

# **Sustainability Assessment: What is it and how do we do it?**

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## **Abstract**

Sustainability assessment is increasingly viewed as an important tool to aid in the shift towards sustainability, and commitments are made in the State Sustainability Strategy (Consultation Draft) to introduce broad-reaching sustainability assessment processes in Western Australia. However, this is a new and evolving concept and there remain very few examples of effective sustainability assessment processes implemented anywhere in the world.

Sustainability assessment is often described as a process by which the implications of an initiative on sustainability are evaluated, where the initiative can be a proposed or existing policy, plan, programme, project, piece of legislation, or a current practice or activity. However, this generic definition covers a broad range of different processes, many of which have been described in the literature as 'sustainability assessment', or a similar term. This paper goes beyond the generic definition to examine the fundamental question of what sustainability assessment could, and should, be.

It does this firstly by reviewing the different approaches described in the literature as being forms of sustainability assessment and evaluating them in terms of their potential contributions to sustainability. Many of these are actually examples of 'integrated assessment', derived from environmental impact assessment (EIA) and strategic environmental assessment (SEA), but which have been extended to incorporate social and economic considerations as well as environmental ones, reflecting a 'triple bottom line' (TBL) approach to sustainability.

It is concluded that to deserve the title of 'sustainability assessment', the assessment process must seek to determine whether or not an initiative is, or is not, sustainable, rather than seeking to minimise unsustainability or even to achieve improvements which may still not result in a sustainable practice. To avoid confusion, this paper uses the term 'assessment for sustainability' for processes that have this aim.

'Assessment for sustainability' firstly requires that the concept of sustainability is well-defined, in terms of sustainability criteria against which the assessment is conducted. The paper compares 'triple bottom line' approaches and principles-based approaches to developing such sustainability criteria, concluding that the latter are more appropriate, since they avoid many of the inherent limitations of the triple bottom line as a conceptualisation of sustainability. Some alternative sets of principles-based sustainability criteria are presented and their implications briefly discussed.

# 1. Introduction

Sustainability assessment is increasingly advocated as an important tool to contribute to the shift towards a more sustainable society. The Western Australian State Sustainability Strategy (Consultation Draft) includes commitments to introduce broad-reaching sustainability assessment processes in Western Australia, and describes a future in which “sustainability assessment forms the basis of all government decisions and is embedded into all levels of government activity” (Government of Western Australia 2002, p41). However, this is a new and evolving concept and there remain very few examples of effective sustainability assessment processes implemented anywhere in the world.

Available definitions of sustainability assessment include:

- “Sustainability assessment is...a tool that can help decision-makers and policy-makers decide what actions they should take and should not take in an attempt to make society more sustainable” (Devuyt 2001a, p9); or
- “The aim of sustainability assessment is to ensure that plans and activities make an optimal contribution to sustainable development” (Verheem 2002a).

However, as this paper will seek to demonstrate, these definitions are sufficiently generic to describe a broad range of different processes, many of which have indeed been called ‘sustainability assessment’ or some similar term in the literature. This paper seeks to examine the concept of sustainability assessment more deeply, using examples of processes discussed in the literature to address the fundamental question of what sustainability assessment could, and should, be.

The concept of sustainability, or sustainable development, is clearly the basis of sustainability assessment. Sustainable development was first described by the Brundtland Commission in 1987 as “development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs” (WCED 1987). Sustainability demands the protection of resources and ecological integrity over the long term, combined with great improvements in human well-being, especially among the poor (Gibson 2001).

Since the Brundtland Commission, many alternative definitions of sustainability have been proposed and diverse interpretations of the concept made. Many of these are based upon the ‘three pillar’ or ‘triple bottom line’ (TBL) concept of sustainability, which requires the integrated consideration of environmental, social and economic issues. The implications of different definitions and interpretations of sustainability that underpin the different approaches to sustainability assessment will be discussed.

The theory of sustainability assessment currently available in the literature has largely evolved from work undertaken by practitioners of environmental assessment (EA), including project environmental impact assessment (EIA), and more recently strategic environmental assessment (SEA), which in turn has been influenced by policy analysis techniques (Sheate et al 2001; Sheate et al 2003). Therefore the approaches to so-called sustainability assessment described in the literature strongly reflect these processes.

The purpose of this paper is to clarify what the term ‘sustainability assessment’ should mean if it is to fulfil its potential as a tool for promoting sustainability. Such clarification is an essential prerequisite to meaningful discussions on the development of sustainability assessment processes in Western Australia and elsewhere.

It begins by reviewing the practices of EIA and SEA and then examines the ‘integrated assessment’ processes that have been derived from EIA and SEA by the inclusion of social and economic, as well as environmental, considerations in the process. These integrated assessment processes are discussed in terms of their aims with respect to sustainability, and the question asked as to whether they go far enough. The TBL approach to sustainability, upon which these integrated assessment processes are based, is considered, and alternatives to the TBL approach are also discussed.

## **2. Environmental Assessment Processes**

When considering the concept of sustainability assessment and reviewing the literature available on the subject, it is useful to consider its conceptual origins. Sustainability assessment is generally viewed as a tool in the ‘family’ of impact assessment processes, closely related to EIA applied to projects and SEA applied to policies, plans and programmes (PPP’s) (Therivel and Partidario 1996).

The literature reflects a widely-held belief that environmental assessment processes such as EIA and SEA can and do make valuable contributions towards sustainability. In some cases it is suggested that this contribution arises directly from the integration of environmental considerations into decision-making (see for example Sheate et al 2003; Wood 2002), while others suggest that EIA and SEA provide a sound basis that can be extended to include broader sustainability concerns (Gibson 2001; Verheem 2002a; Partidario 2003).

The following sections briefly describe and discuss the two major forms of environmental assessment, EIA and SEA, to provide the necessary background for subsequent discussions the contribution of environmental assessment to sustainability.

### **2.1 Environmental Impact Assessment (EIA)**

Environmental impact assessment (EIA) is generally applied to project proposals and “aims to identify the significant environmental effects of proposed activities to decision makers and the public and to identify ways to avoid or reduce environmental damage” (Devuyt 1999, p460). EIA can be considered to be a ‘baseline-led’ process which typically involves comparing the impacts of a proposed action with baseline conditions (Smith and Sheate 2001), and to determine whether or not the potential impacts are acceptable, unacceptable, or manageable with appropriate controls (Sippe 1999).

EIA processes have been embedded in legislation around the world for the past 30 years and have been generally very successful in identifying and mitigating the potential environmental impacts of project proposals (Sippe 1999).

However, the limitations of traditional EIA are also well understood and documented. Dalal-Clayton and Sadler (2002) discuss some of the factors constraining traditional

EIA, particularly the late stage in the decision-making process at which EIA is applied, which means that questions such as whether, where and what type of development should occur have already been addressed.

Dovers goes further in suggesting that: “EIA is fundamentally flawed in being orientated almost totally towards projects. EIA misses regional impacts, cumulative impacts of multiple projects over time, and may allow environmental death by a thousand small cuts. EIA rarely caters for consideration of alternatives to a project, but leads to either approval or rejection, or amelioration of impacts deemed unacceptable” (Dovers 2002, p24).

