



**COOPERATIVE RESEARCH CENTRE FOR COAL IN SUSTAINABLE DEVELOPMENT**  
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**INDICATORS AND THEIR PLACE IN ESTABLISHING SUSTAINABILITY  
– A BRIEFING PAPER**

**TECHNICAL NOTE 23**

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## Executive Summary

Both CCSD Tasks 2.1.6 (Emissions from current power generation) and 6.1.1 (Impacts of waste management options on sustainability outcomes) require knowledge of both the meaning of sustainability and the ways that it may be possible to determine whether power generation systems are acting over time in a more sustainable or less sustainable manner. This briefing paper has been prepared as part of an examination of the role of indicators in trying to communicate the position of the power generation sector in a sustainable society.

It is not the role of the CCSD to dictate the appropriate indicators to be reported by the generation sector as this appears to be being driven by processes beyond the national level. In particular the generic 2002 Guidelines developed by the Global Reporting Initiative (GRI) have become the *defacto* international minimum reporting standard for triple bottom line reporting on sustainability outcomes. The generic guidelines are being supplemented by sectoral supplements which enable more robust and useful reporting to occur for individual sectors. This increased relevance will over time extend the applicability and uptake of sustainability reporting.

Although the GRI has not developed sectoral supplements for the generation sector, the Electricity Supply Association of Australia (ESAA) has developed sector based environmental performance reporting guidelines in association with Environment Australia based on the GRI model. Although external stakeholder involvement in the ESAA guideline development was absent, a comparison of the recommended ESAA and GRI Performance Guidelines shows that in most cases those developed by ESAA comply with or exceed the substance of the GRI recommendations. A significant omission from the ESAA recommendations appears to be the lack of reporting requirements for toxic trace element emissions. This omission could be easily overcome by including in the reporting requirements all substances which are reported to the National Pollutant Inventory.

Scrutiny of the guidelines suggested by both GRI and ESAA also demonstrates that while effects or effectiveness are to be measured extensively, integrated, systemic or cross-cutting indicators are notable by their absence. Although these indicators are more difficult to conceptualise and develop, it is believed that these indices may provide a more enlightening view of the 'good' which the industry or facility provides. Integrating indicators may for example aid the assessment whole of life costs for processes, to allow comparison not only with alternatives but of the real cost of replacement of existing facilities; to quantify the societal costs of emissions or loss of amenity.

It is recommended that CCSD should not independently develop sustainability indicators for the power generation sector and that development of appropriate indicators may be enhanced by CCSD<sup>1</sup> becoming an Organisational Stakeholder in the GRI.

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<sup>1</sup> At the December 2004 ISG meeting this recommendation was discussed with the view being formed that it would be preferable for power generators to participate in the GRI, either directly, or collectively via the ESAA. The presumption was that CCSD would be able to assist in the research effort needed to underpin this engagement.

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## Introduction

Coal utilisation in power production and in metallurgical processes has the potential, without careful management and application of appropriate technology, to lead to significant environmental problems. Coal's abundance, supply security and relative price stability are positive attributes, but contrast with its environmental performance compared to competitor fuels such as gas and renewables.

Other projects in CCSD specifically address the implications for coal of a carbon constrained world, where there will be increasing pressures to reduce emissions of greenhouse gases. However, emissions and waste disposal issues associated with coal mining, preparation, and combustion, present significant, and more immediate challenges, to the social and environmental acceptability.

There are also a number of emerging air quality issues that have the potential to impact on existing and future markets for thermal coals. These include emissions of fine particles and toxic compounds, and impacts of industrial NO<sub>x</sub> on regional air quality.

Increasingly, governments and the broader community are taking a more comprehensive approach to assessing the impacts of energy production on the environment. Assessments of costs of power production are now beginning to include costs associated with health and other impacts. The results of a ten year EU study, for example, recently claimed that the cost of producing electricity from coal or oil would double and the cost of electricity production from gas would increase by 30% if external costs such as damage to the environment and to health were taken into account (see <http://europa.eu.int/comm/research/press/2001/pr2007en.html>). These estimates of environmental and health impacts are presently at best crude and at worst distorting, but they do suggest that the future will increasingly see attempts to include these costs in assessments of power sources. The relationship between environment and human health is increasingly becoming a focal point for community concern, a reflection of better information and understanding, but also of concern over environmental influences where we have no direct control.

The coal and power industries need to be well positioned to respond to these challenges, particularly in a more competitive environment where there are other fuels, such as gas and biomass, being seriously considered as alternatives to coal. Community demand for activities to report against a **triple bottom line** (economic, social and environmental) will increase.

In this context it is useful to develop a sustainability framework for CCSD work on emissions from current power generation (to be conducted in Project P2.1), and waste management (P6.1). Project activities in P2.1 and P6.1 are clearly closely related, and need to be carefully integrated to achieve optimum results.

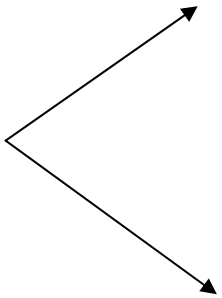
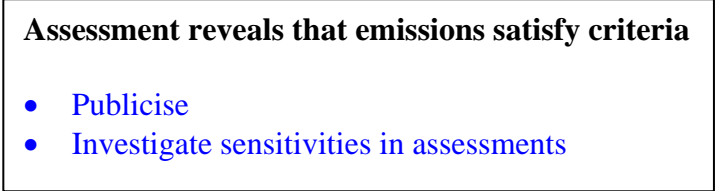
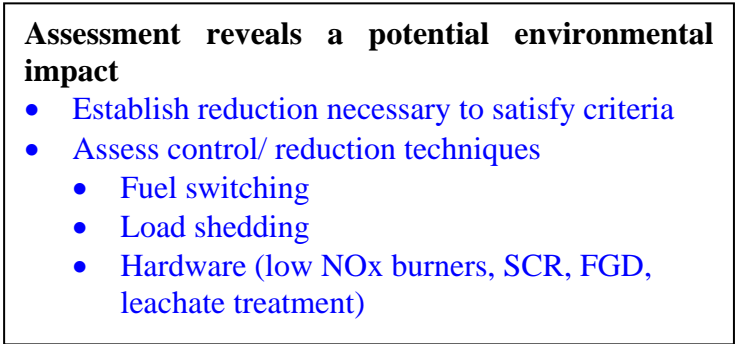
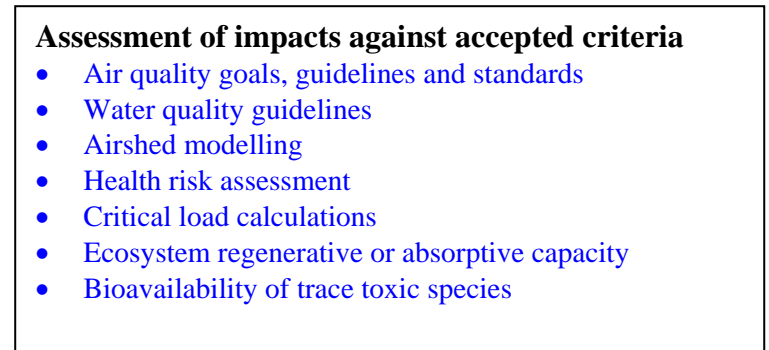
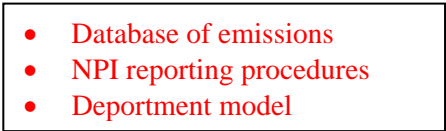
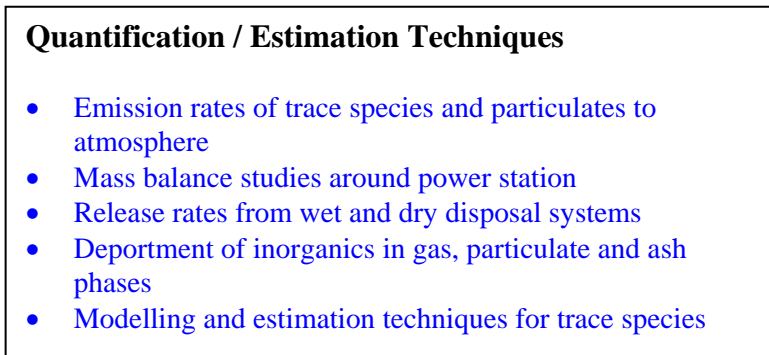
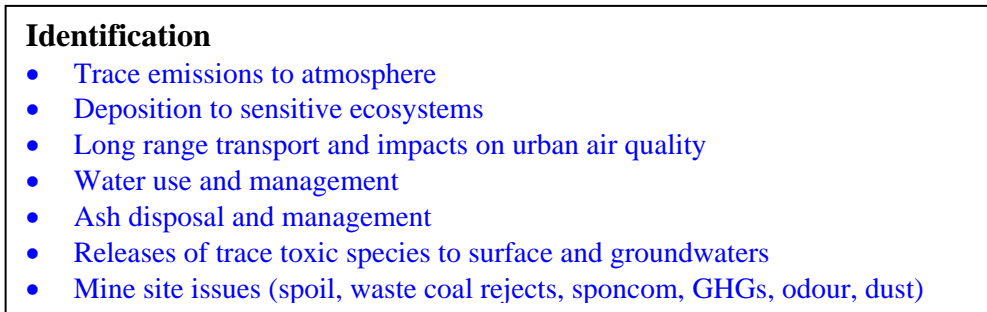
Figure 1 illustrates the suggested framework. Each box represents a stage in the process, as follows:

1. Identification. In this step potential environmental problems are identified on the basis of current knowledge. To a large extent this process is already complete, but there is always a possibility of new issues arising.
2. Quantification/ Estimation Techniques. In order to assess environmental impact, accurate data on emission fluxes, release rates and mass balance studies are essential.

These measurements need to be generalised to develop modelling and estimation techniques in order to cover a broad range of coals and processing conditions. Work in the Black Coal CRC provided a basis for this activity through projects on trace element deportment, NPI reporting, leaching and fine particle emissions. These projects have been extended and refined in CCSD, in order to provide input for environmental assessments of coal utilisation throughout the coal chain.

