participant are verified. While a sample of three abatement actions is considered adequate to assess the reasonableness of all the abatement actions implemented, it should be noted that more or less actions could be included in the verification to take into account the particular circumstances of a participant if required.

Abatement actions implemented are selected by the Verification Administrator on the basis of criteria such as:

- Whether the action is representative of the types of actions that the participant has undertaken; and
- The amount of abatement that the action has the potential to achieve.



## Verification of Abatement Actions Not Implemented

As explained in sections 1.2, 2.2.5 and 2.3.8, verifiers must provide an assessment of the reasonableness of decisions not to implement abatement actions from a sample of individual actions reported in the Action Plan. The verifier is required to ensure that the participant has followed the requirements of the GES Technical Guidelines, and that the financial and technical assessments of the abatement action appear reasonable based on a consideration of the following criteria:

- Has a financial model been prepared by the participant?
- Are the values and assumptions made in the financial model consistent with industry practice?
- Is cost data based on external pricing or is it consistent with industry values?
- Is the abatement action technically feasible?
- Is the methodology used to calculate the abatement correct?
- Has the methodology been accurately applied?
- Is the level of abatement consistent with the scale and scope of the abatement action?

If the answer to any of the questions above is “no” then the verifier needs to clarify if the justification to not implement the abatement action is valid.

## Selection of Abatement Actions Not Implemented

Abatement actions not implemented are selected by the Verification Administrator on the basis of criteria such as whether the action:

- Was representative of the types of actions that the participant chose not to undertake;
- Had the potential to achieve large amounts of abatement;
- Would have had a reasonable likelihood of success given standard industry practice; and
- Was a marginal investment (clearly uneconomic actions are likely to be quickly dismissed by a participant using market knowledge or a verbal quote from suppliers and thus the basis on which to not proceed with the action is unlikely to support a verification).

## Verification of a participant's Record-keeping Practices

As explained in sections 1.2, 2.2.6 and 2.3.8, verifiers must provide a statement in the findings of verification reports on whether participants' record keeping practices are adequate to fulfil GES reporting requirements. To assist in reaching a conclusion on this matter, verifiers should consider the following questions:

- Does the participant have an effective record keeping policy?
- Is the record-keeping arrangement operational and effective?
- Do the records support a complete and unbroken audit trail?
- Are relevant records maintained for the duration of the participant's Deed of Agreement?
- Are all records that support greenhouse gas assertions available to the verifier?

Where the verifier concludes that this is not the case it should be reported as such, and a suggestion provided on how this can be improved.



## ANNEX B VERIFIER SELECTION

Effective verification of GES plans and reports can only be achieved by personnel with the necessary competence. To support this process the AGO has established a Panel of Independent Verifiers. Panel members were selected and assessed for competence within broad industry sectors, including power generation and verification scopes.

This Annex describes the process for final approval of a verifier for a specific verification engagement. In all circumstances verifiers will be appointed after consultation with the participant being verified. Before each appointment the Verification Administrator will assess:

- The competence of the proposed verifier in relation to the specific participant being verified and verification task. This is based on the proposed verification team, their qualifications and experience, and other supporting material provided by the verifier.
- The Detailed Scope of Work provided by the verifier, which confirms the verifier's understanding of the verification task.
- Value for money based on an assessment of price, value represented by the scope of work and the experience and expertise of the verifier.
- The independence of the verifier, when assessed against the conflict of interest requirements in section 2.2.4. Verifiers and participants must advise the Verification Administrator of any actual or potential conflicts of interest that arise during the verification.

The AGO will approve the engagement of verifiers for verification activities funded by the AGO such as GES verifications.

