Sustainability Assessment Working Group Outcomes

1. Context

The State Sustainability Strategy Consultation Draft, which was released in September 2002, includes in its chapter on Sustainability and Governance, a commitment to developing frameworks and processes for sustainability assessment. Sustainability Assessment is described in the Strategy as "a new process that provides integrated advice to provide net benefit outcomes" (Government of Western Australia 2002, p36).

The Strategy includes commitments to "develop sustainability assessment of projects, plans, policies and programs as well as legislation, cabinet submissions, corporate plans and proposed government agreements" (Government of Western Australia 2002, p36) and an intent to "determine arrangements for sustainability assessment of state significant projects in its response to the Keating Review" (Government of Western Australia 2002, p39), referring to a recent study which was undertaken with a view to streamlining and integrating the various assessment processes for major infrastructure processes of State significance.

The Strategy also proposes two specific actions in relation to sustainability assessment:

1.1 "Establish transitionary arrangements for sustainability assessment including the establishment of a Social Assessment Unit in the Department for Planning and Infrastructure and an Economic Assessment Unit in the Department of Treasury and Finance. Capacity to address sustainability will also need to be developed within all relevant agencies".

1.2 "Establish an Industry-Government Working Group on Sustainability Assessment to further develop processes and practices" (Government of Western Australia 2002, p41).

The Sustainability Assessment Working Group was established in response to Proposed Action 1.2 above, with the aim of facilitating the identification and development of appropriate techniques and processes for sustainability assessment. The intent was to draw on the experience of the industrial sector, which had already begun to develop sustainability assessment processes as a tool for internal decision-making, and to evaluate the strengths and weaknesses of the available techniques.

Prior to the Sustainability Assessment workshops, a series of three workshops had been conducted in 2002, attended mainly by representatives from government, academia and NGO's, to discuss institutional and legislative requirements for sustainability assessment.

This document is a summary of the Working Group process and outcomes to date. Although it does not go as far as mapping the way forward, the Working Group outcomes provide the basis for planning the most appropriate way to process the sustainability assessment agenda.

2. The Sustainability Assessment Working Group

The Working Group was convened by the invitation of Professor Peter Newman, Director of the Sustainability Policy Unit in the Department of the Premier and Cabinet, in September 2002. The initial phase of the Working Group's activities consisted of a series of six workshops.

2.1 Role and Scope of Working Group

The role of the Working Group was defined as: "to discuss, share and develop sustainability techniques, with particular emphasis on the integration of environmental, social and economic decision-making". It was clearly stated by Professor Newman that the Working Group was in no way to be considered a government advisory group, but rather a group of professionals meeting to share experiences and ideas.

It was proposed that the outcome of the six workshop series should be documented as a proponent guide to sustainability assessment of project proposals, and including techniques, case studies, and the Working group's conclusions regarding the core requirements of an effective sustainability assessment technique.

The mandate of Working Group discussion was initially to be limited to internal proponent decision-making processes rather than extending to potential Regulator assessment processes, because it was unclear at that stage how the Keating Review recommendations relating to integrated assessment (as discussed above) would be progressed. However, it now appears that those responsible for progressing the Keating Review recommendations recognise the importance of the development of a sustainability assessment process for Western Australia to implement the Keating recommendations for integrated assessment, and are in effect waiting for the development of this process through the implementation of the State Sustainability Strategy. Therefore, the Working Group felt it was appropriate to extend the scope of its discussions to Regulator processes, institutional arrangements and legislative requirements in the interests of supporting the Keating Review process.

2.2 Working Group Membership

The actual attendees varied considerably between the six working group sessions. Of the 35 original invitees, 28 attended at least one workshop or sent a proxy representative. Throughout the workshop series, further invitations were extended, and other interested people requested to join the group. Approximately 55 people attended one or more workshops, with a core group of 14 attending four or more sessions. Typical attendance was between 25-30 people.

2.3 Working Group Sessions

Each Working Group Session commenced with presentations by members of the group, followed by discussion. In practice, these discussion evolved to cover a far greater spectrum of the overall picture of sustainability assessment than was originally envisaged. This is discussed further in Section 3 below.

The presentations made to the Working Group were as follows:

Workshop 1 Wednesday 18th September 2002:

Mr Bruce Larson (General Manager External Affairs, Rio Tinto Iron Ore)
"Hamersley Iron Sustainability Project"

Workshop 2 Friday 4th October 2002:

Dr David Annandale (School of Environmental Science, Murdoch University)
"Techniques for Sustainability Assessment: Lessons From Other Jurisdictions"

Dr Tony Golsby-Smith (2nd Road Thinking Systems)
"Strategic Conversations for Sustainability Assessment"

Workshop 3 Friday 18th October 2002:

Prof Peter Newman and Ms Jenny Pope (Sustainability Policy Unit)
"Role of the Working Group Revisited"

Mr Andrew Higham (Environmental Policy Unit)
"Current Status of the Keating Review for Major Projects"

Mr Peter Snepp (Office of Major Projects, Department of Minerals and Petroleum Resources)
"Initiating the Gorgon Gas Project"

Mr Mark Watson (Lead Environmental Advisor, Gorgon Project)
"Assessing the Sustainability of the Gorgon Gas Development"

Workshop 4 Friday 1st November 2002:

Ms Leanne Barron (Senior Policy Officer, WA Council of Social Services (WACOSS))
"WACOSS Model for Social Sustainability"

Workshop 5 Friday 15th November 2002:

Ms Kate West (Arup Consulting Engineers)
"The SpeAR Model for Sustainability Assessment"

Mr Peter Elliott (Senior Principal – Sustainability, URS Australia)
"Sustainability Assessment – Some Approaches and Evaluation Tools"

Workshop 6 Friday 29th November 2002:

Discussion on institutional arrangements for sustainability assessment

Several follow-up meetings were also held with Working Group members who had been unable to attend most of the workshop sessions, in the interests of obtaining their input to the discussion.

3. Working Group Discussions and Outcomes

This section describes the key points discussed at each of the workshop sessions and describes the evolution of the topics of discussion.

3.1 Workshop 1

Bruce Larson from Hamersley Iron described a technique developed in-house by Hamersley Iron for determining and developing the most sustainable option for the management of the mining company's pastoral leases. He also indicated that the technique has subsequently been used to aid in making decisions more closely related to Hamersley Iron's core business.