3. Assessment of impacts. Using the data obtained and the generalised techniques described in 2 (above), assessments of the environmental performance of coal will be made against accepted criteria. These assessments may not all form part of the research activities of CCSD, but the results need to be used to inform the next step in the framework.
4. Step 4 is a decision point; the assessment may show that:
  - There is acceptable environmental impact (accepted criteria are not exceeded). In this case there may be a need to investigate the sensitivities in the assessments, and to publicise the results.
  - There is a potential adverse environmental impact. In that case the reduction in emission or waste required to eliminate the impact needs to be established, and control and reduction techniques assessed. This assessment can be linked to the economic and social dimensions of sustainability and acceptability. Improvements in environmental performance based on these techniques would then require re-examination through measurement, modelling or estimation to quantify the effects and assess the impacts.

In this report we provide a discussion of sustainability indicators, and argue that indicators have to be extended beyond environmental considerations.



**Figure 1: Sustainability framework for emissions (P2.1) and waste management (P6.1) projects in CCSD**

## Background

The focus of environmental policy-making and planning has been centralised on 'sustainable development' since the publication of the Brundtland Report in 1987, [World Commission on Environment and Development (WCED) (1987)]. *Sustainability* in this context is a value laden term which has developed many and varied meanings. Nearly ten years after Brundtland, Fien (1996) said that "several hundred" definitions of *sustainability* existed in the literature; in the intervening period to the present day, it is highly probable that several hundred more definitions have been promulgated by a similar number of authors. Unfortunately however, 'for those charged with the business of making the word mean something fixed, understandable and enforceable, there is no single meaning and there is no agreement on how it is measured and recognised in an objective sense.'(Bell and Morse, 1999, p151)

The common thread following from these many definitions is the desire to lessen the impact of the human footprint on the surface of the earth. This desire stems from a widely held view, [WCED (1987), United Nations Conference on Environment and Development (UNCED) (2003a), United Nations Commission on Sustainable Development (UNCSD)(2002)] that the long term survival of humanity requires human society to develop an equilibrium<sup>2</sup> with other earthbound ecologies. Norton (1992) equates sustainability likewise with stability describing sustainable activities as those 'for that do not destabilize the large-scale, dynamic, biotic and abiotic systems on which future generations will depend'(p104). As stated by Schnare (1996), 'the reality is, we decide what is desirable in the environment affected by humans. Only when that is decided is it possible to determine what is a threat' (p317).

In the period since 1987 there has been considerable movement in the way that the world bodies have reacted to the concept of sustainability. At the 1992 Earth Summit in Rio de Janeiro the emphasis was on the environment. The summit declaration exhorts human beings to be healthy and productive but 'in harmony with nature'(*Principle 1*) and that this should be achieved by cooperation at a global level 'to conserve, protect and restore the health of the earth's ecosystem (*Principle 7*)(UNCED, 2003b).

The difficulty of thinking or acting environmentally let alone sustainably if you are malnourished, or lack adequate resources of housing, energy or water (World Bank, 2003), led the World Summit for Sustainable Development (WSSD) in Johannesburg in 2002 to recognise that social inequities are often the drivers for environmental, social or economic degradation. Thus the overarching objectives from the Summit for achievement of sustainability became 'poverty eradication, changing consumption and production patterns and protecting and managing the natural resource base for economic and social development'(*Paragraph 11*)(UNCSD, 2003).

Following WSSD 2002 it has been suggested that sustainable development might be seen as not just the interaction of environment, society and economics but an outcome which may be possible when the three spheres of environment, society and economics, are

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<sup>2</sup> Although the term **equilibrium** in itself implies a degree of linearity, of cause and effect. Whereas, as Norton (1995) points out, 'ecological economists believe that ecosystems are not equilibrium systems, but rather dynamic systems whose essence is to be self-organising and self-creative. This emphasis on large-scale dynamics and ecosystem organization causes the ecologists to expect systems to behave in non-linear ways and considers that this behaviour can be induced by gradual increases in the scale of changes to the landscape.'(p118)

overlain by a fourth sphere requiring governance, transparency and accountability (Fig 2) (Hughes, 2003, Hedstrom and Isenburg, 2002).

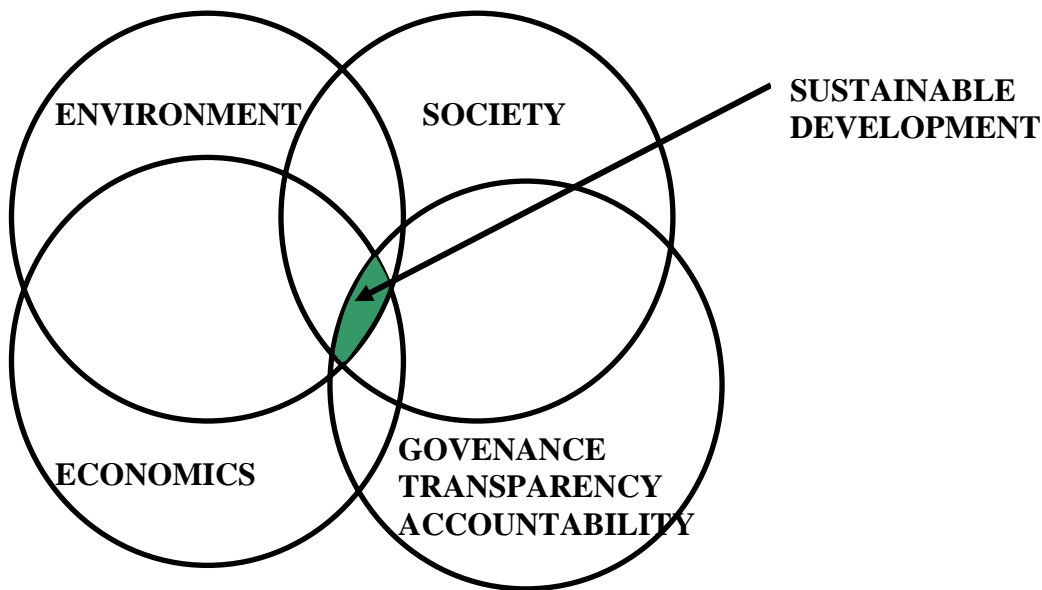


Figure 2: A model of sustainable development following WSSD 2002 (redrawn from Hughes 2003)

Wahurst (2002) poses what must be a key question:

how can industrial development be undertaken without damaging the environment or undermining the development opportunities of local communities – across generations as well as across geographies; and, can the benefits be distributed amongst stakeholders equitably while promoting economic growth?(p31)

and suggests that this can only occur if business embraces the sustainability concept.

### **Non-renewables and sustainability**

It has been argued that sustainability cannot be achieved simply by individual actions taken at an enterprise or industry level, that indeed the “complete economic-social-ecological system and not its component parts” (Elkington,1999, p38) needs to be defined. However for the system of commerce and production to be sustainable, it needs to perform in a manner such that “each act is inherently sustainable and restorative” (Hawken, 1993, pxiv). This might represent a complete mindshift for society, but has been simply described by Rene Dubos in 1972 by the need to ‘think globally and act locally’ (Elben and Elben, 1994, p702).

Within this framework it is also clear that achievement of a sustainable society requires “companies to adopt longer time-scales, to take on board the views of key stakeholders, to integrate triple bottom line thinking in to every aspect of business, and to consider reconfiguring key aspects of the company’s operations” (Elkington, 1999, p299).

It is this last aspect of management towards sustainability (reconfiguration) which is particularly pertinent for fossil fuel energy users and miners who are intuitively “non-sustainable”, in that their resource is incapable of self-replenishment within any time frame which can be contemplated by human society. Clayton and Ratcliffe (1996) suggest that

unless one of the following conditions is met non-renewable resource use can be classed as unsustainable:

- “The resource is so abundant, and is present in forms that can be accessed for low energy and resource costs, that there is no possibility of ever experiencing any scarcity within any meaningful time frame.
- There are mechanisms to recover and recycle the resource within the economy with a high degree of efficiency” (p85)

Given the need to look at longer time frames than this or the next generation the “long-term” lack of sustainability of fossil fuel based industries is apparent and will become more obvious if:

- “ the availability of fossil fuels were to decline, and if other sources of energy had not been developed as substitutes;
- the growth in energy demand outstripped increases in energy conversion (ie generating) capacity and improvements in energy efficiency; or
- the energy conversion process generated pollution at levels or rates that proved to be in excess of the planet’s ability to absorb them” (Clayton and Ratcliffe ,1996, p93).

Elkington (2002) who coined the term “triple bottom line” goes even further by describing the fossil fuel based sectors of oil, steel, cement and coal-fired electricity companies emotively as corporate locusts. Claiming that they are an unsustainable business model, and that although the threat to eco and social systems and economies may not be immediately apparent, they are overwhelming the carrying capacity of these systems by destroying ‘natural, human, social and economic capital’ at an unsustainable rate and as a consequence ‘potentially creating regional or even global impacts’ (p8). He also suggests that they have an ‘incapacity (conscious or not) to foresee the negative system effects, coupled with an unwillingness to heed early warnings and learn from mistakes’ (p9).

For these analysts coal does not have a place, or has a very limited place, in a sustainable world. This view contrasts markedly (as might be expected) with that of the World Coal Institute (2003) which sees artificial barriers to the use of coal as standing in the way of ‘economic and social development and, therefore sustainable development’. It believes that the ‘appropriate course is to encourage the efficient, environmentally acceptable use of coal – for which effective technologies and policies are available – rather than penalise or restrict its use.’

The real answer probably lies between these two extremes, with the users of non-renewables reinventing themselves over time into renewables users, by the use of capital gained from the exploitation of natural resources, whilst being increasingly more restrained as time goes on by resource depletion, regulation and social pressure on their non-renewable use.

### **The place of indicators in establishing and maintaining sustainability**

Whatever definition for *sustainability* is used it is clear that in order to determine if positive progress is to be achieved there must be perceivable outcomes which indicate the direction in which the system is moving. Consideration also needs to be made as to which ‘trajectories are equitable, economically and ecologically desirable and achievable’ (Moffatt, 2000). Under these circumstances knowledge of outcomes (or indicators) is a

necessity to enable rational decisions to be made if the system is to be managed towards equilibrium.

It has been observed that the problem is not how to measure environmental or economic performance but rather how large amounts of data can be converted into a useful decision-making tool. Further difficulties arise with the measurement of social performance, where the indicators often arise from the acquisition of much more qualitative and subjective data (James, 1994).