The need to assess the environmental implications of decisions made at much higher levels of decision-making was recognised, and the concept of strategic environmental assessment (SEA) has evolved rapidly over the past decade to address this gap and to provide a means for assessing the environmental implications of policies, plans and programmes (PPP’s) (Therivel and Partidario 1996).

## **2.2 Strategic Environmental Assessment (SEA)**

As already briefly discussed above, strategic environmental assessment (SEA) is broadly defined as the environmental assessment of policies, plans and programmes (PPP’s) (Therivel and Partidario 1996), in contrast with EIA, which is generally applied to project proposals.

Noble describes the theoretical relationship between EIA and SEA as follows: “Ideally SEA and EIA are considered in sequence where SEA proactively examines a broad range of alternatives and selects the preferred course of action, and EIA is initiated “reactively” to determine in greater detail the potential impacts of the preferred alternative” (Noble 2000, p210).

This is an example of ‘tiering’, also known as ‘the trickledown effect’ or ‘vertical integration’, by which assessments conducted at the higher levels of decision making influence and guide those conducted at the lower levels. This should ensure that environmental issues are dealt with at the appropriate level, resulting in a streamlined process with minimal repetition (Therivel and Partidario 1996; Sadler and Verheem 1996; Marsden 2002; Nooteboom 2000).

Partidario distinguishes between different levels of decision making as follows:

- “Policy: Road-map with defined objectives, set priorities, rules and mechanisms to implement objectives;
- Planning: Priorities, options and measures for resource allocation according to resource suitability and availability, following the orientation, and implementing, relevant sectoral and global policies;
- Programme: Organized agenda with defined objectives to be achieved during programme implementation, with specification of activities and programme investments, in the framework of relevant policies and plans;
- Project: A detailed proposal, scheme or design of any development action or activity, which represents an investment, involves construction works and implements policy/planning objectives” (Partidario 2003, p8)

Despite the fact that many writers have also pointed out that tiering does not function quite so neatly in practice (Nooteboom 2000; Noble 2002; Jones 2003), it remains an important concept for planning and assessment processes.

Within the broad definition of SEA as environmental assessment of PPP's there has been considerable debate as to how it should be approached (Sheate et al 2003) and as a result "there are several definitions of SEA stemming from the many ideas over its role and purpose (Sheate et al 2001, p6).

For example, it is recognised that SEA can be used as a tool to evaluate PPP's already developed or as an integral part of the development, assessment, amendment, implementation, monitoring and review of PPP's, i.e. applied at all stages of the life of a PPP (Sheate et al 2003). However, the use of SEA as a proactive design tool rather than a reactive evaluation tool tends to be favoured in the literature (Dalal-Clayton and Sadler 2002; Brown and Therivel 2000) In the definitions provided above, Partidario's use of the term 'planning' rather than 'plans' is deliberate, as she seeks to emphasise the importance of the planning process rather than the outcome of that process (the plan). Similarly, she advocates that SEA should be part of the strategic planning process rather than an evaluation applied to a completed plan (Partidario 2003).

For the purposes of this paper, and based upon the work of a number of writers, the different forms of SEA can be considered to fall into two broad categories: 'EIA-driven' and 'objectives-led' (Partidario 1999; Partidario and Eggenberger 2000; Sheate et al 2001; Sheate et al 2003).

### **2.2.1 EIA-driven SEA**

EIA-driven SEA is typically applied as a reactive process that aims to evaluate the environmental impacts of a policy, plan or programme for which decision-making is well advanced or complete against a baseline, to evaluate the acceptability of the impacts and to identify potential modifications to improve the environmental outcomes (Sheate et al 2001; Sheate et al 2003; Sippe 1999). Essentially, it is a project-level EIA process applied to a PPP, or "EIA writ large" (Sheate et al 2003).

Partidario (2003) suggests that an EIA-driven approach is reflected in some early definitions and SEA legislation, including The US *National Environmental Policy Act* (1969).

### **2.2.2 Objectives-led SEA**

The literature also describes a range of SEA processes that can be considered to be 'objectives-led'. For the purposes of this paper, the term 'objectives-led' will be used to refer to SEA in which the potential impacts of a policy, plan, programme or strategy are assessed against a series of aspirational environmental objectives, rather than against a baseline (Smith and Sheate 2001; Twigger-Ross 2003). Objectives-led SEA is derived from policy analysis rather than from EIA (Sheate et al 2001; Sheate et al 2003). Clearly, a well-defined set of environmental objectives is an important prerequisite for this form of SEA.

Reflecting the principles of tiering discussed earlier, these objectives must be consistent and compatible with those applied at higher and lower levels of decision-

making. Ideally, environmental assessments conducted at higher levels of the planning hierarchy would establish appropriate objectives for decision-making processes at the lower levels, although it is recognised that processes are rarely so streamlined in practice (Nooteboom 2000).

Objectives, or goals, describe the purpose of a policy, plan or programme, and for the purposes of this discussion the two terms will be considered synonymous. They should reflect a broad strategic vision, such as ‘sustainability’ or ‘sound economic growth’ (Noble 2000) and should also reflect a balance between community values, development objectives and national and global trends (Partidario 2003).

Therivel (1996) points out that while some objectives may be explicitly stated, others will be implicit, resulting from a number of incremental decisions made in political processes. The full list of objectives for a PPP can be derived from the explicit objectives, discussions with the competent authority and decision-makers, higher and lower level PPP’s and other sources.

### **2.2.3 Environmental Assessment and Sustainability**

As previously discussed, the potential for environmental assessment processes such as EIA and SEA to contribute to sustainability has been widely recognised. Some believe that this contribution arises directly from the integration of environmental considerations into decision-making (see for example Sheate et al 2003; Wood 2002), while others suggest that EIA and SEA provide a sound basis that can be extended to include broader sustainability concerns (Gibson 2001; Verheem 2002a; Partidario 2003).

Gibson points out that “environmental assessment processes....are among the most promising venues for application of sustainability-based criteria. They are anticipatory and forward looking, integrative, often flexible, and generally intended to force attention to otherwise neglected considerations” (Gibson 2001, p1) although he also recognises that “environmental assessments are not the only vehicles for specifying sustainability principles, objectives and criteria” (Gibson 2001, p19).

The two views of the potential contribution of environmental assessment to sustainability correspond to two different concepts of sustainability. It is important to note at this point that sustainability is a difficult concept to define in a way that is meaningful and sufficiently practical to allow sustainability to be operationalised. It has been suggested that the difficulty arises because sustainability is a concept like ‘love’, ‘hope’ or ‘freedom’, and as such tend to remain ‘fuzzy’ until applied in a specific context (Government of Western Australia 2002). This situation is not aided by the fact that many alternative theoretical formulations and applications of sustainability have been developed, which are founded upon common concerns and principles, but which have different emphases (Gibson 2001).

This paper does not attempt to provide a detailed analysis of alternative conceptualisations of sustainability, but does seek to highlight where appropriate how this alternative views are embedded into the various documented approaches to ‘sustainability assessment’.