The key features of the Hamersley Iron technique as presented were:

- Represents a decision-making process which considers environmental and social issues from the pre-pre-feasibility stage right through to project completion, as opposed to a process driven solely by economics until the detailed planning stage;
- Used for internal decision-making (identification and development of the most sustainable option);
- Involves the identification of environmental, social and economic factors and prioritisation of these by internal and external stakeholders;
- Uses stakeholders to rank each option against the identified factors;
- Incorporates acceptability thresholds for each group of factors, which the selected option must meet;
- Encourages further development of options to ensure that thresholds are met for the broader groupings of environmental, economic and social factors.

Following questions relating to the Hamersley Iron technique, the group was asked to consider an appropriate way forward for the Working Group process, both in terms of future presentations and process for achieving the desired outcomes from the workshops. A tentative schedule for future workshop presentations was developed.

However, it quickly became clear that many members of the group were keen to extend the scope of discussion from internal proponent assessment techniques to also discuss topics such as the sustainability assessment of policies, plans and programmes; institutional arrangements for Regulator sustainability assessment etc. These topics were clearly outside the original mandate of the group and raised concerns about potential overlap with other government processes such as the implementation of the recommendations of the Keating Review.

It was therefore decided that there would be benefit in a focussed discussion about the role of the Working Group, to identify and acknowledge the concerns of some group members and to identify the way forward. It was suggested that Dr Tony Golsby-Smith of 2nd Road Thinking Systems would provide value in facilitating this discussion, and that he could be brought to Perth to facilitate a series of workshops relating to the implementation of the State Sustainability Strategy, of which the Sustainability Assessment Working Group would be one.

3.2 Workshop 2

In his presentation at the second workshop, Dr David Annandale introduced the group to the bigger picture of sustainability assessment, and explained some of the key concepts involved. These included:

- An explanation of Strategic Environmental Assessment (SEA), commonly defined as the assessment of non-project proposals (eg. policies, plans and programs) from an environmental perspective;
- The difference between EIA-driven assessment, which focuses primarily on minimising and mitigating the negative impacts of development (e.g. the current WA EIA processes under Part IV of the Environmental Protection Act 1986) and sustainability-led assessment, which aims to ensure that the proposal contributes to the achievement of simultaneous environmental, social and economic goals;
- The different requirements of an internal proponent decision-making tool used to develop a proposal and ensure it meets internal sustainability standards (such as that demonstrated by Hamersley Iron) and the process a Regulator might use to evaluate a proposal (in terms of both its positive and negative) within a sustainability framework;
- The difference between processes by a proponent to decide between different options (e.g. the Hamersley Iron example) as opposed to developing a single option to achieve sustainability goals (e.g. Gorgon – see Workshop 3);
- The different uses of the term "integrated", which could refer to substantive, methodological, procedural, institutional or policy integration.

Dr Annandale went on to describe numerous examples of SEA already being conducted in other jurisdictions and also highlighted recent work undertaken by the Netherlands EIA Commission. In considering the future of sustainability assessment in the Netherlands, the Dutch working group reached the following conclusions:

- Sustainability assessment should be structured as an ex-ante decision-making tool rather than an ex-post evaluation process;
- Sustainability assessment should encourage political judgement rather then be a substitute for it;
- Sustainability assessment is not necessarily quantitative appraisal;
- The focus of sustainability assessment should be on how to reduce the risk of transfer from one domain (in time and place) to another (a framework has been proposed consisting of a three by three matrix of impacts (environmental, social and economic impacts against the domains of "here and now", "later" and "there").

Dr Tony Golsby-Smith then presented the group with the concepts of "second road thinking" and the particular technique of "Strategic Conversations". He led a discussion in which group members were encouraged to express their views on the Working Group's mandate and processes, and on sustainability assessment more generally. He then suggested that dialogue-based processes such as those he uses in his work are important to supplement the analytical techniques we are more familiar with through EIA and techniques such as the Hamersley Iron example, to develop

creative solutions to seemingly intractable and overly complex situations. Some of his key points were:

- Logical thinking methodologies are only appropriate in relation to natural science with stable data, not requiring human judgement. Otherwise we need alternative thinking processes (Aristotle's Second Domain);
- The human mind is actually able to hold only small numbers of pieces of information (3-7) at any one time, making purely analytical approaches to complex concepts like assessing sustainability almost impossible due to our inability to see the whole picture when confronted with too much information (and therefore the proposed Dutch sustainability assessment framework is a good example of a simple and manageable conceptual framework);
- Although a mature understanding of the issues is necessary to make a good judgement, the overuse of jargon in explanation creates a "conceptual black hole" particularly to stakeholders with a non-technical background;
- Rational decision-making is a myth – ultimately it comes down to determining whether something is "good" or not, and this decision will not be reached using purely analytical tools.

Dr Golsby-Smith's presentation was particularly inspirational to many group members who had not previously been exposed to these ideas, and the relevance of these concepts to any sustainability assessment processes which may be developed in the future was clearly evident.

3.3 Workshop 3

In acknowledgement of the fact that a significant number of new members had joined the Working Group by this point, and that there had been considerable discussion about the group's role, the third workshop commenced with a reiteration of the role of the Working Group, and the context in which it was operating, by Professor Peter Newman and Ms Jenny Pope. Prof. Newman emphasised that the group was established to focus on evaluating different techniques of assessment, and particularly techniques for integrating consideration of environmental, social and economic concerns.

Some of the issues and concerns raised during the first two workshops were also highlighted, including:

- Concerns about the appropriateness of discussing proponent techniques in isolation from the broader context, especially Regulator processes where applicable;
- Concerns about sustainability assessment of policies, plans and programs etc – who is looking at this?
- Concerns about interaction with the Keating Review process;
- Concerns about smaller projects (those not falling within the Keating Review mandate) – how will these be assessed?
- Intellectual property concerns (a commonly expressed view was "why are we giving up our time to help project proponents who are potentially competitors or paying clients?").

Mr Andrew Higham then addressed the group on the topic of the Keating Review process, the main points being:

- Recommendation 56 of the Independent Review Committee's Final Report for the Review of the Project Development Approvals System (the Keating Review) discusses the introduction of an integrated approvals process for major projects of State significance;
- There is broad support for the assessment of sustainability to become central to the overall development decision within an integrated assessment framework;
- While there had been concern that discussing the potential government processes and institutional arrangements for the sustainability assessment of major projects within the Working Group would overlap with the Keating Review team's mandate, it now appears that the Keating review team is awaiting the release of the State Sustainability Strategy and the associated assessment process in order to progress the implementation of its recommendations. This effectively gave the Working Group the mandate it was looking for to discuss the broader issues of sustainability assessment, including Regulator processes and institutional arrangements, and highlighted the need for good communication between the two groups.