The main functions of indicators are:

- to allow assessment of conditions and trends;
- to permit comparison between different places and situations;
- to assess the relationship between conditions and trends and goals and targets;
- to provide early warning information;
- to allow anticipation of future conditions and trends [Gallopín (1997)]

Gallopín further states (p15) that ‘desirable indicators are variables that summarise or otherwise simplify relevant information, make visible or perceptible phenomena of interest, and quantify, measure, and communicate relevant information.’ They may also be a mechanism for the promotion of cultural change within an organization, where consideration of sustainable development issues can begin to occur within the investment decisionmaking process (Wahurst, 2002).

Importantly the significance of the individual variable (or indicator) should extend beyond simply the measured value of the parameter and should:

- (1) provide an ability to reduce the number of measurements of variables or parameters which would be required to completely or exactly describe a given situation;
- (2) allow simplification of the communication process between those providing or taking the measurement and the end user, which could be a decision maker or simply a member of the broader community;
- (3) have the potential for long term consistency;
- (4) encompass an agreed scientific background, methodology and data to be used in their development, and ;
- (5) have a clearly defined goal for their use. (OECD, 1994, van Esch, 1997, Hammond et al, 1995)

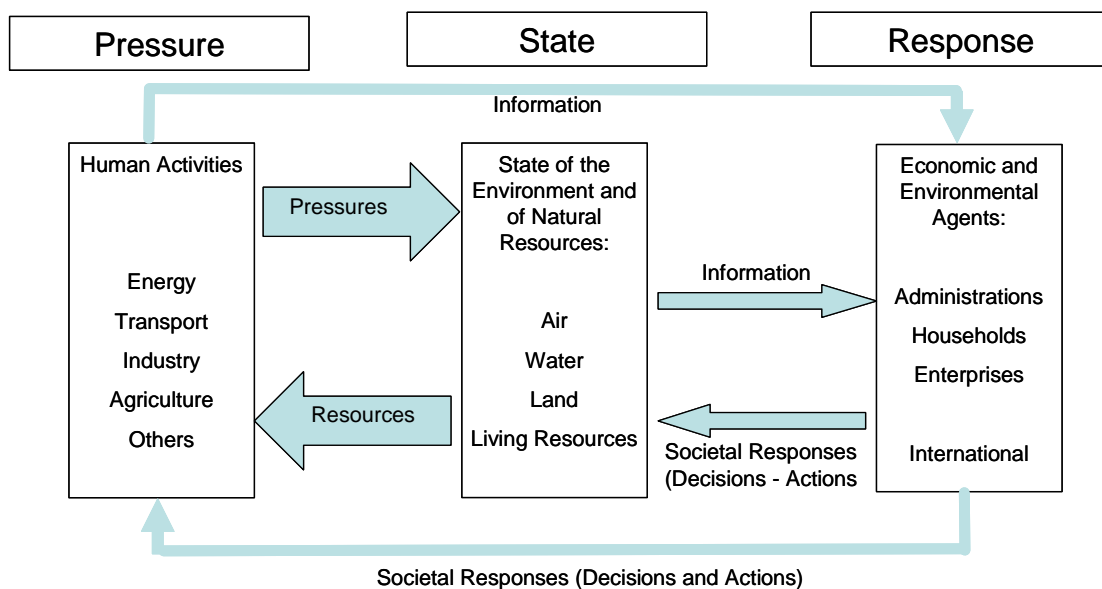
Because one of the intended consequences of indicator use is the simplification of reality, this ‘can be dangerous when dealing with a very complex ecosystem (Bell and Morse, 1999, p47). It becomes therefore ‘important that reporting organisations and those commissioning their reports remain alert to possible systematic distortions in the indicator systems’ (Bakkes, 1997, p384). Other criticisms of indicator use include:

- (1) lack of understanding of how economic, social and environmental forces interact results in difficulty in the establishment of cause and effect, in this situation the selection of appropriate indicators is problematic

- (2) while highly aggregated indicators allow intensification of problem awareness desegregated values are needed to determine coherent action
- (3) If causal relationships between indicator values and the underlying economic, social and environmental trends are not established then the indicators are simply statistics

As one of the more important uses of indicators is their ‘early-warning’ function, the use of ‘pressure’ indicators may enhance the ability to overcome the temporal lag inherent in many ecosystem effects, for example those leading to species extinction (Wahurst, 2002).

In the schematic Pressure-State-Response (PSR) model shown in Fig 3, indicator generation is the driving force for information flows that in turn result in action or decision responses. Without the existence of suitable indicators there is no mechanism to allow movement towards sustainability.



**Figure 3: Pressure-State-Response (PSR) Framework (Organisation for Economic Co-operation and Development (OECD), 1994)**

Indicator generation is also a necessary stage in the evolution of triple bottom line (TBL) reporting. TBL reporting is where environmental, social and financial outcomes for firms and organizations are given equality of recognition of their importance along with the interrelationships and interdependence between all three lines (Elkington, 1997; Elkington, 2002). TBL reporting is also a mechanism by which the overlay of governance, transparency and accountability required as the fourth sphere or pillar of sustainable development beyond environment, economics and society (Fig 2) can be provided.

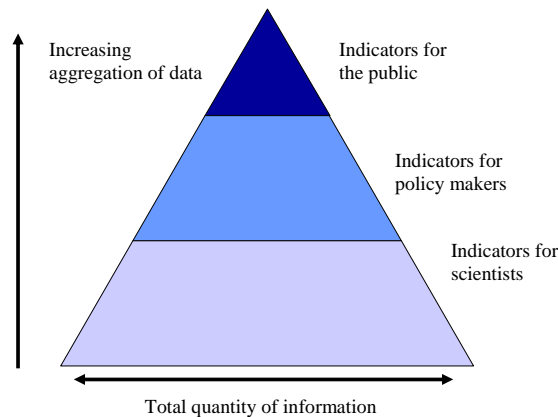
### Specific Indicator Design

Mitchell (1996) suggests some specific steps in designing effective SDIs . These are:

- (i) “define the purpose of the indicators and the user group
- (ii) state what is understood by the term sustainable development and specify the SD principles that the SDIs are to address

- (iii) define and distinguish the issues which are important locally and globally
- (iv) match indicator types to the indicator purpose and user group
- (v) evaluate the indicators against a set of explicit criteria” (p9)

Figure 4 shows a suggested information hierarchy for users which indicates increasing aggregation of information as the users progress from scientists to policy-makers and thence to informing and alerting the general public. Whereas policy makers and scientists may require precise technical information, it is proposed that it is often sufficient for the public to be provided with clear ‘resonant’ indicators that indicate that something is good or bad, improving or deteriorating.



**Figure 4: Information hierarchy, indicating a possible relationship between users and data complexity [redrawn from Braat (1991) in Mitchell (1996), p9]**

### Indicator types

Table 1 summarises the various types of indicators and suggests their applicabilities in reporting within the environmental, social and economic spheres. It is apparent from a reading of the literature that while the area of environmental reporting (and indicators) is well developed, there is little agreement on which social indicators are appropriate, even though it was claimed as early as 1972 that around 1000 social indicators existed and by 1981 there were ‘ten times that’ (Carley, 1981). While there is considerable and continuing activity in the field there is little consensus as to what appropriate social indicators would or should be. Wahurst (2002) states that ‘the development of corporate social performance and Sustainability Indicators is running at least a decade behind that of the development of environmental performance and Sustainability Indicators’ (p50).

Similarly in the field of economics many believe that the best known of the economic indicators including Gross Domestic Product (GDP), are not of much use in assessing real economic or social progress. Cobb et al (1995) suggests that GDP tells us very little, because it ‘does not distinguish between costs and benefits, between productive and destructive activities, or between sustainable and unsustainable ones’. They go on to cynically suggest that as assessed by GDP, “the happiest event is an earthquake. The most desirable habitat is a multi-billion dollar Superfund site’ (p65), in the case of both of these events simply because they cause money to change hands and GDP to increase. In turn Cobb et al (and others eg Hamilton (1999) in Australia) propose that economic indicators are incomplete until the externalities of social and environmental costs are included to develop so called ‘Genuine Progress Indicators’.

**Table 1: Summary of indicator types and their applicability (taken from Warhurst 2000, p35)**

Indicator Type	Overview	Environmental	Social	Economic
Descriptive	Descriptive indicators can relate to drivers, pressure, state, impact, or response (as set out in the DPSIR framework - see Table 2) across the three dimensions of sustainable development. Quantitative and qualitative descriptive indicators describe the factual situation, but do not assess whether this is good or bad - they are in practical terms a statement of fact	☑	☑	☑
Performance	Performance indicators compare the actual situation with targets, allowing progress towards such targets to be measured. Relevant targets include those set at national and international levels, and voluntary targets that relate to more explicitly to sustainable development	☑	☑	☑
Efficiency	Efficiency indicators provide insights into the efficiency of processes and product use. They are, therefore, largely limited to environmental applications at present	☑	☒	☒
Sustainable Reference Values	These relate to target levels of environmental quality set from the specific perspective of sustainable development. At present, only environmental SRVs are available, and these relate to acid deposition, and air quality (used by the European Environment Agency)	☑	☒	☒
Production	Production-related indicators are drawn from standard engineering approaches to process management and relate to both environmental and economic aspects of the production process. These indicators are limited in the scope of their application, representing as they do a narrow focus, largely internal to the company (the typical end-user)	☑	☒	☑
Regulatory	Regulatory indicators are drawn from consideration of legal compliance and typically are limited to the environmental dimension (e.g. release of pollutants to air, land and water). The use of regulatory indicators fails to capture the significance of moving 'beyond compliance' and are static relative to the kinetic sustainable development process	☑	☒	☒
Accounting	Accounting indicators may be used for internal or external reporting with a focus on liability management, and efficient and transparent tracking of costs associated with waste production, management and disposal	☑	☒	☑
Economic	Economic indicators can be used to value external environmental and social costs and allow their internalisation. These are potentially powerful tools and are an essential input to any lifecycle-based assessment of environmental performance	☑	☑	☑
Quality	Similar to production-related indicators, quality-based indicators have as their focal point waste minimization during the production process (assessed from dual aspects of costs savings and minimisation of pollutant release)	☑	☒	☑
Ecological	Ecological indicators relate to the local, regional, national and international impacts on ecosystem health resulting from all aspects of human activity	☑	☒	☒

## Global Reporting Initiative (GRI)

Notwithstanding the preceding comments on the difficulties of selection of suitable indicators many groups are attempting to develop or have developed and are refining comprehensive sustainability reporting guidelines (Wahurst, 2002). In particular those developed by the Global Reporting Initiative<sup>3</sup> (GRI, 2002) appear to have become a *de facto* standard for “best practice” in TBL reporting.