### The Verifier Selection Process

Verifier selection and approval is undertaken according to the process in Figure 2 below. Key process details are outlined below:

- Participants can select a verifier from the Panel or can request the Verification Administrator to select a verifier on their behalf;
- Where the participant decides to select a verifier they must select a verifier from a list of GES competent Panel Members supplied by the Verification Administrator;
- The verifier nominated by the participant is requested to confirm that they have no conflict of interest in completing the engagement and to nominate a verification team, including a Lead Verifier. The team is reviewed for competence by the Verification Administrator. If the nominated verification team is assessed as not having the necessary competence then the participant must select another verifier;
- Where the Verification Administrator is requested to select the verifier on behalf of the participant, the Verification Administrator chooses three competent verifiers from the Panel to tender for the work. As far as possible, the Verification Administrator will share the number of engagements for which verifiers are requested to tender across the full Panel membership with relevant competencies;
- After the competent Verifiers have been identified they are requested to confirm that they have no conflict of interest in completing the engagement. If the Verification Administrator determines that no conflict exists the competent Verifiers are then provided with an Initial Scope of Work and requested to provide a Detailed Scope of Work including verification fees and the who is in the verification team;
- The Verification Administrator reviews the Detailed Scope of Works provided by Verifiers, including the fee proposals, and can request amendments if required;
- Once satisfied, the Verification Administrator selects the verifier representing the best value for money and approves the Detailed Scope of Work; and
- After the participant and the Verification Administrator have agreed, the AGO is advised of the proposed verifier. If the AGO is satisfied of the competence, value for money and independence of the proposed verifier, the AGO will approve the appointment. If the AGO is not satisfied, the participant and Verification Administrator must select another verifier.



Once the AGO has approved a verifier:

- The participant is advised of the engagement of the verifier.
- The Verification Administrator issues a Work Order for the engagement.

If there is a dispute regarding verifier selection, the dispute will be addressed in accordance with the process described in section 2.3.13.

## Selection of the Project Team

In assessing the verifier's competence, the Verification Administrator assesses the proposed verification team to be assured that the team has the appropriate skills. The personnel approved to carry out verification must have, either on an individual basis for single person verification, or collectively, the full range of required verification competencies. A Lead Verifier must be allocated and approved for each verification activity.

## Lead Verifiers

Lead Verifiers have the same basic technical competence as Key Personnel, but have significant additional experience and competence in the following areas:

- Selecting and leading verification teams;
- Planning the verification process, e.g. time, place, criteria for the assessment;
- Identifying and selecting high risk material data streams;
- Managing the verification process including managing impartiality, providing guidance to team members, and making critical decisions; and
- Preparing the verification report.

In particular, the Lead Verifier is responsible for making the definitive professional judgement required for expressing the verification opinion, and signing the verification report. The Lead Verifier must be oversee, and be present at, the onsite verification activities at the participant's premises.