The following conclusions were reached during the subsequent discussion:

- The responsibility for initiating the development of sustainability assessment processes to address the perceived "gaps" of policies, plans and programs and smaller projects, rests with government, and particularly the Sustainability Policy Unit;
- It is important to recognise the interdependence of proponent techniques, Regulator processes and institutional arrangements and to ensure there is communication and common understanding between the different groups working on each of these areas. To this end additional representatives of the Keating review team should be invited to join the Working Group, as well as representatives from groups likely to be involved in future economic and social assessment processes (specifically the Department of Planning and Infrastructure and the Department of Treasury and Finance as per the State Sustainability Strategy proposed action discussed in Section 1);
- The final session of the Working Group on November 29th to be reserved for a discussion around the issue of institutional arrangements for sustainability assessment.

Mr Peter Snepp and Mr Mark Watson then gave their respective presentations on the assessment process currently underway for the proposed Gorgon gas development by ChevronTexaco. The major points were:

- A special assessment process (with limited statutory support, apart from the provisions of s16(s) of the EP Act) has been developed by government to assess the proposed use of Barrow Island (a Class A Nature Reserve) for a plant to process gas from the Gorgon gasfields off the north-west coast of WA;

- This is a strategic-level assessment, and if Cabinet gives its approval in principle to the use of Barrow Island, the project will still require the normal Part IV EIA;
- Government has already indicated that it expects a net benefit to conservation from the development;
- The proponent is preparing a Review Document for public comment, addressing the issues identified in the Strategic, Economic and Social Guidelines prepared by the Department of Minerals and Petroleum Resources (MPR) as well as the relevant environmental issues. During the public comment period, MPR, the EPA and the Conservation Commission will review the document and prepare three separate Bulletins. A summary report will be prepared with the Bulletins attached, and this will also be subject to public review before Cabinet makes a final decision on whether or not access to Barrow island should be granted;
- ChevronTexaco has developed a sustainability framework to reflect the breadth and complexity of the issues, which consists of sustainability principles, criteria and measures. The proponent intends to demonstrate how each commitment within this framework will be met;
- The proponent has been requested to include consideration of alternative locations in its Review document, although it is not expected to prepare a full review for each possible location.

The Gorgon example is conceptually different from the Hamersley Iron technique, as the assessment of whether the development should be allowed to go ahead in this particular location is to be undertaken by government based upon the information provided by the proponent. In essence, Cabinet must decide whether the development is in the best interests of Western Australia, assuming that commitments made in the Review document deliver sufficiently beneficial economic and social outcomes; that potential environmental impacts are identified, minimised and mitigated through the Part IV EIA process; and net conservation benefits can be demonstrated. The alternative against which the proposal is considered, given that the proponent firmly believes that Barrow Island is the only commercially feasible location for the gas processing plant, is the "no development" option.

3.4 Workshop 4

Workshop 4 provided the Working Group with an opportunity to focus on the social aspects of sustainability. Ms Leanne Barron of WACOSS gave a presentation on the recently released Model for Social Sustainability, which represents Stage 1 of WACOSS's Housing and Sustainable Indicators Project.

The subsequent discussion covered a wide ground, and included debate about the fundamental concepts of sustainability. Some of the main points made are summarised below:

- Sustainability is about addressing market failures. Markets don't deliver equity, so therefore we need to identify interventions to achieve equity, which may include subsidies, charity and maybe some others. This is crucial to the implementation of social sustainability;
- We are good at defining principles for sustainability (such as those articulated in the WACOSS model), but have we defined the processes necessary to move

from principles to outcomes? To do this we need to identify what must change in current systems to allow the desired outcomes to be achieved (e.g. market conditions, instruments, culture etc);

- A process was proposed for redesigning systems as follows:
    - Put up model of existing system (how things work now);
    - Put up sustainability principles;
    - Determine how these principles impact on the existing system and therefore where the existing system needs to change;
    - Identify appropriate change measures;
    - Prioritise these change measures, i.e. determine which ones are the most significant in ensuring that the system supports the principles and delivers the desired outcomes.
- Implementation of sustainability means challenging the norm;
- It is difficult to achieve multiple principles and goals, as changing one is likely to impact on all the others.
- The question of whether society has a vision of "successful sustainability" was debated. Some of the group felt that this is "too hard" and that the best we can do is to take small steps in what we believe is the right direction, while others believed that it should be possible to articulate the gap between where we are now and where we want to be, and to plan the necessary journey;
- It is easier and more meaningful to conduct sustainability assessments in the context of appropriate regional goals;
- Regional sustainability assessments should consider current unsustainable practices as well as project proposals, and consider small projects as well as large ones (avoiding "death by 1000 cuts"). They should be conducted in the context of understanding historical problems (through State of the Environment reporting) and planning for a sustainable future (e.g. through scenario planning).

3.5 Workshop 5

Workshop 5 provided an opportunity for two consultants working in the area of sustainability assessment to present their techniques and their views.

Ms Kate West of Arup Consulting Engineers gave a presentation on Arup's Sustainable Project Appraisal Routine (SpeAR) tool for conducting sustainability assessments. In many ways this technique is similar to that of Hamersley Iron, and has been successful utilised by Arup to assess projects, programs and corporate sustainability strategies. Some of the main points about the SpeAR model are:

- The SpeAR diagram is divided into quadrants (environment, societal, natural resources and economic), sectors and indicators;
- Appropriate indicators are developed in conjunction with clients for each of the four "quadrants". These are based on indicators developed by the UN, the Global Reporting Initiative (GRI) and other sources. Approximately 15% of indicators used in any case will be developed to be project-specific;
- Performance against each indicator is then determined and an average score developed for each sector. In the case of more qualitative indicators, this process is conducted in conjunction with stakeholders;

- Recommendations are then developed based on the assessment findings, and a prioritised action plan is developed. Although significance weighting of indicators is not conducted per se, in practice this occurs during the prioritisation of recommendations.

Mr Peter Elliott of URS gave a broad-ranging presentation, suggesting that there is no shortage of available analytical tools to aid sustainability assessment, and that the context in which such assessments are conducted is far more important. He discussed the importance of being clear about what we are assessing; the challenges of defining the objectives; what really adds value; and how to measure success.