For example, the suggestion that environmental assessment itself contributes to sustainability reflects the view that “environmental impacts are at the core of sustainability concerns” (Sadler 1999, p12) and that “specifically, the concern is about the continuing or accelerating throughput of energy and raw materials, beginning with resource extraction and ending with pollution and residuals” (Sadler 1999, p15). This is consistent with a ‘deep green’ ecological sustainability model that can be represented as three concentric circles, the outer representing ecology, the middle representing society and the inner representing the economy (Gibson 2001). This view of sustainability emphasises that the source and sink functions provided by natural resources are finite, and that sustainability therefore means finding a way to live within the limits of natural systems (Sadler 1999; Diesendorf 1997).

On the other hand, the suggestion is often made that environmental assessment should contribute to sustainability by extending its scope to include social and economic considerations along with environmental ones (Marsden and Dovers 2002). This reflects the ‘three pillar’ or ‘triple bottom line’ (TBL) model of sustainability, which is often conceptualised as three intersection circles representing the environment, society and the economy (Gibson 2001). This form of extension of environmental assessment results in a form of triple bottom line integrated assessment (Twigger-Ross 2003).

The term ‘triple bottom line’ was popularised by John Elkington of SustainAbility. In his book *Cannibals with Forks: The Triple Bottom Line of 21st Century Business*, he describes the evolution of the concept within a business context:

“The sustainability agenda, long understood as an attempt to harmonize the traditional financial bottom line with emerging thinking about the environmental bottom line, is turning out to be much more complicated than some early business enthusiasts imagined. Increasingly, we think in terms of a ‘triple bottom line’, focusing on economic prosperity, environmental quality, and – the element which business has tended to overlook- social justice” (Elkington 1997, p2).

Whereas the Brundtland Commission presented a two pillar model reflecting environment and development concerns, the three pillar triple bottom line model separates the development issues into social and economic factors, emphasising that “material gains are not sufficient measures or preservers of human well-being” (Gibson 2001, p7).

For the purposes of this paper, the triple bottom line can be considered an interpretation of sustainability that places equal importance on environmental, social and economic considerations in decision-making.

By far the majority of processes attempting to expand environmental assessment to address broader sustainability issues reflect a triple bottom line approach to sustainability. Triple bottom line integrated assessment is examined further in the following section.

### 3. Triple Bottom Line Integrated Assessment

The integration of environmental, social and economic considerations within an assessment process is an example of 'horizontal integration', in contrast with the other forms of integration identified by Lee (2002): 'vertical integration' (also known as 'tiering' or the 'trickledown effect' as discussed previously) and 'integration into decision-making' which embodies the concept of assessment processes as a fundamental component of the decision-making process. Horizontally integrated assessment processes for sustainability reflect the widely-recognised principle that sustainability assessment requires the consideration of environmental, social and economic issues (Sadler 1999; Devuyt 1999), and reflect a triple bottom line approach to sustainability.

Such extension to include all three pillars of the triple bottom line could conceivably occur within all three of the environmental assessment processes described thus far: EIA, EIA-driven SEA and objectives-led SEA. For the purposes of this discussion, two terms will be used: 'EIA-driven integrated assessment', derived from EIA and EIA-driven SEA, and 'objectives-led integrated assessment'. Although the latter is derived from objectives-led SEA, an objectives-led integrated assessment approach could equally be applied to project-level proposals.

Both of these approaches can be considered to be examples of 'sustainability appraisal', as defined by Sheate et al (2001); 'integrated sustainability appraisal' as discussed by Eggenberger and Partidario (2000) or 'integrated impact assessment' (Sheate et al 2003). Similarly, Lee (2002) uses the term 'sustainability assessment' to describe a special form of horizontally integrated assessment, which takes into consideration economic, environmental and social impacts, a definition which applies equally to EIA-driven and objectives-led integrated assessment.

The term 'integration' implies that integrated assessment should be more than the sum of separate environmental, social and economic assessments. Eggenberger and Partidario (2000) remind us that "the principle that the sum of the parts does not equal the whole is widely acknowledged" and suggest that "integrating in fact means that a new entity is created where new relationships are established, bearing on individual entities that have specific characteristics and specific dynamics but in combination act in a different way".

Brookes (2002) supports this view, suggesting that integrated assessments should demonstrate added value; that is they should be more than the sum of their parts. In other words, integrated assessment should consider the relationships, synergies and conflicts between the impacts (Gibson 2001).

The aim of integrated assessment is articulated by Post et al (1997): "It aspires to describe – from the perspective of an identified problem or proposed project – the relations between the human communities concerned, their economic organization and their actual resource base. It qualifies, quantifies, and, as far as possible, values the effects of proposed and alternative interventions on the three (economic, social and natural) subsystems and their intersystem relations. It attempts to identify beneficial interventions and to fully expose unavoidable trade-offs".



Therefore, both EIA-driven and objectives-led integrated assessment should not only consider the environmental, social and economic implications of proposals, but should also examine the interrelations between these three pillars of the triple bottom line. In the case of EIA-driven integrated assessment, this means that potential interlinkages between TBL impacts must be identified, while objectives-led integrated assessment also requires the identification of interlinkages between TBL objectives.

The two broad approaches to triple bottom line integrated assessment are discussed in more detail below. Examples of their application in practice are also provided.

### **3.1 EIA-driven Integrated Assessment**

EIA-driven integrated assessment is analogous to EIA and EIA-driven SEA, except that social and economic impacts are considered as well as environmental ones, in an integration way. George describes the application of EIA-driven integrated assessment to international trade agreements, noting that “the prime aim of such an appraisal, often referred to as a sustainability impact assessment (SIA) is to identify mitigation measures through which adverse impacts might be minimised or avoided” (George 2001, p96).

As already discussed, to be truly integrated, the interrelations between the three ‘pillars’ of impacts must be considered (George 2001), since it has been recognised that “the combined impacts, positive and negative, of the sets of measures as a whole, are likely to be more than the simple sum of the impacts of their constituent measures because of synergistic effects” (Lee and Kirkpatrick 2001).

The difficulty of developing and conducting EIA-driven integrated assessment processes in practice has been recognised. This may be due to the fact that jurisdictions which do assess the social and economic, as well as environmental impacts of proposals tend to do conduct three separate assessment processes, and therefore inconsistencies in the methods and paradigms of sectoral assessment processes may inhibit implementation of more integrated approaches (Lee 2002).

Recognising this, Eggenberger and Partidario (2000) identify five different levels of integration: substantive, methodological, procedural, institutional and policy, and suggest that these can be progressively implemented. Similarly, Scholten and Post (year?) propose a staged approach to the integration of separate assessment processes, beginning with integration of timing of individual sectoral assessment processes, although recognising that this will not guarantee good communication or good process. The next stage would be a detailed scoping at the commencement of any assessment process to identify alternatives which consider cross-cutting issues and which form the basis of the sectoral assessments.