## Key Personnel

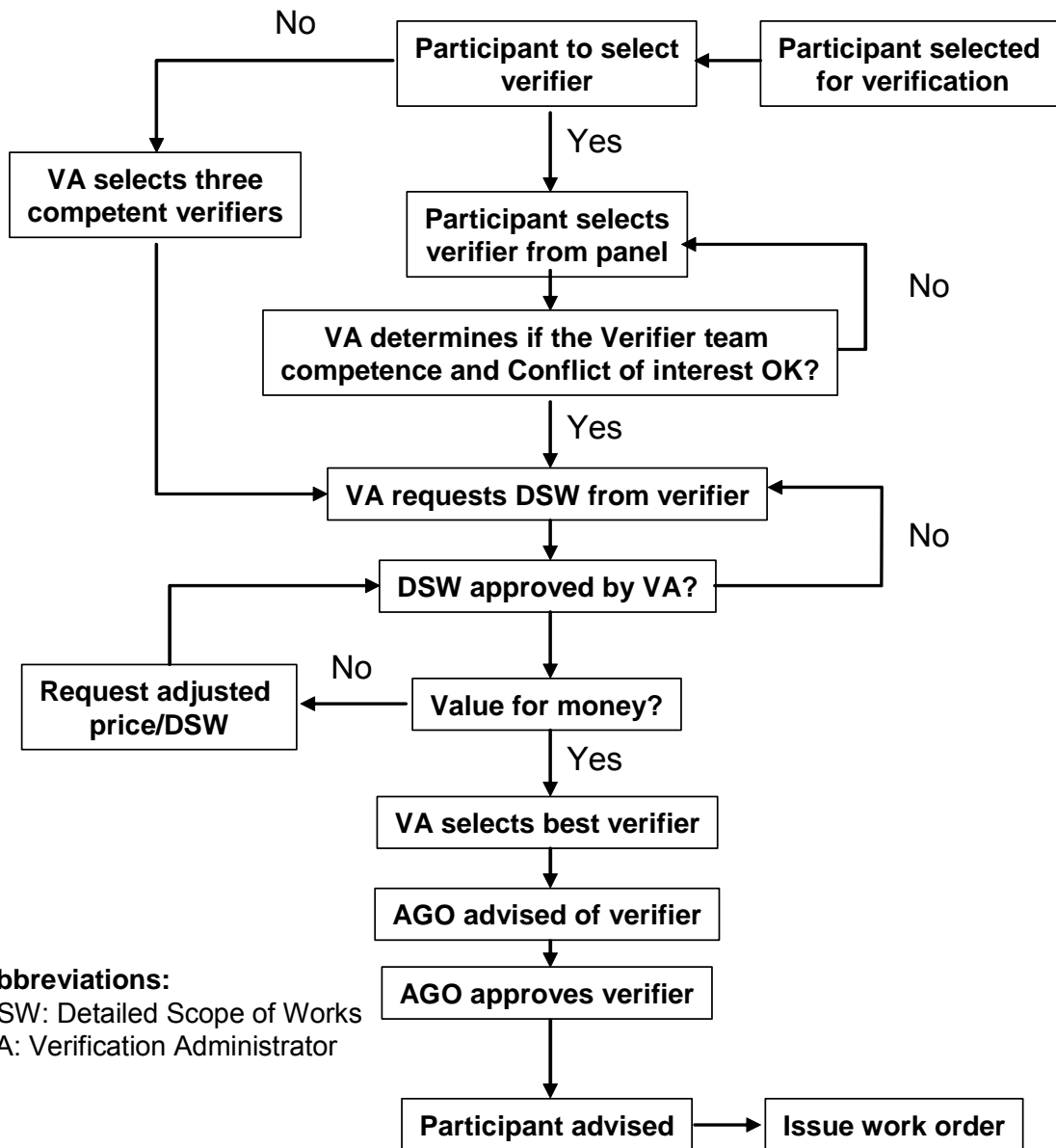
Key Personnel provide support to the Lead Verifier in conducting verification activities, reviewing documentation and evidence and preparing reports. Key personnel are not competent for unsupervised participation in onsite verification activities.

## Technical Specialists

Technical Specialists are senior technical specialists and/or professional staff that provide technical advice to the verification team. Technical Specialists are not competent for unsupervised participation in onsite verification activities.



Figure 2: GES Verifier selection



## GLOSSARY

### **Abatement action**

A specific activity implemented by a participant to reduce GHG emissions.

### **Accuracy**

Closeness of a measured quantity to its real or true value.

### **Action plan**

An Action Plan contains a list of actions proposed by a participant designed to improve the greenhouse intensity of their power stations. This includes a detailed assessment to determine those actions that are feasible. Following government approval, the Action Plan forms an attachment to their Deed of Agreement. The participant then implements the feasible actions within the five-year timeframe of their Deed of Agreement.

### **AGO**

Australian Greenhouse Office: The part of DEH that administers the GCP programme.

### **Annual report**

An Annual Report provides details of a participant's fuel consumption, capacity, greenhouse intensity and performance. Details on the implementation and progress of a participant's actions as outlined in their Action Plan are also included as well as an assessment of the improvement in their greenhouse intensity and abatement achieved by the actions.

### **Assurance**

Provided by verifiers over their verification opinion. The level of assurance required determines the level of detail with which the verifier assesses the GHG assertions.

### **ASME**

American Society Of Mechanical Engineers.

### **BS**

British Standards.

### **Conflict of interest**

Any threat to impartiality from sources of bias that may compromise, or may reasonably be expected to compromise, a verifier's ability to make unbiased decisions.

### **CO<sub>2</sub>-e**

The standardised unit of impact for all greenhouse gases. Referred to as carbon dioxide equivalent (CO<sub>2</sub>-e). The six greenhouse gases are: carbon dioxide, hydrofluorocarbons, methane, nitrous oxide, perfluorocarbons, and sulphur hexafluoride.