Some of his main points were:

- At present, proponents attempting to incorporate sustainability principles into their projects are being forced to develop their own sustainability criteria, due to a lack of a clear vision and a defined sustainability framework from Government;
- This means that criteria vary widely between projects, companies and industry sectors, because "sustainability" means different things to different people and because the context is different in each case;
- If we fail to get the sustainability framework right, and to articulate it clearly (preferably in the State Sustainability Strategy) then the sustainability agenda will flounder and there will be significant backlash;
- The framework should consist of the Government's long term vision for sustainability in Western Australia; government policies (with defined owners who understand the implications of these policies), plans and programs and projects (to meet both business drivers and sustainability principles);
- Business has two main opportunities to apply sustainability principles: at the pre-feasibility stage of project development and by integration into management systems and processes (including internal policies, standards, process and behaviours);
- It is important to determine the value premise for sustainability. The triple bottom line is still not a reality to proponents and therefore values are related to the business case and business risks. To what extent should stakeholder values be considered? (not all stakeholders are equal);
- To achieve the behavioural changes and desired outcomes (however they have been defined), we need to identify the gap between the current and desired states and to apply total systems thinking to identify the critical processes and behaviours that need to change (see also notes on the discussion in Workshop 4);
- We need to measure the right things to assess progress towards the desired outcomes, which means the right balance between process, outcome and behavioural (value) measures;
- Considerations in the performance evaluation of a project include: appropriateness (whether the objectives align with sustainability principles/goals/values); effectiveness (the extent to which objectives are actually achieved); efficiency (the extent to which inputs are converted to outputs) and cost effectiveness (the relationship between inputs and outcomes in dollar terms);

- The use of assessment techniques is a small part of the overall process and there are many tools available, including decision analysis, matrix analysis, goal attainment setting (e.g. Hamersley Iron technique and Arup's SpeAR), logical framework approach, pressure state response, multi-criteria analysis, sensitivity analysis, cost benefit analysis, URS's Risque model.

3.6 Workshop 6

As agreed at Workshop 3, Workshop 6 was put aside to discuss institutional arrangements for sustainability assessment.

Professor Bryan Jenkins presented to the group a potential process framework for sustainability assessment, which recognises the links between government and proponent activities (particularly the need to feed back actions resulting from assessment processes to government as well as proponents); the importance of the "trickledown" of sustainability assessment from policy, program and plan level (particularly regional sustainability plans) to individual projects; and the need to assess and improve existing unsustainable practices as well as new proposals. The Working Group responded vary favourably to this framework, with most members feeling that it provided a positive way forward. The framework has subsequently been developed into a paper, which is to be published in the February 2003 issue of the Environmental Planning and Law Journal, by Prof. Jenkins, Dr David Annandale and Dr Angus Morrison-Saunders, all of Murdoch University. A late draft of this paper is appended to this document.

3.7 Follow-up Meetings

Several additional meetings were held with key members of the Working Group who had been unable to attend the majority of the workshop sessions. The outcomes from these meetings are discussed here.

A meeting was held between Prof. Bryan Jenkins (Murdoch University), Mr Peter Elliott (URS Australia) and Ms Jenny Pope on 20th December 2002 to further discuss the framework presented by Prof. Jenkins at Workshop 6. The conclusion reached at this meeting was that:

- A think-tank process is required to progress the development and implementation of the framework. This should involve representatives from industry as well as government. The process could be expected to take approximately 12 months and involve 10-12 people (as an umbrella group, which could be supported by other groups). The umbrella group would be mandated to develop the framework as well as strategies and processes for its implementation, and present its findings to Cabinet for endorsement.

A further meeting was held on 14th January 2003 between Dr Bernard Bowen (Chairman of the Environmental Protection Authority); Mr Rob Sippe and Mr Colin Murray (Department of Environmental Protection); Mr Andrew Higham; Mr Michael Rowe and Ms Jenny Pope (Department of the Premier and Cabinet).

After discussing the outcomes of the Working Group process, the following points were made:

- Project sustainability is less significant in the overall picture than cultural/behavioural change, policy analysis, programmes and plans, regional plans and existing unsustainable practices. We are not good at policy analysis at the present;
- Each of these areas contributing to sustainability requires a different approach;
- Existing unsustainable practices (e.g. agriculture) are a major issue. The Government should take strong action to require that private landholders meet their moral obligations to the wider community, for example through enforced management plans;
- Government leadership is required, both in terms of mapping the way forward and in taking a leadership role in conducting sustainability assessments of its own activities;
- The State's expectations of business should be clearly stated;
- In conducting sustainability assessment it is important to minimise trade-offs between environmental, social and economic goals and to establish acceptability limits. Experience from the EIA process indicates that this is difficult and that acceptability limits will have to evolve over time, but we can define minimum acceptable standards and gradually tighten these;
- Integration of environmental, social and economic considerations during and assessment process may not be realistic;
- We need to keep the assessment process simple, and structure it in such a way that its benefits are apparent and no-one can object to it.

4. Where Are We Now?

As can be seen from the details in Section 3, the Working Group process covered significant ground, most of which was not directly related to the original role of the group of discussing sustainability techniques appropriate for use internally by project proponents. It is therefore not possible at this point to prepare a proponent guidance document as was originally planned. However, the Working Group process had some significant positive outcomes, including:

- The formation of a core group of professionals willing and able to support the Government in developing and implementing sustainability assessment processes in Western Australia;
- The provision of a forum for stimulating discussions, which have effectively "opened up" the sustainability assessment agenda, which in turn should lead to the development of better assessment processes in the long term.

The current state of affairs with respect to the sustainability assessment of proposals can perhaps be summarised as follows:

- To meet the commitments in the State Sustainability Strategy Consultation Draft, the Government needs to take significant steps towards implementing sustainability assessment processes for:
    - Government policies, plans, programs, legislation, cabinet submissions, corporate plans and proposed government agreements;