If the respective impact assessment processes are not integrated effectively, then this form of ‘integrated’ assessment is reduced to three separate impact assessments, each generating data relating to the potential environmental, social and economic impacts of the proposal or initiative. The three sets of data must then be ‘integrated’ in some way after it has been collected in order to reach a decision as to whether or not the proposal or initiative is acceptable within a sustainability context.

It has been pointed out that some trade-offs are inevitable in this situation (Gibson 2001). While Post et al's (1997) definition of integrated assessment discussed previously suggests that integrated assessment aims to fully expose trade-offs, others go further in suggesting that trade-offs should be minimised by an integrated assessment process (Government of Western Australia 2002).

Several writers have recommended the use of tools such as multi-criteria analysis (MCA) to aid the integration process (Twigger-Ross 2003), while others have proposed criteria to guide decisions regarding trade-offs (Gibson 2001). However, the integrated consideration of triple bottom line impacts remains a challenging task.

EIA-driven integrated assessment process should result in acceptable outcomes with respect to environmental, social and economic baselines. However, as George points out: "For this type of activity, the term sustainability appraisal, or sustainability impact assessment, is shorthand for saying that all three of the sustainable development spheres are evaluated. It does not necessarily mean that the appraisal evaluates a proposal against sustainable development objectives" (George 2001, p96). Therefore, contributions to sustainability may be limited to minimising negative outcomes rather than to maximising positive ones.

### ***3.2 Objectives-led Integrated Assessment***

Objectives-led integrated assessment reflects a desire to achieve a particular vision or outcome defined by integrated environmental, social and economic objectives. It assesses the extent to which the implementation of a proposal contributes to this vision, in contrast with EIA-driven integrated assessment which aims to ensure that triple bottom line impacts of a proposal are acceptable compared with baseline conditions.

An objectives-led approach reflects a concept of sustainability as a goal, or series of goals, to which society is aspiring. As Gibson says: "Adopting contributions to sustainability as a key objective and test in environmental assessment clearly implies that minimization of negative effects is not enough. Assessment requirements must encourage positive steps – towards greater community and ecological sustainability, towards a future that is more viable, pleasant and secure" (Gibson 2001, p1).

The implication that sustainability can be defined by a series of triple bottom line goals is consistent with the Western Australian Government's definition of sustainability as "meeting the needs of current and future generations through simultaneous environmental, social and economic improvement" (Government of Western Australia 2002, p24). Just as objectives-led SEA requires clearly defined environmental objectives, objectives-led integrated assessment requires clearly defined environmental, social and economic objectives against which the assessment can be conducted.

It is suggested that an objectives-led approach, in which objectives are clearly defined at the commencement of the planning or decision-making process, is more likely to result in 'win-win-win' outcomes between the three pillars of sustainability, and therefore less likely to generate conflicts and trade-offs. This would require agreement of a broad set of objectives reflecting the needs of all stakeholders at the commencement of the process. According to Gibson: "For practical (environmental)

assessment purposes, especially at the project level, it is usually desirable and often crucial to specify the relevant sustainability principles, objectives and criteria as fully and credibly as possible before proponents begin thinking about their purposes and options” (Gibson 2001, p20).

Since the objectives define the required outcomes of the proposal under development specifying objectives at the commencement of the process places the onus of identifying and maximising ‘win-win-wins’ on those responsible for developing the proposal rather than those who may be conducting a reactive impact assessment once the proposal has been largely developed. The former are much better placed to do this, since they are involved at a much earlier stage of the decision-making process; it is in their interests to maximise positive outcomes with maximum efficiency, thereby creating ‘win-win-wins’; there may be additional incentives if sustainability criteria have been applied that restrict a ‘business as usual’ approach (or in other words ‘necessity is the mother of invention’); and because it is in the job descriptions of planners and designers to find new and creative ways to achieve objectives, especially when clear boundaries for the development are established up front.

An example of objectives-led integrated assessment is the UK Department of the Environment, Transport and the Regions (DETR) process requiring that regional plans be subject to ‘sustainability appraisal’ defined as “a systematic and iterative process undertaken during the preparation of a plan or strategy, which identifies and reports on the extent to which the implementation of the plan or strategy would achieve the environmental, economic and social objectives by which sustainable development can be defined, in order that the performance of the strategy and policies is improved” (Smith and Sheate 2001, p265; George 2001, p95).

Given the prevalent view that sustainability is about positive change rather than simply minimising the negative, objectives-led integrated assessment clearly has more potential to contribute to sustainability than EIA-driven integrated assessment. As Gibson points out: “In most jurisdictions, the essential immediate effect of a shift to sustainability-based criteria is an expansion of central concern from avoidance of significant adverse effects to expectation of positive contribution to the achievement of sustainability objectives, however vaguely specified” (Gibson 2001, p19).

However, an objectives-led approach to sustainability assessment has its own challenges and limitations. Issues of tiering and its practical limitations apply to objectives-led integrated assessment as they do to objectives-led SEA. Furthermore, the objectives must be consistent and compatible with each other, which in itself represents a challenging task since it is not uncommon for strategic objectives to be conflicting (George 2001; Therivel 1996).

The potential of TBL objectives-led integrated assessment as a form of sustainability assessment forms part of the discussion in the following section, which begins by asking the fundamental question of what sustainability assessment should, or could, be.

## **4. Sustainability Assessment**

The previous section discussed forms of integrated assessment based upon the triple bottom line (TBL) concept of sustainability. The examples of ‘sustainability impact assessment’ as applied to trade agreements, and ‘sustainability appraisal’ as applied to UK regional plans were provided as examples of the EIA-driven and objectives-led integrated assessment respectively. The former aims to minimise negative triple bottom line impacts while the latter seeks to maximise positive triple bottom line impacts, and both therefore can be said to make some contribution to sustainability. But does this mean that these assessment processes are examples of sustainability assessment?

At this point, it is necessary to ask the fundamental question of what the purpose of sustainability assessment should, or could, be.

### **4.1 Assessment for Sustainability**

The observation has been made that the integrated assessment processes defined in the literature, whether they fall into the EIA-driven or objectives-led category, essentially evaluate only whether a proposal represents a positive or negative contribution to sustainability (Fuller 2002; George 2001). Generally, they avoid attempting to define criteria or conditions for sustainability, and limit themselves to minimising negative triple bottom line outcomes (EIA-driven integrated assessment) or maximising positive ones (objective-led integrated assessment).

Even the UK DETR, which does require assessment against “objectives by which sustainable development can be defined” does not actually require that these objectives be achieved, requiring only that “the extent to which” the objectives of sustainable development would be met is identified (George 2001).

While this ‘direction to target’ approach is recognised as being of some benefit, concerns have been raised that it is not enough, and that sustainability assessment processes should go further if they are to fulfil their potential of contributing to a sustainable society (Fuller 2002; George 2001).

For example, Fuller (2002) and Sadler (1999) discuss the need to measure ‘distance from target’ as well as ‘direction to target’. George goes even further by stating that proposals should not be assessed for their contribution to sustainability, but to determine whether or not they are in themselves sustainable. He reaches this conclusion following his detailed examination of the UK DETR process (George 2001).