Since the release in 2002 of a generic set of reporting guidelines the GRI has begun to develop sector specific guidance to supplement the generic information elicited by the 2002 guidelines. These sectoral supplements are more closely aligned to the needs of individual sectors, with the aim of tailoring the reporting guidelines to the particular sustainability issues faced by industries in those sectors. The aim is by combining the Guidelines with the sectoral supplements to enable more robust and useful reporting and to extend the applicability and uptake of the GRI Guidelines across sectors and around the world (GRI, 2002). As yet these are not available for the electricity supply sector.

The 2002 generic GRI performance indicators are presented in Appendix A. The following comments are made by GRI with respect to these indicators:

*“The performance indicators are grouped under three sections covering the economic, environmental, and social dimensions of sustainability. This grouping is based on the conventional model of sustainable development and is intended to aid users of the Guidelines. However, limiting performance indicators to these three categories may not fully capture the performance of an organisation for a number of reasons. For example:*

- *changes in one aspect of economic, environmental, or social performance often result in changes to other aspects of sustainability;*
- *sustainability strategies often use one area of sustainability as a reference point when defining goals for another area; and*
- *advancing sustainable development requires coordinated movement across a set of performance measurements, rather than random improvement within the full range of measurements. Therefore, in addition to the economic, environmental, and social dimensions, a fourth dimension of information is necessary: integrated performance.’*(GRI, 2002, p44).

## GRI sector based reporting guidelines

Although the GRI has not developed sector based guidelines for the electricity supply sector, the supplement developed for the Mining and Metals Sector provides some guidance as to the scope of supplementation that might be expected to be developed in the future (GRI, 2004).

The Electricity Supply Association of Australia (ESAA) has developed sector based environmental performance reporting guidelines in association with Environment Australia based on the GRI model (ESAA, 2002b). These guidelines (Appendix B) include

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<sup>3</sup> ‘The Global Reporting Initiative (GRI) is a multi-stakeholder process and independent institution whose mission is to develop and disseminate globally applicable Sustainability Reporting Guidelines. These guidelines are for voluntary use by organisations for reporting on the economic, environmental, and social dimensions of their activities, products, and services. The GRI incorporates the active participation of representatives from business, accountancy, investment, environmental, human rights research and labour organisations from around the world. Started in 1997 by the Coalition for Environmentally Responsible Economies (CERES), the GRI became independent in 2002, and is an official collaborating centre of the United Nations Environment Programme (UNEP) and works in cooperation with UN Secretary-General Kofi Annan’s Global Compact’ (GRI, 2003)

comprehensive issue and indicator lists for the different sectors of the electricity industry. The guidelines also acknowledge that while there are commonalities within the different sectors of the electricity industry that companies should use the lists ‘as a guide for developing their own issue and indicator sets that are relevant to their business’ (ESAA, 2002a, p16).

The environmental performance indicators recommended by ESAA are refined and integrated into a further framework for triple bottom line reporting (Appendix C (ESAA, 2000a), a format that includes additional financial and social performance indicators. These latter are much less well developed than the environmental indicators, confirming the conclusions of Warhurst (2002) stated earlier.

Comparison of the recommended ESAA and GRI Performance Guidelines (Appendices A and C) shows that in most cases those developed by ESAA comply with or exceed the substance of the GRI recommendations. The codes for the matching GRI Guidelines are noted in the corresponding rows for the Table in Appendix C.

### **Possible deficiencies in the ESAA Guidelines**

The possible absence of indicators for the emission of toxic trace elements from combustion is noteworthy. It is apparent for some elements that although they form only a minor component of the fuel, the large tonnages combusted ensures that electricity generation is a significant component of nationally identified point sources (NPI, 2003a, 2003b). The reporting deficiency identified could be overcome by including in GRI Core Indicator EN<sub>10</sub> all toxic element emissions which require reporting to the Australian National Reporting Inventory (NPI).

In contrast, the generation of solid wastes such as flyash is captured by indicators in the ESAA Guidelines which mirror GRI EN<sub>11</sub> (Appendices A and C). These require total waste, by type (hazardous, non-hazardous) and destination (reused, recycled, landfilled, destroyed) to be compiled and described in absolute terms (annual tonnes), in relation to energy production (tonnes/GWh sent out) and recycled and reused (as a % of ash production). A similar description would be appear to be appropriate for toxic element emissions.

Scrutiny of the guidelines suggested by both GRI and ESAA also demonstrates that while effects or effectiveness are to be measured extensively, integrated, systemic or cross-cutting indicators are notable by their absence. Although these indicators are more difficult to conceptualise and develop, it is believed that these indices may provide a more enlightening view of the ‘good’ which the industry or facility provides. Integrating indicators may for example aid the assessment whole of life costs for processes, to allow comparison not only with alternatives but with the real cost of replacement of existing facilities; to quantify the societal costs of emissions or loss of amenity.

An important aspect of the advancement of sustainability is the development of participatory processes where stakeholders are integral to the process of indicator development. While the ESAA Guidelines acknowledge the importance of stakeholder involvement (2002c, p10), there is a notable absence of stakeholders other than their own members in the indicator development which has taken place to date. The “experts” in the process have developed the indicators rather than being the facilitators of stakeholder education and engagement. It maybe that additional or a wider spectrum of stakeholders

would see the development of a different (but possibly complementary) suite of indicators to those which have been currently proposed.

## Conclusions

- Sustainability and sustainable development have been defined in many ways. The common thread linking these definitions is the aim to produce an interrelationship between the environment, the economy and society where the opportunities of future generations are not compromised by decisions made by today's society.
- WSSD (2002) in Johannesburg recognized that inequity is often the driver for environmental, financial or societal instability. The Conference sought to improve sustainability in part by a 'bottom up' process of poverty eradication and natural resource management and the removal of inequities.
- While industries dependent on non-renewable resources are demonstrably not sustainable, they have an important role to play both in maintaining society as it is currently configured and providing a base from which to establish sustainable replacements. The role may be as facilitators using some of the bounty from non-renewable exploitation to reconfigure these industries into renewables users.
- Progress towards sustainability requires the development of indicators to allow progress to be tracked and managed. The use of 'pressure' indicators may allow effective early warning of potential ecosystem instabilities.
- Triple bottom line reporting by industries of their environmental, social and financial effects promotes the importance of all three spheres and provides a mechanism for governance, transparency and accountability of sustainability.
- Indicators of effects and effectiveness are well developed particularly in the environmental sphere. Social and economic indicators which reflect 'real' progress towards sustainability are not as immediately apparent.
- Sustainability reporting guidelines have been developed and are continuing to be refined. Sectorally tailored guidelines are being developed. The guidelines put forward by the Global Reporting Initiative (GRI) appear to have become the *de facto* standard for triple bottom line reporting.
- GRI acknowledge the limitations of the guidelines in completely capturing performance, particularly because of interactions between the environment, economic and social spheres where an improvement in one area can result in deterioration of another.
- ESAA has developed a recommended set of sector based performance guidelines for the electricity industry, which for the most part comply or exceed the GRI standard.
- A notable omission from the ESAA recommendations is the failure to explicitly include emissions of toxic trace elements. These could be appropriately indicated by reporting emissions which are required to be reported under the National Pollutant Inventory.
- Both the ESAA and GRI recommended indicator series appear to fail to include indicators which capture societal costs beyond effects and effectiveness.
- The ESAA indicators were developed in the absence of stakeholder participation beyond its own membership.

## Recommendation

Tasks 2.1 and 6.1 both contain tasks which when originally formulated required the identification and development of environmental indicators for the coal-fired generation sector. This review of the available literature and discussions with those involved in the generation industry suggests that it would be imprudent for CCSD to independently develop indicators for an industry which is not only national but international in its scope. Not only would the independently developed indicators have little status but may also cut across efforts in national and international indicator development, resulting in duplication and further diminution of their usefulness.

The view has been formed that it is not the role of the CCSD to dictate the appropriate indicators to be reported by the generation sector and that a more appropriate way of CCSD and the Australian industry having an input into indicator development may be by direct involvement in the Global Reporting Initiative (GRI).

The GRI is a multi-stakeholder process and independent institution whose mission is to develop and disseminate globally applicable Sustainability Reporting Guidelines. These Guidelines are for voluntary use by organisations for reporting on the economic, environmental, and social dimensions of their activities, products, and services. The GRI incorporates the active participation of representatives from business, accountancy, investment, environmental, human rights, research and labour organisations from around the world. Started in 1997 by the Coalition for Environmentally Responsible Economies (CERES), the GRI became independent in 2002, and is an official collaborating centre of the United Nations Environment Programme (UNEP) and works in cooperation with UN Secretary-General Kofi Annan's Global Compact.

The generic 2002 Guidelines developed by the GRI have become the *de facto* international minimum reporting standard for triple bottom line reporting on sustainability outcomes. The generic guidelines are currently being supplemented by sectoral supplements which enable more robust and useful reporting to occur for individual sectors. This increased relevance will over time extend the applicability and uptake of sustainability reporting.

Since the release in 2002 of a generic set of reporting guidelines the GRI has begun to develop sector specific guidance to supplement the generic information elicited by the 2002 guidelines. These sectoral supplements are more closely aligned to the needs of individual sectors, with the aim of tailoring the reporting guidelines to the particular sustainability issues faced by industries in those sectors. The aim is by combining the Guidelines with the sectoral supplements to over time enable more robust and useful reporting and to extend the applicability and uptake of the GRI Guidelines across sectors and around the world (GRI, 2002).