    - Development projects of State significance.
- Project sustainability assessments, including the development of appropriate objectives for the development, must be undertaken within the broader policy context, whether they are undertaken internally by proponents or externally by Regulators. Therefore, it is vital that the Government's vision of sustainability and expectations of business are clearly articulated;
- Ultimately, sustainability assessments should be conducted within an integrated framework, to ensure consistency of objectives and the effective management of issues arising from assessments undertaken (refer to attached paper). However, it is unlikely that such a framework can be implemented quickly, and there is a need to take some initial, simple steps within the term of the current government;
- If sustainability assessment is considered in terms of an overall framework (as discussed previously); processes (likely to be different for different types of assessments, e.g. policies, plans and programmes versus projects versus existing unsustainable practices) and analytical techniques, the following comments can be made:
    - A structured and integrated framework is ultimately essential but likely to be a long term goal (as discussed previously);
    - Little thought has been given to date to appropriate sustainability assessment processes, although there is literature available from other jurisdictions. Some of the issues yet to be addressed in the development of a sustainability assessment process for Western Australia are:
        - Which project proposals should be subject to sustainability assessment?
        - Should the process be structured as an ex-ante decision-making tool rather than an ex-post evaluation process (refer to notes on the proposed Dutch model in Section 3.2);
        - Should the environmental, social and economic assessment processes be fully integrated?
        - If so, is there a need for transitional arrangements as an interim approach (refer to State Sustainability Strategy commitments for three assessment units, also the framework proposed in the appended paper)?
        - What changes are necessary (including changes to institutional arrangements and legislation) to implement an effective sustainability assessment process (refer to appended paper)?
        - Which stakeholders should be involved in assessment processes?
        - By what means should different stakeholder values be converted to meaningful objectives, targets, criteria and indicators for the project?
        - To what extent should analytical techniques be used compared with stakeholder dialogue processes (refer to Section 3.2)?
        - How should acceptability limits be established?
        - How should unavoidable tradeoffs be managed?
    - Practitioners working in the field of sustainability assessment have a wide range of analytical tools available to aid in conducting an assessment (see Section 3.5);
- Therefore, while there is a need to progress the development of the sustainability assessment framework (as per discussion in Section 3.7), there is also a need to

develop at least "first pass" processes to enable the government to meet its commitments discussed above and demonstrate acceptable progress;

- Members of the Sustainability Assessment Working Group have expressed a willingness to be involved in these activities, and they represent an extremely valuable resource;
- The Sustainability Policy Unit is responsible for guiding the implementation of the State Sustainability Strategy. At this point, an overall strategy for the development and implementation of sustainability assessment processes, based upon these Working Group outcomes, should be devised.

5. References

1. Government of Western Australia (2002). Focus on the Future. The Western Australian State Sustainability Strategy Consultation Draft. Department of the Premier and Cabinet. Perth.

Evolution of a Sustainability Assessment Strategy for Western Australia

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The Western Australian government has committed itself to developing a sustainability assessment process for projects, plans, policies and programs as well as legislation, Cabinet submissions, corporate plans and proposed government agreements. This paper briefly reviews some of the challenges posed by sustainability assessment. It then presents an integrated approach for a process that could be implemented in Western Australia with minimal amendment to existing legislation and administrative bodies.

Introduction

Western Australia has a well-established environmental impact assessment process, and a track record for dealing comprehensively with the evaluation of project-level development proposals.[1]

As with most other jurisdictions, however, Western Australia is less experienced with the techniques and administrative processes required to manage 'sustainability assessment'. Sometimes called 'integrated assessment', or 'triple-bottom-line assessment', the purpose of sustainability assessment is to simultaneously analyse the impacts of a proposal on a combination of environmental, social, and economic 'receptors'.

In its policy platform prior to the 2001 State election, the ALP promised to: establish an Ecologically Sustainable Development (ESD) Unit to develop a strategy for sustainability to monitor and report on progress towards sustainable development and undertake ESD assessment of Cabinet submissions, proposed legislation and agreements entered into by Government.[2]

This promise led the Gallop Government to establish a Sustainability Unit within the Department of the Premier and Cabinet, and drove a series of discussions and consultations focused on designing a new administrative system that could deal with sustainability assessment of traditional projects, and of so-called 'strategic initiatives' such as policies, plans, programmes, legislation, and Cabinet submissions.

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[1] Wood C., 1995, *Environmental Impact Assessment: A Comparative Review*. Harlow: Longman. Annandale D., 2001, 'Developing and evaluating environmental impact assessment systems for small developing countries'. *Impact Assessment and Project Appraisal*, 19(3):187-193.

[2] Labor. Environment: Executive Summary. www.votelabor.org (accessed February 2, 2001).

It has become clear over the course of 2002 that the Western Australian institutional framework does not support the effective processing of proposals assessed from a sustainability perspective. This article examines why this situation exists, and proposes a comprehensive institutional framework that would allow for a broad consideration of sustainability issues. It is our belief that a number of the lessons learned from this exercise can be generalised to other jurisdictions.

The article begins by introducing the Western Australian Government's main response to its pre-election sustainability policy promises: the draft State Sustainability Strategy[3]. This document takes some tentative steps towards an outline of a sustainability assessment system as well as recommending 'sustainability action plans' as a requirement for all government agencies and 'regional sustainability strategies' to encourage the pursuit of sustainability at a regional scale. The article then extends the suggestions made in the Sustainability Strategy, to propose a new and comprehensive institutional arrangement.

The draft state sustainability strategy

In September 2002, the Premier of Western Australia released a draft consultation document known as the Western Australian State Sustainability Strategy. This substantial document was open for public comment until January 2003.

While the Draft Strategy did not attempt to present a fully-formed institutional arrangement for sustainability assessment, it did offer some "pieces of the puzzle". In particular, the Draft Strategy commented on the need for: sustainability assessment of proposals; regional sustainability strategies; and Government agency sustainability action plans.

The next three sections of this article will examine how these institutional mechanisms have been proposed in the Draft Strategy, how they have been dealt with in other jurisdictions, and the limitations they present when proposed without consideration for other needed aspects of a comprehensive framework.

Sustainability assessment of proposals

The existing EIA process in WA has been well-described elsewhere.[4]. The current model for EIA of proposals in WA is summarised in Figure 1. Proponents are responsible for the environmental management of their proposals, and must demonstrate that their proposed mitigation measures will meet environmental objectives and other assessment criteria established by the Environmental Protection

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[3] Government of Western Australia 2002. *Focus on the Future: The Western Australian State Sustainability Strategy Consultation Draft*. Government of Western Australia, 235pp. http://www.sustainability.dpc.wa.gov.au/docs/Draft_Strategy.htm (accessed December 9, 2002).

[4] Morrison-Saunders, A. and J. Bailey 2000. Transparency in EIA Decision-Making: Recent Developments in Western Australia. *Impact Assessment and Project Appraisal*, **18**(4), 260-270.

Authority (EPA)[5]. Assessments of proposals by proponents are available for public comment and are evaluated by the EPA. The Minister for the Environment decides on the acceptability of the proposal and the conditions to be imposed if it is allowed to proceed.