In George’s model, sustainability assessment can be defined as a process to determine whether or not a particular proposal, initiative or activity is, or is not, sustainable, and therefore effectively becomes a yes/no question. Based upon this discussion, it is suggested that the term ‘sustainability assessment’ should be reserved exclusively for those processes that have the aim of determining whether or not an initiative, whether a proposal or an existing practice, is sustainable. However, to avoid confusion between terms, this paper will use the term ‘assessment for sustainability’ to distinguish it from other related forms of assessment which do not share this specific aim.

The notion of ‘assessing for sustainability’ implies that sustainability is a societal state, or perhaps more realistically a series of societal states, with particular characteristics or conditions, defined by sustainability criteria. In the words of Dr Karl-Henrik Robert of The Natural Step: “When the global society is sustainable, pollution will no longer increase, nature will no longer be impoverished through physical degradation, and within that frame, human needs will be met globally” (The Natural Step 2001, p10). “Assessment for sustainability’ is conducted to determine whether or not an initiative embodies these sustainability characteristics and meets these sustainability criteria. If it does, then it may be considered sustainable.

## **4.2 Context and Application**

In discussing his ‘assessment for sustainability’ model, George points out that it does not eliminate the need for the kinds of impact assessment processes discussed previously. Rather, he acknowledges the role of impact assessment and the importance of planning to meet a range of environmental, social and economic objectives. However, he disputes that these processes can be considered to be forms of sustainability assessment, because they do not assess whether a proposal or initiative meets fundamental criteria for sustainability.

With respect to impact assessment, George recommends that the identification of the potential impacts of a proposal should be addressed by the planning process in the case of spatial plans (George 2001) or by EIA in the case of specific project developments (George 1999) and that mitigation of significant impacts must be satisfactory (George 1999). Information generated by the impact assessment processes is necessary in order to address the proposed sustainability criteria from an informed perspective. Furthermore, the application of weak sustainability requires integrated assessment as a component of the decision-making process, because weak sustainability involves the conversion of natural capital into other forms of capital which requires consideration of trade-offs between the three ‘pillars’ of the triple bottom line (George 1999).

George also recognises the important role of environmental, social and economic objectives within the decision-making process, but suggests that such objectives, which typically concern issues such as jobs, economic growth, housing, transport, services etc, relate to development that is not necessarily sustainable and therefore should guide the planning process rather than the sustainability assessment process (George 2001).

‘Assessment for sustainability’ could potentially be applied for a range of different purposes, although it is noted that actual experience with this approach remains very limited. For example, it could be conducted reactively at the conclusion of decision-making, perhaps by regulators, to determine whether a proposal is sustainable (external process), or proactively during the decision-making process to assess the sustainability of the various options proposed to meet a series of objectives (internal process) (Verheem 2002b). It could also be applied to existing practices and activities. In some cases it may be a stand-alone process, and in others it may be one component of a more complex decision-making process.

It has been recognised by a number of writers that if ‘sustainability assessment’ in any form is to fulfil its potential as a tool for sustainability, then it must be applied broadly within a robust framework. These conclusions have arisen from discussions of sustainability assessment and also of other forms of assessment, particularly SEA. It is beyond the scope of this paper to review these in detail, but in summary it has been suggested to be effective and an instrument of change, ‘assessment for sustainability’ must be applied:

- Within a structured framework (Jenkins et al 2003);
- To proposed new initiatives at all levels of decision-making (Noble 2002);
- To existing practices across all sectors (Jenkins et al 2003);
- To the prevailing policy and legislative paradigm (Dovers 2002);
- To any decision with the potential to impact on patterns of production and consumption; governance and settlement (Dovers 2002); and
- By all sectors of society (Devuyst 2001a; Verheem 2002a).

### **4.3 Criteria for Sustainability**

This approach of ‘assessment for sustainability’ clearly requires some form of sustainability criteria against which the proposal can be assessed.

Gibson has the following to say on the matter of criteria in assessment processes:

“Decision criteria are the basic rules of the game. Effective application of sustainability-based criteria in (environmental) assessments will entail at least some clarity about what the effective criteria are and how they are to be interpreted. Policy-makers and process designers have sometimes embraced vagueness as a means of preserving discretionary flexibility and contextual adjustability. Constructive ambiguity can also be helpful in keeping representatives of competing interests at the table. But vagueness is maintained at a cost. While participants in (environmental) assessments – proponents, intervenors, administrators and decision-makers – will appreciate the need to adapt assessment obligations to suit different undertakings, locales and expectations, reinventing the rules for every specific case is likely to bring intolerable uncertainty and unduly attenuated deliberation” (Gibson 2001, p5).

Sustainability criteria should effectively separate sustainable outcomes from unsustainable ones for the purposes of the assessment process. Sustainability criteria are analogous to the ‘acceptability limits’ which are embodied in many environmental assessment processes (see for example Sippe 1999).

While it may appear a daunting task to define sustainability in terms of criteria, Gibson points out that “many versions of sustainability-based decision-criteria have been proposed for implementation” and that “a few have been, in various ways, been applied” (Gibson 2001, p1). Some alternative principles-based criteria for sustainability are discussed in the following sections.

#### **4.3.1 The Triple Bottom Line Objectives Approach**

This section returns to the triple bottom line objectives-led integrated assessment process identified earlier as having potential as a form of sustainability assessment,

and examines whether or not it provides a suitable basis for the 'assessment for sustainability' (assessment against criteria defining the conditions of sustainability). Firstly, the relationship between triple bottom line objectives and sustainability is discussed, followed by a more detailed examination of the triple bottom line as an interpretation of sustainability.

When considering the suitability of objectives-led integrated assessment processes for 'assessment for sustainability', it is important to recognise firstly that a series of environmental, social and economic goals do not necessarily define a condition of sustainability. Beginning with a series of triple bottom line objectives is a 'bottom up' approach, reflecting the view that sustainability is the simultaneous achievement of any environmental, social and economic goals, while the alternative 'top down' approach begins with the concept of sustainability as a state to which society aspires, and then seeking to define this state in terms of environmental, social and economic goals.

The difference between these two approaches was recently debated in Western Australia, following the development of a definition for sustainability in the State Sustainability Strategy Discussion Paper as "the simultaneous achievement of environmental, social and economic goals" (Government of Western Australia 2002). It was pointed out in various public submissions that this definition did not incorporate the criteria of meeting basic needs of both the current generation and future generations, embodied by the principles of intra- and intergenerational equity. These principles are generally considered to be fundamental to sustainability (George 2001; Sadler 1999) and intergenerational equity in particular is the focus of the original Brundtland Commission definition for sustainable development (WCED 1997). By omitting intra- and inter-generational equity, it was argued that the original Western Australian definition therefore did not actually define sustainability.

This debate, and the resulting change in the Western Australian definition of sustainability to include the phrase "to meet the needs of current and future generations" as well as the notion of the simultaneous achievement of goals (Government of Western Australia 2002), emphasises the concept of sustainability as a societal state, or more realistically a range of possible states, with certain definable characteristics, in contrast with the view of sustainability as the simultaneous achievement of any triple bottom line goals.