As yet a sector supplement is not available for the electricity supply sector. A Mining and Metals Supplement has been developed and is currently being revised following a period of public consultation with release of the revised version scheduled for December 2004. At a seminar on 26<sup>th</sup> August, Alyson Slater, GRI, Associate Director of Communications, indicated that development in the near future of a supplement for the Oil and Energy sectors was a relatively high priority.

CCSD could have a ‘seat at the table’ in the development of the sector supplement by becoming an Organisational Stakeholder of the GRI<sup>4</sup>. If the development of the Mining and Metals Supplement is a guide for the process to be used in the Energy sector it is likely that the GRI will convene a multi-stakeholder working group with the purpose of developing an Oil and Energy Sector Supplement to the Guidelines. This Supplement will deal with economic, environmental, and social performance indicators specific to the oil and energy industry. By becoming a member of GRI, it would be possible for CCSD to inform and seek input from the participants in CCSD as part of the supplement indicator development process.

Annual cost of becoming an Organisational Stakeholder is modest (€500 for annual turnovers < €9M). Further information on the benefits of membership is available from the GRI website: <http://www.globalreporting.org>. Membership would be a tangible demonstration of the commitment of CCSD to the sustainability ethos.

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<sup>4</sup> At the December 2004 ISG meeting this recommendation was discussed with the view being formed that it would be preferable for power generators to participate in the GRI, either directly or collectively via the ESAA. The presumption was that CCSD would be able to assist in the research effort needed to underpin this engagement.

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## APPENDIX A: GRI 2002 Performance Indicators

### *Economic Performance Indicators*

Core Indicators	Additional Indicators
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#### DIRECT ECONOMIC IMPACTS

#### *Customers*

<p><b>Monetary flow indicator:</b>  <b>EC<sub>1</sub>. Net sales.</b>                      As listed in the profile section under 2.8</p>	
<p><b>EC<sub>2</sub>. Geographic breakdown of markets</b>                      For each product or product range, disclose national market share by country where this is 25% or more. Disclose market share and sales for each country where sales represent 5% or more of GDP.</p>	

#### *Suppliers*

<p><b>Monetary flow indicator:</b>  <b>EC<sub>3</sub>. Cost of all goods, materials, and services purchased.</b></p>	<p><b>EC<sub>11</sub>. Supplier breakdown by organisation and country.</b>                      List all suppliers from which purchases in the reporting period represent 10% or more of total purchases in that period. Also identify all countries where total purchasing represents 5% or more of GDP.</p>
<p><b>EC<sub>4</sub>. Percentage of contracts that were paid in accordance with agreed terms, excluding agreed penalty arrangements.</b>                      Terms may include conditions such as scheduling of payments, form of payment, or other conditions. This indicator is the percent of contracts that were paid according to terms, regardless of the details of the terms.</p>	

#### *Employees*

<p><b>Monetary flow indicator:</b>  <b>EC<sub>5</sub>. Total payroll and benefits (including wages, pension, other benefits, and redundancy payments) broken down by country or region.</b>                      This remuneration should refer to current payments and not include future commitments                      (Note: Indicator LA<sub>9</sub> on training also offers information on one aspect of the organisation's investment in human capital.)</p>	
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#### *Providers of Capital*

<p><b>Monetary flow indicator:</b>  <b>EC<sub>6</sub>. Distributions to providers of capital broken down by interest on debt and borrowings, and dividends on all classes of shares, with any arrears of preferred dividends to be disclosed.</b>                      This includes all forms of debt and borrowings, not only long-term debt.</p>	
<p><b>EC<sub>7</sub>. Increase/decrease in retained earnings at end of period.</b>                      (Note: the information contained in the profile section (2.1-2.8) enables calculation of several measures, including ROACE (Return On Average Capital Employed).</p>	

### *Public Sector*

<p><b>Monetary Flow Indicators:</b> <b>EC<sub>8</sub>. Total sum of taxes of all types paid broken down by country.</b></p>	<p><b>EC<sub>12</sub>. Total spend on non-core business infrastructure development.</b> This is infrastructure built outside the main business activities of the reporting entity such as a school, or hospital for employees and their families.</p>
<p><b>EC<sub>9</sub>. Subsidies received broken down by country or regions.</b> This refers to grants, tax relief, and other types of financial benefits that do not represent a transaction of goods and services.  Explain definitions used for types of groups.</p>	
<p><b>EC<sub>10</sub>. Donations to community, civil society, and other groups broken down in terms of cash and in-kind donations per type of group.</b></p>	

### INDIRECT ECONOMIC IMPACTS

	<p><b>EC<sub>13</sub>. The organisation's indirect economic impacts.</b> Identify major externalities associated with the reporting organisation's product and services.</p>
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### *Environmental Performance Indicators*

Core Indicators	Additional Indicators
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#### *Materials*

<p><b>EN<sub>1</sub>. Total materials use other than water, by type.</b> Provide definitions used for types of materials. Report in tonnes, kilograms, or volume.</p>	
<p><b>EN<sub>2</sub>. Percentage of materials used that are wastes (processed or unprocessed) from sources external to the reporting organisation.</b> Refers to both post-consumer recycled materials and waste from industrial sources. Report in tonnes, kilograms, or volume.</p>	

#### *Energy*

<p><b>EN<sub>3</sub>. Direct energy use segmented by primary source.</b> Report on all energy sources used by the reporting organisation for its own operations as well as for the production and delivery of energy products (e.g. electricity or heat) to other organisations. Report in joules.</p>	<p><b>EN<sub>17</sub>. Initiatives to use renewable energy sources and to increase energy efficiency.</b></p>
	<p><b>EN<sub>18</sub>. Energy consumption footprint (i.e. annualised lifetime energy requirements) of major products.</b> Report in joules.</p>
<p><b>EN<sub>4</sub>. Indirect energy use.</b> Report on all energy used to produce and deliver energy products purchased by the reporting organisation (e.g. electricity or heat). Report in joules.</p>	<p><b>EN<sub>19</sub>. Other indirect (upstream/downstream) energy use and implications, such as organisational travel, products life cycle management, and use of energy-intensive materials.</b></p>

#### *Water*

<p><b>EN<sub>5</sub>. Total water use.</b></p>	<p><b>EN<sub>20</sub>. Water sources and related ecosystems/habitats significantly affected by use of water.</b> Include Ramsar-listed wetlands and the overall contribution to resulting environmental trends.</p>
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	<p><b>EN<sub>21</sub>. Annual withdrawals of ground and surface water as a percent of annual renewable quantity of water available from the sources.</b> Breakdown by region.</p>
	<p><b>EN<sub>22</sub>. Total recycling and reuse of water.</b> Include wastewater and other used water (e.g. cooling water).</p>

**Biodiversity**

<p><b>EN<sub>6</sub>. Location and size of land owned, leased, or managed in biodiversity-rich habitats.</b> Further guidance on biodiversity-rich habitats may be found at <a href="http://www.globalreporting.org/forthcoming">www.globalreporting.org/forthcoming</a>.</p>	<p><b>EN<sub>23</sub>. Total amount of land owned, leased, or managed for production activities or extractive use.</b></p>
<p><b>EN<sub>7</sub>. Description of the major impacts on biodiversity associated with activities and/or products and services in terrestrial, fresh-water, and marine environments.</b></p>	<p><b>EN<sub>24</sub>. Amount of impermeable surface as a percentage of land purchase or leased.</b></p>
	<p><b>EN<sub>25</sub>. Impacts of activities and operations on protected and sensitive areas.</b> (e.g. IUCN protected area categories 1-4, world heritage sites, and biosphere reserves).</p>
	<p><b>EN<sub>26</sub>. Changes to natural habitats resulting from activities and operations and percentage of habitat protected or restored.</b> Identify type of habitat affected and its status.</p>
	<p><b>EN<sub>27</sub>. Objectives, programmes, and targets for protecting and restoring native ecosystems and species in degraded areas.</b></p>
	<p><b>EN<sub>28</sub>. Number of IUCN Red List species with habitats in areas affected by operations.</b></p>
	<p><b>EN<sub>29</sub>. Business units currently operating or planning operations in or around protected or sensitive areas.</b></p>

**Emissions, Effluents, and Waste**

<p><b>EN<sub>8</sub>. Greenhouse gas emissions.</b> (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>). Report separate subtotals for each gas in tonnes and in tonnes of CO<sub>2</sub> equivalent for the following:</p> <ul style="list-style-type: none"> <li>• Direct emissions from sources owned or controlled by the reporting entity</li> <li>• Indirect emissions from imported electricity heat or steam</li> </ul> <p>See WRI-WBCSD Greenhouse Gas Protocol.</p>	<p><b>EN<sub>30</sub>. Other relevant indirect greenhouse emissions.</b> (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFCs, PFCs, SF<sub>6</sub>). Refers to emissions that are a consequence of the activities of the reporting entity, but occur from sources owned or controlled by another entity. Report in tonnes of gas and tonnes of CO<sub>2</sub> equivalent. See WRI-WBCSD Greenhouse Gas Protocol.</p>
<p><b>EN<sub>9</sub>. Use and emissions of ozone-depleting substances.</b> Report each figure separately in accordance with Montreal Protocol Annexes A, B, C, and E in tonnes of CFC-11 equivalents (ozone-depleting potential).</p>	<p><b>EN<sub>31</sub>. All production, transport, import, or export of any waste deemed ‘hazardous’ under the terms of the Basel Convention Annex I, II, III and VIII.</b></p>
<p><b>EN<sub>10</sub>. NO<sub>x</sub>, SO<sub>x</sub>, and other significant air emissions by type.</b> Include emissions of substances regulated under:</p> <ul style="list-style-type: none"> <li>• Local laws and regulations</li> <li>• Stockholm POPs Convention (Annex A, B,</li> </ul>	<p><b>EN<sub>32</sub>. Water sources and related ecosystems/habitats significantly affected by discharges of water and runoff.</b> Include Ramsar-listed wetlands and the overall contribution to resulting environmental trends. See GRI Water Protocol.</p>