[5] Government Gazette (2002). *Environmental Impact Assessment (Part IV Division 1) Administrative Procedures 2002*. Government Gazette, WA, No. 26 special, 8 February 2002, 561-580. http://www.epa.wa.gov.au/docs/1139_EIA_Admin.pdf (accessed August 6, 2002)

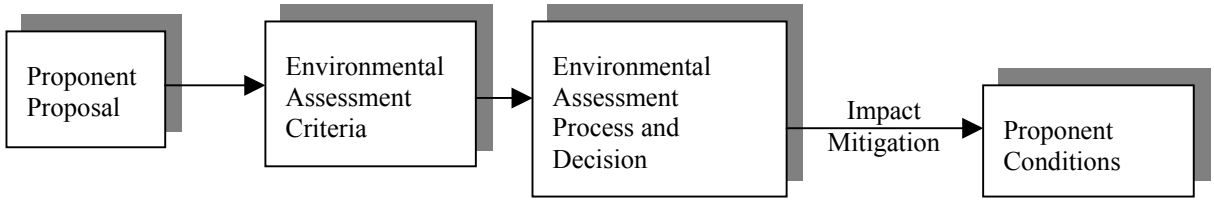

Figure 1 Steps in the current EIA process

The strengths of the current EIA process and its level of acceptance by stakeholder groups has been recently acknowledged[6]. This process focuses on biophysical matters with minimal account given to social and economic areas, hence EIA only partially addresses sustainability assessment requirements. However, in light of the successful track record of EIA in WA, one approach to sustainability assessment would be to extend the capabilities of EIA to incorporate the necessary social and economic inputs (Figure 2).

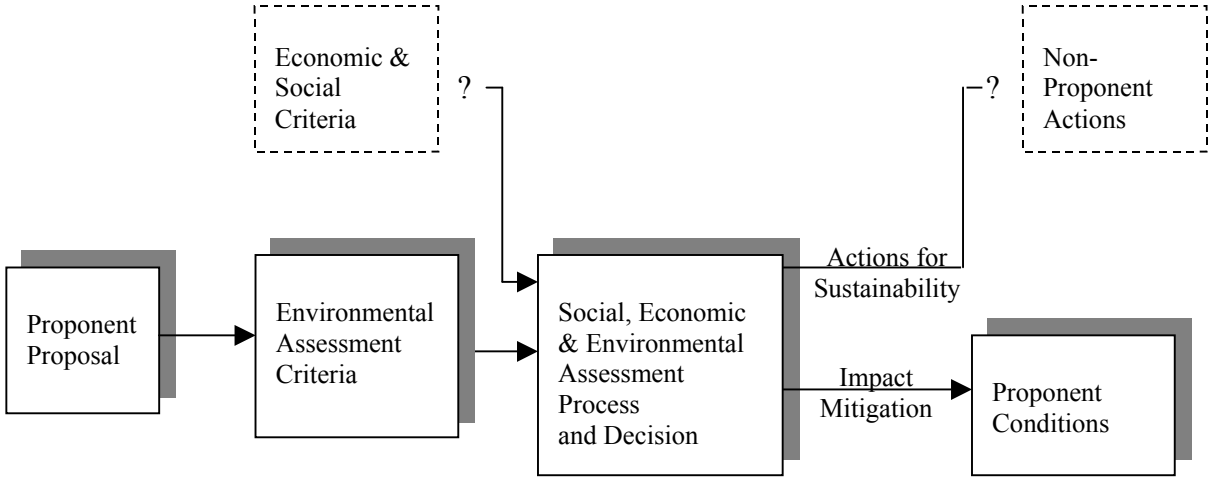

Figure 2 Extension of the Existing EIA Process to Incorporate Social and Economic Issues

A similar ad hoc assessment process has been initiated by the Western Australian Government for a proposed major oil and gas field off the north-west coast, known as the Gorgon project. The intention here is that the Office of Major Projects will prepare a social-economic-strategic assessment for public comment which will parallel the EPA's environmental assessment process[7]. It remains to be seen how this process will work in practice. However a major weakness of this approach, as indicated by the question marks and dotted lines in Figure 2, is that no current mechanism exists to provide economic and social criteria upon which sustainability assessment will be based. Similarly it is not clear how proposed actions for

[6] Independent Review Committee 2002. *Review of the Project Development Approvals System: Final Report*. Perth, Western Australia pp41-42 http://www.premier.wa.gov.au/main.cfm?MinId=01&Section=0110 (accessed December 9, 2002)

[7] Government of WA 2002, op cit, p38.

sustainability that cannot be imposed as proponent conditions or require action by the various government agencies will be implemented in practice.

Under the current EIA process, proponents are responsible for environmental management of their proposals (predominantly biophysical aspects, and generally within the confines of the project site boundaries) and requirements for these are stipulated in legally binding approval conditions issued by the Minister for the Environment and Heritage. However, when the scope of assessment is broadened to include social and economic aspects for the purposes of sustainability assessment, many management actions will transcend both the proponent's project site and their responsibilities. For example, provision of social infrastructure (eg. regional planning, health, education, communication etc.) and issues such as equity in employment and wealth distribution will become the responsibility of numerous government agencies, including local, state and federal levels of jurisdiction.

The idea of extending the capabilities of EIA to incorporate social and economic considerations is not new. Robert Gibson has put forward a similar model for use in Canada[8]. He notes that adopting sustainability-based criteria in EIA means using environmental assessment as a mechanism for forcing attention to sustainability principles and ensuring positive contributions to achieving sustainability objectives. This entails adjusting EIA processes and practices to force and facilitate application of these principles in the planning and approval of projects, activities, plans, programmes, policies and other undertakings likely to affect prospects for sustainability[9].

One problem that Gibson notes with the integration of sustainability principles into the EIA process concerns compromises and trade-offs[10]. One of the strengths of the current EIA process in WA is that the EPA reports only on environmental matters and provide recommendations to the Minister. Proposals that impact on the environment usually provide perceived social and economic benefits to the community. It is the Minister, in association with other ministers or Cabinet, who determines whether a proposal should proceed or not. This means that any trade-off between environmental losses and economic gains is made at the political level. . The danger of extending the EIA process to incorporate sustainability principles is that these trade-offs may start to occur throughout the entire assessment process.