### **Deed of Agreement**

The Deed requires participants to derive a GES 'best practice' performance range for each power plant covered, evaluate and undertake actions to reduce greenhouse intensity, and report greenhouse intensity annually.

### **Department of the Environment and Heritage (DEH)**

The Australian Government Department that administers the GCP programme.

### **Detailed Scope of Work (DSW)**

The detailed description of the proposed verification process prepared by the verifier.

### **Emission reductions**



The calculated or measured reduction between a baseline scenario and the actual emissions.

### **Emissions factors**

Greenhouse gas emissions per unit of production or activity. Default values are set out in the AGO Factors and Methods Workbook.

### **Generator Efficiency Standards (GES)**

An initiative that is part of Greenhouse Challenge Plus. Objectives are to deliver reductions in the greenhouse gas intensity of electricity generation. They apply to fossil fuel powered generation plants that are 30 MW electrical capacity or above, produce 50 GWh per annum electrical output or above and have a capacity factor of 5% or more in each of the last three years.

### **GES best practice performance range**

The 'best practice' performance range is derived by applying an annual allowance for non-recoverable degradation to the Reference curve. The 'best practice' allowance is for degradation in sent out efficiency (hso) of not more than 0.2 - 0.3% of net heat rate per annum (unless otherwise indicated by manufacturers data), which translates to an equivalent increase in greenhouse intensity.

### **GES participant**

GES participants are power generation companies that have signed a legally binding Deed of Agreement with the Australian Government Department of the Environment and Heritage.

### **GES reference curve**

The GES reference curve represents a power plant's greenhouse intensity as a function of load at the time of performance/acceptance testing, adjusted for current fuel properties, heat losses additional to performance/acceptance test conditions and current atmospheric conditions.

### **Greenhouse Challenge Plus**

A cooperative partnership between industry and the Australian Government to: reduce greenhouse gas emissions; accelerate the uptake of energy efficiency; integrate greenhouse issues into business decision-making; and provide more consistent reporting of greenhouse gas emissions levels.

Members report their greenhouse gas emissions inventory, abatement actions and greenhouse performance indicators. Members can also elect to participate in Greenhouse Friendly™ and the Generator Efficiency Standards.

### **Greenhouse Challenge Plus Cooperative Agreement**

Agreement that initiates membership and sets out the undertakings of the Member and the Government. A number of commitments are made in the agreement, including annual progress reporting, independent verification and an annual public statement.

### **Greenhouse Challenge Plus Member**

Organisation that enters an agreement (Cooperative, Facilitative or Aggregate Agreement) with the Australia Government. The organisation remains a Member so long as they continue to meet the undertakings of their agreement.

### **Greenhouse Challenge Plus information security protocol**

Protocol that ensures Member information is treated confidentially. All AGO staff working in the Greenhouse Challenge Plus team sign and follow the protocol.

### **Greenhouse Challenge Plus Progress Report**

Annual report submitted by Members to the AGO covering their updated emissions inventory, abatement actions, offsets and progress against greenhouse performance indicators.

### **Greenhouse Intensity (GI)**

Measure of Greenhouse efficiency as the emission rate of greenhouse gases from fuel burning expressed in



kilograms CO<sub>2</sub>-e / MWh sent-out. For cogeneration, this is discounted for steam and heat produced.

**Greenhouse Friendly™**

Initiative that provides consumers with the opportunity to purchase carbon neutral products or services. To achieve certification, the greenhouse gas emissions associated with the life cycle of the product or service (i.e. production, use and disposal) must be fully offset. Approved abatement projects provide the offsets.

**Greenhouse gas assertion**

A declaration or factual and objective statement of greenhouse related performance made by the participant. For example, a statement in an Annual Report which says “The power plant’s greenhouse intensity is XX.” Or “the estimated abatement from this action is YY”.

**Industry Advisor**

AGO staff that support Members.

**Initial Scope of Work**

The description of the verification task prepared by the Verification Administrator.