George (2001) argues a similar point in his analysis of the UK DETR 'sustainability appraisal' process, which is an example of a TBL objectives-led integrated assessment process. The UK process goes as far as to require that the environmental, social and economic objectives against which the assessment is conducted actually represent a condition of sustainability. However, as George (2001) points out: "the extent to which an appraisal will achieve its aim depends critically upon the extent to which the chosen objectives do indeed define sustainable development. It is insufficient for them to be a combined set of environmental, economic and social objectives. They must be objectives 'by which sustainable development can be defined'" (George 2001, p96).

He goes on to suggest that the types of TBL objectives typically applied in the UK do not define sustainability, and are actually very similar to objectives that would be applied for development that is not purporting to be sustainable. While he

acknowledges that such objectives are appropriate to guide planning processes, he argues that they are not appropriate for the assessment of sustainability (George 2001).

If TBL goals and related criteria are developed that do not actually define sustainability, then assessment against these criteria could be misleading, and suggest that something is sustainable when in fact it is not. Fuller (2002) makes this point when he points out that if prevailing economic or political philosophies which may not support sustainability are assumed unchangeable at least in the short term, and the assessment is conducted within this framework, a false conclusion could be reached that a development is moving towards sustainability if the implications of context are ignored.

Despite the risks identified above, if it were feasible to define sustainability by a set of triple bottom line objectives, as is required by the UK DETR, it would be possible to use these objectives to develop sustainability criteria against which an initiative could be assessed for sustainability. Therefore, theoretically, TBL objective-led integrated assessment could provide the basis for a process for assessing for sustainability (George 2001).

However, as has already been discussed, it is extremely difficult in practice to develop a consistent and compatible set of environmental, social and economic objectives that truly define sustainability, and practical experience in the UK demonstrates a tendency to develop series of objectives that are very desirable but which do not define a state of sustainability (George 2001).

It is suggested that the reasons for the difficulties reflect the limitations of the triple bottom line as a concept of sustainability.

Firstly, as has already been discussed, the starting point for a TBL concept of sustainability is a series of separate environmental, social and economic considerations, which then must be integrated. The question of how to integrate environmental, social and economic concerns in practice, and how to incorporate the inter-relations between the three 'pillars' of environmental, social and economic concerns, has been the subject of considerable debate in the literature.

It has been suggested that the separation of the concept of sustainability into the three pillars of the triple bottom line tends to emphasise potentially competing interests rather than the linkages and interdependencies between them, making the task of integration extremely difficult and promoting trade-offs (Gibson 2001). The risk of environmental standards being traded off against socio-economic factors in such a process has been discussed extensively in the literature (Sheate et al 2003; Jenkins et al 2003; Gibson 2001; Lee 2002).

Fuller (2002) summarises these concerns by suggesting that "where trade offs between the economy and the environment are seen as legitimate in the pursuit of sustainability, sustainability assessment could be regarded as a means for economic requirements to override those of the environment or the social context". Although Sadler points out that the likelihood of win-lose scenarios can be reduced by the incorporation of minimum acceptability thresholds into the TBL model and requiring



that any initiative at least meets these minimum thresholds, he also agrees that “beyond these boundaries, one set of criteria are either unduly promoted or unduly discounted against the others” (Sadler 1999, p20).

Furthermore, the triple bottom line can be considered reductionist approach to sustainability, and that dividing the holistic concept of sustainability into three pillars as a starting point invariably runs the risk of the sum of the parts being less than the whole. This is particularly true if the interrelations between the three pillars are not adequately understood and described, and therefore sustainability is reduced to a consideration of separate environmental, social and economic factors, the sum of which is less than the whole, that is, sustainability. Gibson expresses this concern by pointing out that there are sustainability-related discourses that are “not always incorporated in pillar-based sustainability literature and practice” (Gibson 2001, p17).

As the originator of the concept of holism, Jan Smuts, said: “In all of the previous cases of wholes we have nowhere been able to argue from the parts to the whole. Compared to its parts the whole constituted by them is something quite different, something creatively new, as we have seen. Creative Evolution synthesises from the parts a new entity not only different from them but quite transcending them. That is the essence of a whole. It is always transcendent to its parts and its character cannot be inferred from the characters of its parts” (Smuts 1999, p367).

In addition, Gibson points out that the three pillars of the triple bottom line, although recognised to be interconnected and interdependent, still “reflect more or less conventional modern disciplinary categories” (Gibson 2001, p7) whereas sustainability should be “necessarily an attack on conventional thinking and practice” (Gibson 2001, p6).

Based upon the preceding discussion, the conclusion is drawn that it is difficult, and probably inappropriate, to define a holistic concept of sustainability and corresponding criteria or conditions for sustainability from a triple bottom line starting point. Alternative approaches are discussed in the following section.

### **4.3.2 The Principles-Based Approach**

Several alternatives to the triple bottom line as a means of defining sustainability for the purposes of assessment have been proposed. These involve defining sustainability criteria or conditions derived from sustainability principles instead of triple bottom line goals, to avoid the limitations and challenges of the triple bottom line.

Gibson (2001) promotes the use of a principles-based approach to sustainability assessment instead of the triple bottom line ‘three pillar’ approach as adopted by the integrated assessment models already discussed, arguing that the pillar approach emphasises the potential conflicts between the pillars, and is more likely to result in trade-offs, whereas a principles-based approach emphasises interconnections and interdependencies between the pillar areas.

In presenting his model, Gibson says: “We have therefore chosen here to propose a slightly different approach – one that avoids constructing the edifice of sustainability criteria on the conventional pillars...The alternative, which is perhaps only superficially different from the pillar approach, is to begin not with categories based

on the usual areas of concern (ecological, social etc.) but with a list of the key changes needed in human arrangements and activities if we are to move towards long term viability and well-being” (Gibson 2001, p8).

Sadler discusses the potential use of indicators to define sustainability criteria, and concludes that “the better way forward is to establish ‘benchmark principles’ which are robust enough to evaluate the ‘sustainability contours’ of development proposals and choices” (Sadler 1999, p17).

George (2001) also reaches the conclusion that a principles-based approach to developing sustainability criteria is the more appropriate, after recognising the limitations of the objectives-led approach in the UK. He recommends an approach to sustainability assessment based upon fundamental principles of sustainability as defined by the Rio Declaration and Agenda 21 (George 2001), as does Sadler (1999).

The use of the Rio Declaration principles is also supported by the International Association for Impact Assessment (IAIA) in their performance criteria for SEA where it is suggested that the ultimate objective of sustainability assessment should be to determine how proposals can best contribute “to the overall sustainable development strategy as laid down in Rio 1992 and defined in the specific policies or values of a country” (IAIA 2002). Sadler (1999) calls assessment based upon sustainability principles ‘environmental sustainability assurance’.

‘Assessment for sustainability’ using criteria based upon sustainability principles avoids some of the inherent challenges of TBL integrated assessment, such as the practical difficulties of integrating environmental, social and economic concerns; the risk of trade-offs and the erosion of environmental standards (Gibson 2001), and the likelihood that a series of TBL goals will fail to fully describe the holistic concept of sustainability.