<ul style="list-style-type: none"> <li>and C)-persistent organic pollutants</li> <li>• Rotterdam Convention on Prior Informed Consent (PIC)</li> <li>• Helsinki, Sofia, and Geneva Protocols to the Convention on Long-Range Trans-boundary Air Pollution.</li> </ul>	
<p><b>EN<sub>11</sub>. Total amount of waste by type and destination.</b>  “Destination” refers to the method by which waste is treated, including composting, reuse, recycling, recovery, incineration, or land filling. Explain type of classification method and estimation method.</p>	
<p><b>EN<sub>12</sub>. Significant discharges to water by type.</b>  See GRI Water Protocol.</p>	
<p><b>EN<sub>13</sub>. Significant spills of chemical, oils, and fuels in terms of total number and total volume.</b>  Significance is defined in terms of both the size of the spill and impact on the surrounding environment.</p>	

***Suppliers***

	<p><b>EN<sub>33</sub>. Performance of supplies relative to environmental components of programmes and procedures described in response to Governance Structure and Management Systems section (Section 3.16).</b></p>
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***Products and Services***

<p><b>EN<sub>14</sub>. Significant environmental impacts of principal products and services.</b>  Describe and quantify where relevant.</p>	
<p><b>EN<sub>15</sub>. Percentage of the weight of products sold that is reclaimable at the end of the products’ useful life and percentage that is actually reclaimed.</b>  “Reclaimable” refers to either the recycling or reuse of the product materials or components.</p>	

***Compliance***

<p><b>EN<sub>16</sub>. Incidents of and fines for non-compliance with all applicable international declarations/conventions/treaties, and national, sub-national, regional, and local regulations associated with environmental issues.</b>  Explain in terms of countries of operation.</p>	
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***Transport***

	<p><b>EN<sub>34</sub>. Significant environmental impacts of transportation used for logistical purposes.</b></p>
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***Overall***

	<p><b>EN<sub>35</sub>. Total environmental expenditures by type.</b>  Explain definitions used for types of expenditures.</p>
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***Social Performance Indicators: Labour Practices and Decent Work***

Core Indicators	Additional Indicators
<b><i>Employment</i></b>	
<p><b>LA<sub>1</sub>.</b> Breakdown of workforce, where possible, by region/country. Status (employed/non-employee), employment types (full time/part time), and by reemployment contract (indefinite or permanent/fixed term or temporary). Also identify workforce retained in conjunction with other employers (temporary agency workers or workers in co-employment relationships), segmented by region/country.</p>	<p><b>LA<sub>12</sub>.</b> Employee benefits beyond those legally mandated. (e.g. contributions to health care, disability, maternity, education and retirement).</p>
<p><b>LA<sub>2</sub>.</b> Net employment creation and average turnover segmented by region/country.</p>	
<b><i>Labour/Management Relations</i></b>	
<p><b>LA<sub>3</sub>.</b> Percentage of employees represented by independent trade union organisations or other bona fide employee representatives broken down geographically OR percentage of employees covered by collective bargaining agreements break down by region/country.</p>	<p><b>LA<sub>13</sub>.</b> Provisions for formal worker representation in decision-making or management, including corporate governance.</p>
<p><b>LA<sub>4</sub>.</b> Policy and procedures involving information, consultation, and negotiation with employees over changes in the reporting organisation's operations (e.g. restructuring).</p>	
<b><i>Health and Safety</i></b>	
<p><b>LA<sub>5</sub>.</b> Practices on recording and notification of occupational accidents and diseases, and how they related to the ILO Code of Practice on Recording and Notification of Occupational Accidents and Diseases.</p>	<p><b>LA<sub>14</sub>.</b> Evidence of substantial compliance with the <i>ILO Guidelines for Occupational Health Management Systems</i>.</p> <p><b>LA<sub>15</sub>.</b> Description of formal agreements with trade unions or other bona fide employees representatives covering health and safety at work and proportion of the workforce covered by any such agreements.</p>
<p><b>LA<sub>6</sub>.</b> Description of formal joint health and safety committees comprising management and worker representatives and proportion of workforce covered by any such committees.</p>	
<p><b>LA<sub>7</sub>.</b> Standard injury, lost day, and absentee rates and number of work-related fatalities (including subcontracted workers).</p>	
<p><b>LA<sub>8</sub>.</b> Description of policies or programmes (for the workplace and beyond) on HIV/AIDS.</p>	
<b><i>Training and Education</i></b>	
<p><b>LA<sub>9</sub>.</b> Average hours of training per year per employee by category of employee. (e.g. Senior management, middle management, professional, technical, administrative, production, and maintenance).</p>	<p><b>LA<sub>16</sub>.</b> Description of programmes to support the continued employability of employees and to manage career endings.</p> <p><b>LA<sub>17</sub>.</b> Specific policies and programmes for skills management or for lifelong learning.</p>
<b><i>Diversity and Opportunity</i></b>	
<p><b>LA<sub>10</sub>.</b> Description of equal opportunity policies or programmes, as well as monitoring systems to ensure compliance and results of monitoring. Equal opportunity policies may address workplace harassment and affirmative action relative to historical patterns of discrimination.</p>	

<p><b>LA<sub>11</sub>. Composition of senior management and corporate governance bodies (including the board of directors), including female/male ratio and other indicators of diversity as culturally appropriate.</b></p>	
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***Social Performance Indicator: Human Rights***

Core Indicators	Additional Indicators
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***Strategy and Management***

<p><b>HR<sub>1</sub>. Description of policies, guidelines, corporate structure, and procedures to deal with all aspects of human rights relevant to operations, including monitoring mechanisms and results.</b> State how policies relate to existing international standards such as the Universal Declaration and the Fundamental Human Rights Conventions of the ILO.</p>	<p><b>HR<sub>8</sub>. Employee training on policies and practices concerning all aspects of human rights relevant to operations.</b> Include type of training number of employees trained, and average training duration.</p>
<p><b>HR<sub>2</sub>. Evidence of consideration of human impacts as part of investment and procurement decisions, including selection of suppliers/contractors.</b></p>	
<p><b>HR<sub>3</sub>. Description of policies and procedures to evaluate and address human rights performance within the supply chain and contractors, including monitoring systems and results of monitoring.</b> “Human rights performance” refers to the aspects of human rights identified as reporting aspects in the GRI performance indicators.</p>	

***Non-discrimination***

<p><b>HR<sub>4</sub>. Description of global policy and procedures/programmes prevention all forms of discrimination in operations, including monitoring systems and results of monitoring.</b></p>	
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***Freedom of Association and Collective Bargaining***

<p><b>HR<sub>5</sub>. Description of free of association policy and extent to which this policy is universally applied independent of local laws, as well as description of procedures/programmes to address this issue.</b></p>	
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***Child Labour***

<p><b>HR<sub>6</sub>. Description of policy excluding child labour as defined by the ILO Convention 138 and extent to which this policy is visibly stated and applied, as well as description of procedures/programmes to address this issue, including monitoring systems and results of monitoring.</b></p>	
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***Forced and Compulsory Labour***

<p><b>HR<sub>7</sub>. Description of policy to prevent forced and compulsory labour and extent to which this policy is visibly stated and applied as well as description of procedures/programmes to address this issue, including monitoring systems and results of monitoring.</b> See ILO Convention No. 29. Article 2.</p>	
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***Disciplinary Practices***

	<b>HR<sub>9</sub>. Description of appeal practices, including, but not limited to, human rights issues.</b> Describe the representation and appeal process.
	<b>HR<sub>10</sub>. Description of non-retaliation policy and effective confidential employee grievance system (including, but not limited to, its impact on human rights).</b>

***Security Practices***

	<b>HR<sub>11</sub>. Human rights training for security personnel.</b> Include type of training, number of persons trained, and average training duration.
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***Indigenous Rights***

	<b>HR<sub>12</sub>. Description of policies, guidelines, and procedures to address the needs of indigenous people.</b> This includes indigenous people in the workforce and in communities where the organisation currently operates or intends to operate.
	<b>HR<sub>13</sub>. Description of jointly managed community grievance mechanisms/authority.</b>
	<b>HR<sub>14</sub>. Share of operating revenues from the areas of operations that are redistributed to local communities.</b>

***Social Performance Indicators: Society***

Core Indicators	Additional Indicators
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***Community***

<b>SO<sub>1</sub>. Description of policies to manage impacts on communities in areas affected by activities, as well as description of procedures/programmes to address this issue, including monitoring systems and results of monitoring.</b> Include explanation of procedure for identifying and engaging in dialogue with community stakeholders.	<b>SO<sub>4</sub>. Awards received relevant to social, ethical, and environmental performance.</b>
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***Bribery and Corruption***

<b>SO<sub>2</sub>. Description of the policy, procedures/management systems, and compliance mechanisms for organisations and employees addressing bribery and corruption.</b> Include a description of how the organisation meets the requirement of the OECD Conventions on Combating Bribery.	
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***Political Contributions***

<b>SO<sub>3</sub>. Description of the policy, procedures/management systems, and compliance mechanisms for managing political lobbying and contributions.</b>	<b>SO<sub>5</sub>. Amount of money paid to political parties and institutions whose prime function is to fund political parties or their candidates.</b>
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***Competition and Pricing***

	<b>SO<sub>6</sub>. Court decisions regarding cases pertaining to anti-trust and monopoly regulations.</b>
	<b>SO<sub>7</sub>. Description of policy, procedures/management systems, and compliance</b>

	mechanisms for preventing anti-competitive behaviour.
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***Social Performance indicators: Product Responsibility***

Core Indicators	Additional Indicators
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***Customer Health and Safety***

<p><b><i>PR<sub>1</sub></i></b>. Description of policy for preserving customer health and safety during use of products and services, and extent to which this policy is visibly stated and applied, as well as description of procedures/programmes to address this issue, including monitoring systems and results of monitoring. Explain rationale for any use of multiple standards in marketing and sales of products.</p>	<p><b><i>PR<sub>4</sub></i></b>. Number and type of instances of non-compliance with regulations concerning customer health and safety, including then penalties and fines assessed for these breaches.</p>
	<p><b><i>PR<sub>5</sub></i></b>. Number of complaints upheld by regulatory or similar official bodies to oversee or regulate the health and safety of products and services.</p>
	<p><b><i>PR<sub>6</sub></i></b>. Voluntary code compliance, product labels or awards with respect to social and/or environmental responsibility that the reporter is qualified to use or has received. Include explanation of the process and criteria involved.</p>