Agency action plans

The concept of government agency sustainability action plans was introduced in Canada in 1995 when legislation[11] required all Canadian federal departments and several designated agencies to prepare Sustainable Development Strategies (SDS) for

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[8] Gibson, R. 2001. Specification of sustainability-based environmental assessment decision criteria and implications for determining "significance" in environmental assessment. Department of Environment and Resource Studies, University of British Columbia. http://www.sustreport.org/downloads/Sustainability,EA.doc (accessed December 9, 2002)

[9] ibid at p52

[10] ibid at p53

[11] 1995 amendments to the Canadian *Auditor General Ac*

review by Parliament with the assistance of a new Commissioner of the Environment and Sustainable Development. The federal Green Guide[12] to Government also adopted in 1995 in Canada suggested the following components for an SDS:

- Department Profile;
- Issue Scan;
- Consultations;
- Goals, Objective and Targets;
- Action Plan; and
- Measurement, Analysis and Reporting of Performance.

One of the significant institutional aspects in Canada in relation to SDS has been the establishment of the Commissioner of the Environment and Sustainability as an integral part of the Office of the Auditor General of Canada. The Commissioner monitors the extent to which departments have implemented the action plans and met the objectives outlined in their strategies.

However, there is one thing lacking the Canadian system, and that is an overall government assessment of priority actions to achieve sustainability. In discussions with Commissioner's staff in 2000, the need was seen for a 'State of Sustainability' Report along the lines of the Western Australian 1998 State of Environment Report[13] which identified priority environmental issues to be addressed and appropriate management responses to tackle these issues. A State of Sustainability Report would need to cover priority social and economic issues as well as environmental issues. As one commentator[14] states: 'at present the SDS exercise is simply that - a legislated requirement imposed on the bureaucracy, to which all departments have conformed, but without yet transforming their policies and operations to the extent anticipated by the legislation and strived for by the Commissioner'.

The institutional arrangements in Canada can be contrasted with the establishment of the Resource Assessment Commission in Australia. It was established as an agency to make recommendations on how to balance economic, social and environmental factors in resource management decisions. In a democratic society, the balancing act is the role of the political arm of the system rather than the bureaucratic arm. While there is a need for accurate information that can be placed in a sustainability framework, there is a difficulty in institutional arrangements where agencies in essence take on a role which is usually the province of their political masters.

Regional sustainability strategies

After a decade of trying to implement Agenda 21 at a national level, a number of recent reviews of how to progress towards sustainability are concluding that the

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[12] Government of Canada 1995. *A Guide to Green Government*. Minister of Supply and Services, Ottawa.

[13] Government of Western Australia 1998. *Environment Western Australia 1998: State of the Environment Report*. Department of Environmental Protection, Perth, WA.

[14] DVJ Bell, 2002 *Canada's Commissioner of the Environment and Sustainable Development: A Case Study*, York Centre for Applied Sustainability, York.

appropriate scale to address the concept is at the regional or subnational level[15]. These reviews suggest that regions are an appropriate basis for considering sustainability. Also, the transition to sustainability will require the implementation of proactive strategies and not just reactive assessments of other policies and proposals.

A precedent for regional sustainability strategies comes from the integrated regional development planning adopted by the Organisation of American States in the 1980s[16]. This planning approach incorporated a regional diagnosis of economic, social and environmental issues in order to develop a strategy that dealt with them in an integrated way. This approach was considerably refined by the Asian Development Bank throughout the late 1980s, and early 1990s.[17]

In Western Australia, the closest existing mechanism is regional statutory planning. While there has been a long history of regional statutory planning in the Perth metropolitan region, there has only been a legislative authority for statutory planning in other regions since 1994[18]. Only the Peel and Bunbury regions have been addressed so far, although non-statutory land use strategies have been developed for other regions.

However, the emphasis of these strategies has been on land use planning to facilitate projected development rather than on the achievement of sustainability. The need to broaden land use planning for sustainability has been recognised in the United Kingdom where sustainability appraisal has been added to regional planning[19]. This does not go as far as integrated economic, social and environmental planning which is needed for regional sustainability strategies.

The other regionally-focused institution in Western Australia is the Regional Development Commission. There are nine Commissions representing amalgamations of local government areas covering Western Australia. However, the mandate of the commissions is economic development[20]. There would need to be a statutory change and a broadening of their skill base for these commissions to address sustainability at a regional level. The commissions with their close links to local government and community representation do provide the 'bottom-up' mechanism to complement the 'top down' regional statutory planning.

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[15] US National Research Council 2000. *Our Common Journey: A Transition Towards Sustainability*. National Academy Press. World Economic Forum 2002. *2002 Environmental Sustainability Index*. http://www.ciesin.columbia.edu/indicators/ESI (accessed September 2, 2002)

[16] Organisation of American States 1984. *Integrated Regional Development Planning: Guidelines and Case Studies from Organisation of American States Experience*. OAS, Washington DC.

[17] P King, D Annandale, and J Bailey 2000. Integrated Economic and Environmental Planning at the Subnational Level in Asia. *Journal of Environmental Assessment Policy and Management*. **2**(3): 317-338.

[18] *Planning Legislation Amendment Act* (No. 2) 1994 (WA)

[19] Department of Environment, Transport and the Resource 2000. *Good Practice Guide on Sustainability Appraisal of Regional Planning Guidance*. HMSO, London.

[20] *Regional Development Commissions Act* 1993 (WA), s23

Integrated approach to sustainability assessment

Rather than have three separate components to progress sustainability, sustainability assessments of proposals, policies and programmes, regional sustainability strategies and agency sustainability action plans could be brought together. A new and comprehensive institutional arrangement for sustainability assessment in Western Australia is shown in Figure 3. The model has been designed to integrate with the draft state sustainability strategy and to require minimal legislative amendment to be made operational. Salient features of this model are now discussed.

Non-proponent conditions and positive actions

Two of the major limitations of EIA are that it can only place conditions on proponents, and that it focuses on impact mitigation in reaction to a proposal rather than proactive approaches to improve environmental outcomes. While these limitations can be accommodated in EIA, it is a major deficiency in sustainability assessments because actions by non-proponents and proactive approaches to facilitate the transition to sustainability are essential.

The integration of the regional sustainability strategies and agency sustainability action plans with sustainability assessments can be used to address those deficiencies. Although not specified in the State Sustainability Strategy, there will be a need for regional sustainability management plans to implement the regional sustainability strategies. Actions for sustainability at the regional level from sustainability assessment can be incorporated as adaptations of regional strategies. Actions for sustainability by government agencies can be incorporated as adaptations of the agency sustainability action plans.