Three proposed sets of principles-based sustainability criteria are discussed below.

#### George’s Sustainability Criteria (George 1999; 2001)

Essentially, George considers that the principles of intra- and intergenerational equity are the cornerstones of sustainability (George 1999, 2001). From this basis and by incorporating other Rio Declaration and Agenda 21 principles including the participation principle (Principle 10); the local communities principle (Principle 22); and the precautionary principle (Principle 15), he develops a series of criteria for sustainability, in the form of questions to which the answer must always be ‘yes’ (George 2001). These are:

1. Have all social groups within the planning area (groups affected by the project) been identified, and have the social, economic and environmental impacts on each group been assessed separately where they are likely to be different, including different impacts on men and women?
2. Will the planning documents and the sustainability appraisal (or EIA report) be published and made readily available to all members of the public?
3. Will all members of the public have the opportunity to comment on the planning documents and sustainability appraisal (proposals), and will their views be taken into account before plans or planning guidance are adopted (a decision is made)?

4. Have suitable provisions been made for the participation of disadvantaged minorities in the planning process?
5. Has all relevant planning guidance been complied with?
6. Have significant transboundary impacts been identified and properly assessed, are relevant international agreements complied with, and will affected parties be consulted before final decisions are made?
7. Have all potential global impacts been identified and properly assessed, and are relevant global agreements complied with?
8. Have any potentially critical ecosystem factors that may be affected been identified?
9. Has the risk of serious or irreversible damage arising from any such impact been satisfactorily assessed, with suitable systems for monitoring and impact avoidance where needed, and using risk assessment techniques where appropriate?
10. If the risk of serious or irreversible damage is significant, or if a risk that is already significant may be increased, will the impact be fully mitigated, in kind, so that there will be zero adverse residual impact?
- 10a. Is any loss of natural habitat quantified, where it is important for species conservation?
- 10b. Is it demonstrated that the rate of loss will not exceed the equilibrium regeneration rate?
- 10c. Is an appropriate contribution to reducing greenhouse gases shown to be made, which is in accordance with the Kyoto Protocol?
11. Has the natural capital that may be converted into other forms of capital been identified?
12. Is it satisfactorily demonstrated that total capital will be conserved?

It is noted that some of these criteria relate to process rather than outcomes: for example questions 1-4 relate to community involvement in the decision-making process. This is because George relies upon participatory processes to deliver local and regional intra-generational equity; in other words that each social group will demand equity and obtain equity through the participation process. Similarly, Criterion 5, which addresses national intra-generational equity, assumes that “democratic processes have resulted in a national strategy, national objectives and national guidance for lower levels of policy-making and planning, which cater for the interests of other regions and the nation as a whole” (George 2001, p101).

In summary: criteria 1-4 address local and regional intra-generational equity; criteria 5 relates to national intra-generational equity; criterion 6 addresses trans-national intra-generational equity, i.e. short or medium range international impacts; criterion 7 global intra-generational equity, i.e. global impacts; and criteria 8-12 relate to intergenerational equity.

George considers that communities and individuals can generally be trusted to make appropriate decisions about social and economic benefits to be handed on to their ancestors, but that intergenerational equity is mainly about environmental issues and the conservation of capital, and therefore strict criteria to address these issues are required. His criteria incorporate the concepts of strong and weak sustainability, where strong sustainability requires that natural capital must be conserved, while weak sustainability allows for natural capital to be converted into another form of capital (George 2001).

George suggests that the application of strong or weak sustainability should depend upon the use of the precautionary principle (Rio Declaration Principle 15): “where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation”. Therefore, Criteria 8 and 9 determine whether strong or weak sustainability should be applied. George suggests that this decision should be made explicitly, and also suggests that the principle should be used without consideration of cost-effectiveness (George 1999, 2001).

Criterion 10 is the strong sustainability criterion. George suggests that biodiversity loss and climate change are sufficiently significant to require the application of strong sustainability (George 1999, 2001) and that compliance with the Biodiversity Convention and the Climate Change Convention (in accordance with the Rio Declaration Principle 7) would be a practicable test of this criterion (George 2001).

However, Criteria 10a, 10b and 10c reflect a condition of ‘working towards sustainability’ due to the limitations inherent in the Conventions; for example, the implication that intra-generational equity is met by the Kyoto Protocol, whereas it may not be in some cases such as island states (George 2001). They can also be considered as “time-limited weak sustainability” since they reflect the position that while increasing greenhouse gas emissions and loss of biodiversity are not sustainable, they will not be halted in the immediate future, particularly in developing countries where this would be inequitable (George 1999).

With respect to Criterion 10c relating to greenhouse gas emissions, George suggests that if there is no nation plan that distributed Kyoto targets, then the applicable targets must be applied across the board (George 1999).

Criteria 11 and 12 are the weak sustainability criteria. Weak sustainability raises issues of how natural capital should be valued for the different groups (local, national, international or global) who benefit from it. By necessity, values must be determined by the present generation (George 1999).

George has applied his sustainability assessment criteria retrospectively to a six projects of the type typically subject to EIA in the UK, to determine whether or not they could be considered sustainable according to his criteria. In doing this, he demonstrated that this approach is practical and can be effectively applied to addresses the fundamental question: ‘is this initiative sustainable?’ (George 1999). However, it is acknowledged that further trials should be conducted to further assess the practicality of this approach in different contexts.

#### Sadler’s Sustainability Principles (Sadler 1999)

Sadler’s approach is similar to George’s, in that it also takes as its starting point the principles of intra- and intergenerational equity (Sadler 1999). After discussing the need to elect a ‘standard for sustainability’ in terms of weak, moderate, strong or absolute sustainability, Sadler proposes both supply-side and demand-side strong sustainability principles.

The supply-side principles are:

1. "Avoid irreversible changes;
2. No or minimal impact on critical resource and ecological functions;
3. No net loss or deterioration of natural capital;
4. Renewable resources should be depleted (harvested or used) at a rate equal to their regeneration;
5. Non-renewable resources should be depleted at a rate equal to their replacement by renewable substitutes;
6. Waste emissions should not exceed the assimilated capacity of the environment or cause harmful effects to human health;
7. Conserve biological diversity, comprising the variability of ecosystems, species and gene pools" (Sadler 1999, p24)

Sadler's demand-side principles are based around the precautionary principle to be applied to individual decisions, as well as some principles for addressing structural causes of ecological unsustainability, whereas the supply-side principles are suitable as sustainability criteria against which sustainability assessment can be conducted.

Sadler's model strongly reflects a more ecologically-driven view of sustainability, whereas George's criteria more obviously reflect issues of social equality.

#### The Natural Step System Conditions

An alternative set of sustainability criteria is presented by The Natural Step, an organisation devoted to providing tools to support the implementation of sustainability. The Natural Step defines sustainability in terms of four system conditions or criteria for sustainability:

1. "Substances from the earth's crust must not systematically decrease in nature;
2. Substances produced by society must not systematically increase in nature;
3. The productivity and diversity of nature must not be systematically deteriorated;
4. Basic human needs must be met everywhere" (Sadler 1999, p22).