**ISO**

International Organization for Standardization.

**Material discrepancy**

A material discrepancy impacts on decision making. A discrepancy is regarded as material if someone making a decision based on a report containing the discrepancy would come to a different conclusion if the discrepancy was corrected.

**Sent-out electricity**

Gross electricity generation as measured at the generator terminals less all auxiliary energy consumed by the electricity generating plant and all losses between the generator terminals and the point at which electricity is dispatched for transmission or distribution to consumers.

**WRI**

World Resources Institute.

**WBCSD**

World Business Council for Sustainable Development.

**Verification Administrator (VA)**

A third party organisation who coordinates independent verification on behalf of the AGO.

Verifiers Members of the Greenhouse Challenge Plus verification panel with responsibility for performing and reporting on the verification process.

**Verifier**

Person who undertakes independent verification of a participant.



## REFERENCES

- California Climate Action Registry (2002). *California Climate Action Registry Certification Protocol, October 2002*. [http://198.104.131.213/docs/PROTOCOLS/certification\\_protocol\\_102102.pdf](http://198.104.131.213/docs/PROTOCOLS/certification_protocol_102102.pdf).
- Commission of the European Communities (2004). *Commission Decision of 29 January 2004 establishing guidelines for the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council (the Report)*. [http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/l\\_059/l\\_05920040226en00010074.pdf](http://europa.eu.int/eur-lex/pri/en/oj/dat/2004/l_059/l_05920040226en00010074.pdf).
- Commonwealth of Australia (2004). *AGO Factors and Methods Workbook August 2004*. Australian Greenhouse Office. <http://www.greenhouse.gov.au/workbook/pubs/workbook.pdf>.
- Commonwealth of Australia (2005). *Greenhouse Challenge Plus Programme Framework 2005*. Australian Greenhouse Office, Department of the Environment and Heritage. <http://www.greenhouse.gov.au/challenge/about/pubs/programmeframework.pdf>.
- Commonwealth of Australia (2001). *Technical Guidelines Generator Efficiency Standards Version 1.2 January 2001*. Australian Greenhouse Office. [http://www.greenhouse.gov.au/ges/publications/pubs/guide\\_app2.pdf](http://www.greenhouse.gov.au/ges/publications/pubs/guide_app2.pdf)
- International Emissions Trading Association (2004). *Validation Verification Manual Version 4.0*. Validation Verification Manual Working Group. <http://www.ieta.org/ieta/www/pages/download.php?docID=259>.
- International Petroleum Industry Environmental Conservation Association (2003). *Petroleum Industry Guidelines for Reporting Greenhouse Gas Emissions*. [http://www.ipieca.org/downloads/climate\\_change/GHG\\_Reporting\\_Guidelines.pdf](http://www.ipieca.org/downloads/climate_change/GHG_Reporting_Guidelines.pdf).
- International Organization for Standardization (2005). ISO/DIS 14064-1 *Greenhouse gases - Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals*. <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=38381&scopelist=PROGRAMMEME>.
- International Organization for Standardization (2005). ISO/DIS 14064-2 *Greenhouse gases - Part 2: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements*. <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=38382&scopelist=PROGRAMMEME>.
- International Organization for Standardization (2005). ISO/DIS 14064-3 *Greenhouse gases - Part 3: Specification with guidance for the validation and verification of greenhouse gas assertion*. <http://www.iso.org/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=38700&scopelist=PROGRAMMEME>.
- NSW Greenhouse Gas Abatement Scheme (2003). *Guide to Record Keeping for Abatement Certificate Providers, Version 1*. <http://www.greenhousegas.nsw.gov.au/>.
- NSW Greenhouse Gas Abatement Scheme (2004). *Audit and Technical Services Panel Audit Guideline, Version 2.1*. <http://www.greenhousegas.nsw.gov.au/>.
- World Resources Institute/World Business Council for Sustainable Development (2004). *The Greenhouse Gas Protocol. A Corporate Accounting and Reporting Standard*. [http://pdf.wri.org/ghg\\_protocol\\_2004.pdf](http://pdf.wri.org/ghg_protocol_2004.pdf)