***Products and Services***

<p><b><i>PR<sub>2</sub></i></b>. Description of policy, procedures/management systems, and compliance mechanisms related to product information and labelling.</p>	<p><b><i>PR<sub>7</sub></i></b>. Number and type of instances of non-compliance with regulations concerning product information and labelling, including any penalties or fines assessed for these breaches.</p>
	<p><b><i>PR<sub>8</sub></i></b>. Description of policy, procedures/management systems, and compliance mechanisms related to customer satisfaction, including results of surveys measuring customer satisfaction. Identify geographic areas covered by policy.</p>

***Advertising***

	<p><b><i>PR<sub>9</sub></i></b>. Description of policies, procedures/management systems, and compliance mechanisms for adherence to standards and voluntary codes related to advertising. Identify geographic areas covered by policy.</p>
	<p><b><i>PR<sub>10</sub></i></b>. Number and types of breaches of advertising and marketing regulations.</p>

***Respect for Privacy***

<p><b><i>PR<sub>3</sub></i></b>. Description of policy, procedures/management systems, and compliance mechanisms for consumer privacy. Identify geographic areas covered by policy.</p>	<p><b><i>PR<sub>11</sub></i></b>. Number of substantiated complaints regarding breaches of consumer privacy.</p>
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**APPENDIX B: Recommended ESAA Environmental Performance Indicator  
Guidelines for the Australian Electricity Industry (ESAA, 2002b)**

<b>Performance Indicators - Management</b>			
Legislative compliance	Total number of incidents reported to environmental regulators	No.	Indicate nature of problem
	Number of written warnings or infringement notices received	No.	Indicate nature of problem
	Penalties for non-compliance	\$	Where appropriate provide explanatory notes to indicate why penalties were not imposed by the regulator.
Environmental management	ESAA Code of Practice Audit results	Average score for audit; Score for each section of the ESAA audit, benchmarked against industry averages	ESAA Code of Environmental Practice audit protocol
	Fraction of activity with EMS to ISO 14001 (divided into certified and not certified)	% (based on number of employees, work areas or other indicators)	
	Environmental expenditure	\$	Must include an indication of what considered to be "environmental expenditure"
Complaints	Number of complaints/inquiries received	No.	Define complaints/inquiries Categorise by issue where possible.
	% of complaints / inquiries resolved.	No.	Categorise by issue where possible

<b>Performance Indicators – Thermal generation</b>			
Greenhouse	Greenhouse gas (including SF6)	Tonnes (CO <sub>2</sub> equivalents) Tonnes/GWh of electricity sent out	International Greenhouse Gas Protocol or National Greenhouse Gas Inventory Methodology Workbook
Emissions to air	NOx emissions	Tonnes Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
	SOx emissions	Tonnes (SO <sub>2</sub> Equivalents) Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
	Dust (particulate) emissions (based on PM10)	Tonnes Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
	Carbon monoxide emissions	Tonnes Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
Water Consumption	Net water consumption all sources (water consumed or degraded from its original quality so that it is not available to other users)	M Litres M Litres/GWh electricity sent out	GRI Water Protocol: water is classed as used if it is discharged to a saline environment or rendered purposes.
	Net water consumption or use from all sources (eg. surface water, groundwater, recycled waste water)	M Litres M Litres/GWh electricity sent out	GRI Water Protocol: water is classed as used if it is discharged to a saline environment or rendered unusable for other purposes.
	Influence on water flows surface or groundwater)	Average intake or outflow rate (ML/day) as a % of average flow rate of water course (ML/day)	If possible, measure on a monthly basis and average over the year.
Energy consumption	Total energy consumption by fuel source (eg. coal, oil, diesel)	Joules (J) or GWh	GRI Energy Protocol
	Thermal Efficiency	% (Electricity sent out/fuel consumed)	Australian Greenhouse Office “Generator Efficiency Standard Program Guidelines”
	Consumption of recycled fuels (eg, refuse derived fuel, waste oil)	% of total fuel consumption (J or GWh)	GRI Energy Protocol
	Energy consumed in-station	Joules or GWh % (Joules/total fuel consumption)	
Solid & liquid waste	Total waste, by type hazardous, non-hazardous) and destination (reused, recycled, landfilled, destroyed)	Tonnes Tonnes/GWh of electricity sent out	Relevant state and federal legislation
	Oil recycled	% of waste oil produced	
	Ash recycled	% of ash produced	
Hazardous substances	PCBs (scheduled and nonscheduled) released to the environment, removed, captured & destroyed	tonnes	National PCB Management Plan and state regulations

Land use	Total amount of land used for power generation activities (excluding buffer zones)	Hectares Hectares/GWh of electricity sent out	
	Ratio of land rehabilitated to land used	Land rehabilitated as a % of land used for power generation	“Rehabilitation” includes land that is subject to special management measures to improve its ecological value, including tree planting, conservation or rehabilitation.
Water quality	Compliance with water quality discharge licence conditions. <i>If specific water quality indicators are desired, these could be selected from the list provided under Section 3.3: Performance Indicators for Renewable Generation.</i>		Water quality issues may be incorporated into the general legislative compliance indicator.

<b>Performance Indicators – Renewable generation</b>			
Renewable energy	Renewable energy produced	GWh sent out	
Greenhouse	Greenhouse gas emissions (including SF6)	Tonnes (CO2 equivalents) Tonnes/GWh of electricity sent out	International Greenhouse Gas Protocol or National Greenhouse Gas Inventory Methodology Workbook
Emissions to air	NOx emissions	Tonnes Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
	SOx emissions)	Tonnes (SO2 Equivalents) Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
	Dust (particulate) emissions (based on PM10)	Tonnes Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
	Carbon monoxide emissions	Tonnes Tonnes/GWh of electricity sent out	National Pollutant Inventory Guidelines
Water consumption	Net water consumption all sources (water consumed or degraded from its original quality so that it is not available to other users)	M Litres M Litres/GWh electricity sent out	GRI Water Protocol Water is classed as used if it is discharged to a saline environment or rendered unusable for other purposes
Biodiversity & land management	Total amount of land used for power generation activities (excluding buffer zones)	Hectares Hectares/GWh of electricity sent out	GRI Biodiversity Protocol
	Location, size and % of land owned, leased or managed in “biodiversity rich” habitats (protected habitats or habitats recognised as being of ecological significance)	Hectares, %	GRI Biodiversity Protocol

	Ratio of land rehabilitated to land used	Land rehabilitated as a % of land used for power generation	“Rehabilitation” includes land that is subject to special management measures to improve its ecological value, including tree planting, conservation or rehabilitation.
Water quality	Nutrient levels	Total phosphorous and/or nitrogen (mg/l) Phosphorous and/or nitrogen (mg/l) compared to upstream levels	Relevant state legislation
	Algal levels	Chlorophyll (ug/l) Chlorophyll compared to upstream levels	
	Sediment suspension levels	Suspended solids (mg/l) Suspended solids compared to upstream levels	
	Turbidity NTU	NTU compared to upstream levels	
Water quality	Nutrient levels	Total phosphorous and/or nitrogen (mg/l) Phosphorous and/or nitrogen (mg/l) compared to upstream levels	Relevant state legislation
	Algal levels	Chlorophyll (ug/l) Chlorophyll compared to upstream level	
	Sediment suspension levels	Suspended solids (mg/l) Suspended solids compared to upstream levels	
	Turbidity NTU	NTU compared to upstream levels	
	Salinity TDS (mg/l)	TDS compared to upstream levels	
	Alkalinity pH	pH compared to upstream levels	
	Colour Pt/Co	Colour compared to upstream levels	
	Temperature Degrees Celsius	Temperature compared to upstream levels	
Visual impact	Location, size and % of land owned, leased or managed in “visually sensitive” areas	Hectares, %	
Solid and liquid waste	Total waste, by type (hazardous, non-hazardous) and destination (reused, recycled, landfilled)	Tonnes Tonnes/GWh of electricity sold	Relevant state legislation
Hazardous substances	PCBs released to the environment PCBs removed, captured or destroyed	Tonnes	National PCB Management Plan and state regulations
Energy consumption	Total energy consumption by fuel source (eg. Electricity, coal, oil, diesel)	Joules or GWh Joules/GWh of electricity sent out	GRI Energy Protocol

<b>Performance Indicators – Networks (Transmission and Distribution)</b>			
Energy efficiency	Transmission and distribution losses	GWh GWh/circuit km (%)	
Demand management.	Demand management initiatives implemented	No. Initiatives implemented	Details of demand management initiatives and programs should be provided
	Savings from demand management initiatives	Total savings (\$ and GWh)	
Greenhouse	Greenhouse gas emissions (including SF6)	Tonnes (CO <sub>2</sub> equivalents)	International Greenhouse Gas Protocol, National Greenhouse Gas Methodology Workbook Include emissions from transmission/distribution losses, vehicle use, and SF6 losses
PCB Management	PCBs (scheduled and nonscheduled) released to the environment, removed, captured or destroyed	Kg	National PCB Management Plan and state regulations
Bushfires	Number of bushfires caused by assets/activities	No. No./no. bushfires in service area	
Vegetation management	Customer satisfaction with vegetation management	No. complaints about vegetation management or customer survey results	State regulations
Land use	Area of land occupied (including buildings, substations, line easements, etc)	Hectares	Specify type of land use May be more applicable to transmission than distribution
Land use (cont'd).	Ratio of land rehabilitated to land used	Land rehabilitated as a % of land used for power generation	“Rehabilitation” includes land that is subject to special management measures to improve its ecological value, including tree planting, conservation or rehabilitation
Visual	impact Location, size and % of land owned, leased or managed in “visually sensitive” areas	Hectares	
	Cables underground	Km % of total km	Comment on existing overhead lines undergrounded and new underground lines installed
Hazardous substances	Oil in storage Oil in equipment Oil recycled or disposed of Oil spilled (eg. from storage, transformers or cables)	Litres	Dangerous Goods regulations
	Pesticide consumption	Litres	Include pesticides used for poles and for vegetation management
Site Contamination	Number of sites assessed for site contamination	No.	Relevant state legislation
	Number of contaminated sites	No.	Relevant state legislation

	Number of remediated sites	Remediated sites as a % of known contaminated sites	Relevant state legislation
Energy consumption	Total energy consumption by fuel source (eg. electricity, coal, oil, diesel)	Joules or GWh GWh/GWh of electricity distributed or transmitted	GRI Energy Protocol
Solid & liquid waste	Total waste, by type (hazardous, non-hazardous) and destination (reused, recycled, landfilled)	Tonnes Tonnes/GWh of electricity distributed or transmitted	Relevant state legislation