These system conditions reflect what Sadler terms 'absolute sustainability', since they require "non-depleting and non-damaging use of natural resources" (Sadler 1999, p21), and therefore represent the most stringent of the three sets of sustainability criteria discussed above.

#### Using Other Sustainability Principles

Rather than beginning with the Rio Declaration principles, combined with weak, moderate, strong or absolute interpretations of sustainability (George 1999, 2001; Sadler 1999), other sustainability principles can also be potentially used as the basis for the development of sustainability criteria.

For example, Gibson proposes a set of sustainability criteria to be used for this purpose. These are conceptually and substantively similar to those developed for Western Australia and summarised below (Government of Western Australia 2002, p28):

1. Long-term economic health;

2. Equity and human rights;
3. Biodiversity and ecological integrity;
4. Settlement efficiency and quality of life;
5. Community, regions, 'sense of place' and heritage;
6. Net benefit from development;
7. Common good from planning
8. Integration of the triple bottom line;
9. Accountability, transparency and engagement;
10. Precaution;
11. Hope, vision, symbolic and iterative change.

Sets of principles such as these have a broad scope and reflect an 'all-encompassing' view of sustainability. This contrasts with George's approach, for example, which is based upon only two principles: intra- and intergenerational equity. Arguably, this may make more difficult the task of translating these principles into sustainability criteria that define what is, and what is not, sustainable. However, this process would itself aid in clarifying what concept of sustainability is to be the model for Western Australia.

#### ***4.4 Developing Processes Based Upon Sustainability Criteria***

The above discussion concluded that a principles-based approach to developing sustainability criteria is more appropriate than a triple bottom line approach, and briefly three alternative sets of principles-based were briefly outlined. They are clearly very different from each other, based as they are upon different conceptualisations of what sustainability actually is.

While such sets of criteria such as these provide the basis for 'assessment of sustainability', they must be clarified for the relevant context before they can actually be applied within an assessment process (Gibson 2001). In practice, this is likely to involve the identification of the potential impacts of the initiative in question relevant to each sustainability criterion; assessment of significance of these impacts; establishment of 'acceptability thresholds' for the potential impacts deemed to be significant; prediction of the scale and magnitude of the likely impacts; and the assessment of the impacts against the 'acceptability thresholds'. This in turn will allow the assessment of the initiative against the sustainability criteria.

While it is beyond the scope of this paper to discuss the development of assessment processes in any more detail, several key points can be made.

Firstly, the sustainability criteria must define sustainability. This is a challenging concept, since has already been discussed, interpretations of sustainability vary considerably, even when founded on the same basic principles (Gibson 2001). While it is beyond the scope of this paper to discuss the meaning of sustainability in any depth, the conclusion can be drawn from previous discussion (for example, the evolution of the Western Australian definition of sustainability, and the criteria proposed by George (1999 and 2001)) that the sustainability criteria must reflect the principles of intra- and intergenerational equity in some way, as these are fundamental to the concept of sustainability.

Secondly, the clear definition of 'acceptability limits' for the various potentially significant impacts are essential to the process. These should reflect the sustainability criteria which form the basis of the assessment process and should effectively separate sustainable outcomes from unsustainable ones for the purposes of the assessment process.

Thirdly, since the potential impacts will vary depending on context, the process of identifying potential impacts, determining which ones are significant for the purpose of the assessment and establishing acceptability limits must be done on a case-by-case basis. This process can be aided by experience, as has been the case with environmental assessment processes. Tiering will also be important, in that higher level assessments can be used to "clarify sector and area specific sustainability principles, objectives and criteria" (Gibson 2001, p21).

## **5. Summary and Conclusions**

This paper has reviewed the evolving concept of 'sustainability assessment' by firstly considering its origins as a member of the family of environmental assessment processes that includes environmental impact assessment (EIA) and strategic environmental assessment (SEA), where a distinction was made between EIA-driven, baseline-led processes and objectives-led processes.

The potential for these processes to contribute to sustainability was then discussed. Typically, this has involved the expansion of the scope of environmental assessment processes to include social and economic considerations as well as environmental issues, reflecting the 'triple bottom line' or 'three pillar' approach to sustainability and resulting in forms of integrated assessment. Examples of EIA-driven and objectives-led integrated assessment were provided, and the risks and challenges of these approaches discussed. In particular, the practical difficulty of integrating environmental, social and economic considerations in a way which fully recognises interactions and interlinkages, and which maximises 'win-win-wins' and minimises trade-offs was acknowledged.

These forms of integrated assessment were then reviewed for their contributions to sustainability. It was argued that EIA-driven integrated assessment tends to focus on minimising negative impacts and reducing unsustainable practices, but fails to address the concept of sustainability as a societal goal. Objectives-led integrated assessment was found to be far more compatible with the concept of sustainability, since it assesses the contribution of a proposal to aspirational objectives, rather than against baseline conditions.

However, it was pointed out that most applications of integrated assessment processes in practice, even objective-led processes that attempt to define sustainability in terms of triple bottom line objectives, tend to limit themselves to measuring whether or not a proposal represents a positive or negative contribution to sustainability. In other words, they consider 'direction to target', where the target is a sustainable society. It has been pointed out that while this may be useful, it may not be sufficient to drive the kind of change required in the pursuit of this goal and that process are needed that actually assess whether an initiative is, or is not, sustainable. For the purposes of this paper, such processes have been termed "assessment for sustainability" processes.

‘Assessment for sustainability’ requires a clear definition of sustainability and corresponding sustainability criteria against which the assessment can be conducted. While sustainability criteria could theoretically be developed through a triple bottom line interpretation of sustainability, this approach has practical challenges and conceptual limitations. Several writers have therefore recommended principles-based criteria for sustainability that avoid the problems of the triple bottom line approach.

Three sets of principles-based criteria have been briefly discussed, which have been developed to the point where they can be effectively used to assess whether or not a proposal or activity is sustainable, according to the particular interpretation of sustainability they represent, as demonstrated by George (1999). However, it is acknowledged that further trials of the approach in different applications are needed. Furthermore, it was acknowledged that the establishment of sustainability criteria is only one step in the overall development and implementation of ‘assessment for sustainability’ processes.

Furthermore, ‘assessment for sustainability’ does not replace all applications of EIA-driven impact assessment or objectives-led processes of decision-making. Rather, it is an additional tool that can be effectively applied within a decision-making framework to ensure that decisions are in fact sustainable. It can also be used retrospectively as a stand-alone process to evaluate existing practices for sustainability. It can and should be applied broadly, to both proposed and existing practices, and to all levels of decision-making.

The major conclusions drawn are therefore:

- Sustainability assessment should assess whether or not an initiative is sustainable, and not simply assess ‘direction to target’. For the purposes of this paper, such processes have been termed ‘assessment for sustainability’;
- ‘Assessment for sustainability’ requires a clear concept of sustainability as a societal goal, defined by criteria against which the assessment is conducted;
- While theoretically a triple bottom line view of sustainability could be used as a starting point to develop these criteria, in practice this is unlikely to be successful, and principles-based approaches are recommended.



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