<b>Performance Indicators – Retailing</b>			
Renewable energy	Customer subscriptions to Green Energy	No. Total GWh % sales	
Greenhouse	Greenhouse gas emissions (compared to benchmarks for NSW retailers)	Tonnes (CO2 equivalents), compared to benchmark	Methodology to be approved by NSW Ministry of Energy and Utilities
Energy efficiency	Energy efficiency initiatives implemented – customer or internal	No. initiatives implemented	Details of initiatives, programs and targets should be provided
	Electricity sales foregone	GWh	

## APPENDIX C: ESAA Triple Bottom Line Reporting Guidelines

<b>Indicators of financial and economic issues</b>			
Issue	Possible Indicators	Units	Alignment to GRI
Market share	Sales (with geographic breakdown)	(\$)	EC1/EC2
Financial performance	Earnings before interest and tax	(\$)	EC1
	Net profit/loss	(\$)	EC1
	Distributions to providers of capital: ▶ Interest on debt & borrowings	(\$)	EC6
	▶ Dividends	(\$)	
	Taxes paid	(\$)	EC1
	Subsidies received	(\$)	EC1
	Increase/decrease in retained earnings	(\$, %)	EC1
Employees	Value of wages & benefits	(\$)	EC5
Suppliers	Payments/ payables to suppliers	(\$)	EC3
	Supplier contracts paid in accordance with agreed terms	No.	EC4
Indirect economic impacts	Indirect economic impacts (qualitative information)		EC13

<b>Indicators of Social Issues: Labour practices</b>			
<b>Issue</b>	<b>Possible indicators</b>	<b>Units</b>	<b>Alignment to GRI</b>
Workforce profile	Workforce by status & employment contract	no., %	LA1
	Employment net creation and turnover	no., %	LA2
Quality of management	Results of employee satisfaction surveys	Average scores	
	Employee involvement in decision making, including innovation programs	Qualitative information	LA13
	Corporate values & alignment of employees with these values	Qualitative information & survey scores	
Industrial relations	Policies & procedures regarding changes in operations, including restructuring & redundancies	Qualitative information	LA4
	Workforce unionisation	% employees covered by Enterprise Bargaining Agreements	LA3
Health & safety	Health programs for employees	Qualitative information	LA12?
	Health & pension benefits provided to employees	\$ value + qualitative information	LA12?
	Health & safety management systems	Qualitative information	LA6/LA14
	Standard injury, lost day and absentee rates and fatalities	No. injuries, fatalities and days absent Lost time injury frequency rate (Injuries per million hours worked)	LA7
Human rights	Human rights, child labour, forced & compulsory labour policies & practices (including supply chain management)	Qualitative information	HR1, HR2, HR3, HR6, HR7
	Equal opportunity and non-discrimination policies & programmes	Qualitative information	LA10, HR4
	Freedom of association policies & practices	Qualitative information	HR5
	Ratio of lowest wage to national minimum & cost of living	%	
	Diversity profile of senior management/ board and other employees	No. and % of gender and ethnicity of senior management & board, as compared to regional and industry averages	LA11
	Flexible working practices/arrangements (eg. "family friendly" policies and promotion of balanced lifestyles)	Qualitative information	LA12
Training	Employee training	No. , % of employees and contractors trained	LA9 GRI more specific "lifelong learning"

<b>Indicators of Social Issues: Customers, community and other external stakeholders</b>			
<b>Issue</b>	<b>Possible indicators</b>	<b>Units</b>	<b>Alignment to GRI</b>
Customer service & product stewardship	Customer satisfaction	Survey/feedback results	PR8
	Customer and public health and safety policies & practices	Qualitative information	PR1
	Product and service information policies & practices	Qualitative information	PR2
	Social and environmental responsibility policies & practices	Qualitative information	SO1
Business ethics	Customer privacy policies & practices	Qualitative information	PR3/PR11
	Bribery & corruption policies & practices	Qualitative information	SO2
	Anti-competitive behaviour policies & practices	Qualitative information	SO6, SO7
Community development	Social and community impact policy	Qualitative information	SO1
	Rebates and payment plans offered to customers	No. rebates and plans	
	Philanthropy/ charitable donations / sponsorships	\$ value, hrs voluntary work Qualitative information about recipients of donations, extent of “in kind” donations	EC10
	Apprenticeships/ cadetships offered	No. & \$ value	
	Work experience programs	Qualitative information	
	Public perception	Survey results	PR8
Stakeholder management	Stakeholder engagement (including indigenous representation & involvement in decision making)	Qualitative information	SO1 (in part)
	Mechanisms for balancing shareholder and stakeholder interests	Qualitative information	SO1 (in part)
Supply chain management	Social performance of suppliers	Qualitative information on supplier management, Quantitative information on performance of suppliers (using the above indicators) if available	

<b>Environmental Issues and indicators</b>			
Issue	Indicator	Units	Alignment to GRI
Legislative compliance	Total number of incidents reported to environmental regulators	No	EN16
	Number of written warnings of infringement notices received	No.	EN16
	Number of prosecutions	No.	EN16
Environmental management	Penalties for non-compliance	\$	EN16
	ESAA Code of Practice Audit results	Score for each section of the ESAA audit, benchmarked against industry averages	
	Fraction of activity with EMS to ISO14001(divided into certified and non certified)	% based on no. of employees, work areas or other indicators	
	Environmental expenditure	\$	EN35
Complaints	Number of complaints/inquiries received	No.	PR4
	Number of complaints/inquiries resolved	No.	PR5
Renewable energy	Renewable energy produced	GWh sent out	
	Customer subscriptions to Green Energy	No. Total GWh % sales	
	Energy sourced from renewables	%, compared to mandatory renewable energy targets	
Greenhouse	Greenhouse gas emissions(including SF6)	Tonnes (CO2 equivalents) Tonnes/GWh of electricity sent out	EN8, EN9
	Greenhouse gas emissions (compared to benchmarks for NSW retailers)	Tonnes (CO2 equivalents), compared to benchmark	
	Thermal efficiency %,	(Electricity sent out/fuel consumed)	
Demand management	Demand management initiatives implemented	No. Initiatives implemented	
	Savings from demand management initiatives	Total savings) (\$ and GWh	
Energy efficiency	Energy efficiency advice provided to customers	Total number of audits conducted + bill inserts distributed + other energy efficiency information distributed	
	Electricity sales foregone	GWh \$	
	Transmission and distribution losses	GWh GWh/ circuit km %	
Biodiversity & land management	Total amount of land used for power generation activities (excluding buffer zones)	Hectares Hectares/GWh of electricity sent out	EN23

	Area of land occupied by networks (including easements)	Hectares	EN23
	Location, size and % of land owned, leased or managed in “biodiversity rich” habitats (protected habitats or habitats recognised as being of ecological significance)	Hectares, %	EN6, EN7
	Ratio of land rehabilitated to land used	Land rehabilitated as a % of land used for power generation	EN26/EN27 (part)
Water consumption	Net water consumption, total and by source (eg. surface water, groundwater, recycled waste water)	Litres Litres/GWh electricity sent out	EN5/EN22 GRI Water Protocol (GRI, 2003)
	Influence on water flows (surface or groundwater)	Average intake flow rate (ML/day) as a % of average flow rate of water course (ML/day)	EN20 GRI Water Protocol (GRI, 2003)
Energy consumption	Total energy consumption by fuel source (eg. electricity, coal, oil, diesel)	Joules Joules/GWh of electricity sent out	EN3
	Consumption of recycled fuels (eg, refuse derived fuel, waste oil)	% of total fuel consumption	EN2
	Energy consumed in-station Joules or GWh	% (Joules/total fuel consumption)	EN4
Emissions to air	NOx emissions	Tonnes Tonnes/GWh of electricity sent out	EN10
	SOx emissions	Tonnes (SO2 Equivalents) Tonnes/GWh of electricity sent out	EN10
	Dust (particulate) emissions (based on PM10)	Tonnes Tonnes/GWh of electricity sent out	EN10
	Carbon monoxide	emissions Tonnes Tonnes/GWh of electricity sent out	EN10
Solid & liquid waste	Total waste, by type (hazardous, non-hazardous) and destination (reused, recycled, landfilled)	Tonnes Tonnes/GWh of electricity sent out	EN11
	Oil recycled	% of waste oil produced	EN2
	Ash recycled	% of ash produced	EN2
Hazardous substances	PCBs (scheduled and nonscheduled) released to the environment, removed, captured & destroyed	Tonnes	EN31
	Oil in storage Oil in equipment Oil spilled (eg. From cables)	Litres	EN13
	Pesticide consumption	litres	
Contamination	Number of sites assessed for site contamination	No.	
	Number of contaminated sites	No.	

	Number of remediated sites	Remediated sites as a % of known contaminated sites	
Environmental flows	Water allocated to maintaining environmental flows	Litres, % of total water flows	GRI Water Protocol (GRI, 2003)
Water quality	Compliance with water quality discharge licence conditions	Water quality issues should be incorporated into the general legislative compliance indicator, and may also be reported separately using the indicators below or other indicators.	
	Nutrient levels	Total phosphorous and/or nitrogen (mg/l) Phosphorous and/or nitrogen (mg/l) compared to upstream levels	
	Algal levels	Chlorophyll (ug/l) Chlorophyll compared to upstream levels	
	Sediment suspension levels	Suspended solids (mg/l) Suspended solids compared to upstream levels	
	Turbidity	NTU NTU compared to upstream levels	
	Salinity	TDS (mg/l) TDS compared to upstream levels	
	Alkalinity	pH pH compared to upstream levels	
	Colour	Pt/Co Colour compared to upstream levels	
	Temperature	Degrees Celsius Temperature compared to upstream levels	
Amenity/ visual impact	Location, size and % of land owned, leased or managed in “visually sensitive” areas	Hectares, %	
	Cables underground	% of total (in terms of kilometres of cables)	
Bushfires	Number of bushfires caused by assets/activities	No. No./no. of bushfires in service area	
Vegetation management	Customer satisfaction with vegetation management	No. complaints about vegetation management or customer survey results	