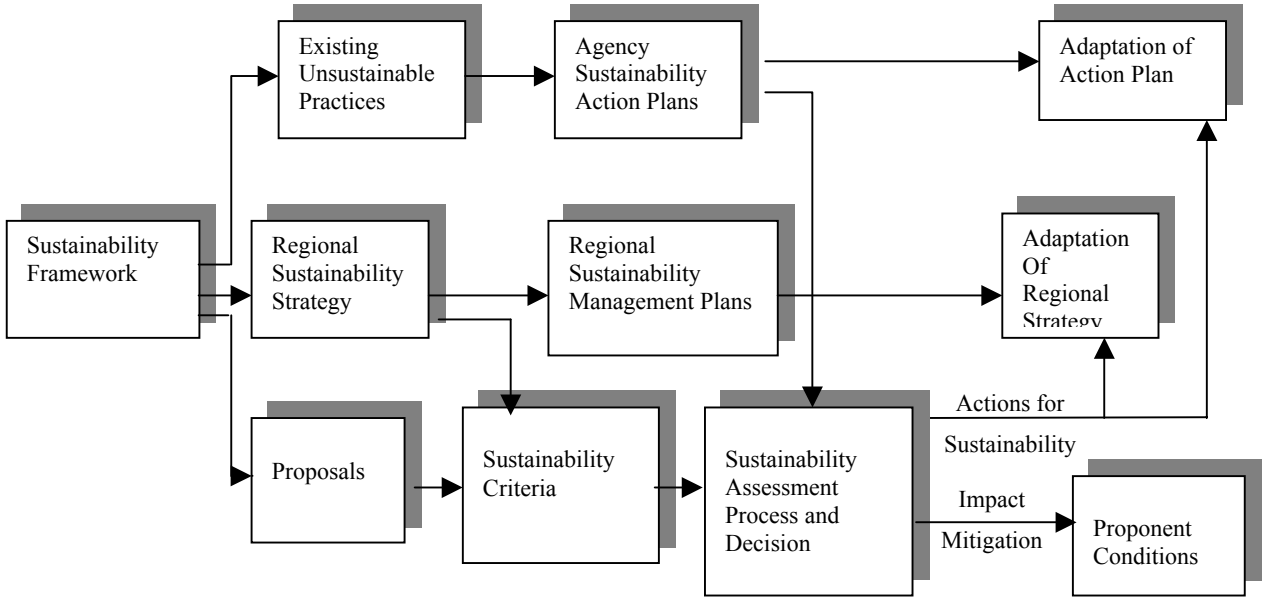

Figure 3 Proposed framework for a sustainability assessment strategy

Sustainability assessment criteria

The detailed history of EIA and environmental policy in WA has resulted in the generation of a range of environmental criteria that can be used to assess proposals. However, the same cannot be said for social and economic criteria.

As noted previously, the regional level is the appropriate scale to address sustainability. The relevant social and economic criteria for the sustainability assessment of proposals, policies and programmes can be derived from regional sustainability strategies. Determination of sustainability objectives and the development of strategies for the transition to sustainability, are two key components of regional sustainability strategies. Contributions (positive or negative) to the objectives, and compatibility (or incompatibility) with regional strategies could form the criteria for sustainability assessments of proposals, policies and programmes.

State of sustainability reporting

For agency sustainability action plans to be appropriately designed, they need to address the priority issues and they need to be measured against sustainability indicators. The 1998 Western Australian State of Environment Report (SOER) provides an appropriate approach for environmental issues but needs to be expanded to address social and economic issues. A 'State of Sustainability Report' to identify existing unsustainable practices and a government response providing the basis for agency sustainability action plans is needed.

The concept of using SOER as a basis for policy making, as occurred with the last SOER in WA, also has international parallels. The United Nations has established the

Global Environmental Outlook program which integrates the analysis and reporting involved in SOER with the strategic policy development processes of the UN and other regional agencies. This model has also been used successfully for the Netherlands Environmental Policy Plan[21].

However, SOER in WA is an administrative rather than a statutory requirement. There is an expectation that an SOER would be produced once every five year. To meet this timetable for the next SOER due in 2003, a draft report would need to have been released in 2002. There would be advantages in making State of Sustainability Reporting a statutory requirement, not only in terms of the timing of its preparation but also in terms of its links to policy making and basis for agency Sustainability Action Plans.

Existing unsustainable practices

State of the environment reporting in both the state[22] and Australia wide[23] highlights the problems that exist with current land, water and air resource management. Issues such as dryland salinity, eutrophication of waterways and air pollution in urban areas highlight deficiencies in the management regime of natural resource agencies and the unsustainable practices of landowners and citizens generally. The most recent SOER for WA noted "a steady decline in the condition of the environment and an increase in the pressure humans place on the environment" which "will result in increasing social costs"[24]. A sustainability assessment framework needs to address and remedy existing degrading practices. This can be achieved in two ways: natural resource sector action plans and regional sustainability strategies.

The EPA has initiated a process of working with all agencies responsible for the management of natural resources in the state to develop environmental values, objectives and targets. The intention is that the EPA will subsequently evaluate the environmental performance of agencies against these[25]. Other strategies for promoting the sustainable use of natural resources are proposed in the draft State sustainability strategy on a sector by sector basis[26].

Sustainability framework

State of environment reporting has a framework established by OECD in terms of the Pressure/State/Response model. There is a need to develop a Sustainability

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[21] Four National Environmental Policy Plans have now been prepared - 1989, 1993, 1998, 2001 - published by the Netherlands Ministry of Housing, Spatial Planning and the Environment.

[22] Government of Western Australia 1998 op cit

[23] Australian State of the Environment Committee (2001) *Australia State of the Environment 2001: Executive Overview*, available at: http://www.ea.gov.au/soe/2001/overview.html#conditionoftheenvironment (accessed November 1, 2002)

[24] Government of WA 1998 op cit, p7

[25] Environmental Protection Authority 2001. *Environmental Protection Authority Annual Report 2000-2001*. EPA, Perth, p5

[26] Government of WA 2002, op cit, Chapter 5

Framework which provides the principles, policies and guidance for the broad approach to the achievement of sustainability.

Institutional change

Full implementation of sustainability in government will require significant institutional change. However there is still lack of clarity of how to define sustainability. This makes designing the appropriate institutional arrangements problematic. What is clearer is actions that contribute to improved sustainability. In other words, it is possible to conceive of a *transition* to sustainability. It is also appropriate to consider the institutional changes needed to facilitate a transition to sustainability. This section describes what are considered to be the minimum institutional changes needed to implement the sustainability framework described in this paper.

The culmination of the analysis discussed previously is a proposed comprehensive institutional arrangement for sustainability assessment in Western Australia. Figure 4 outlines our proposal.

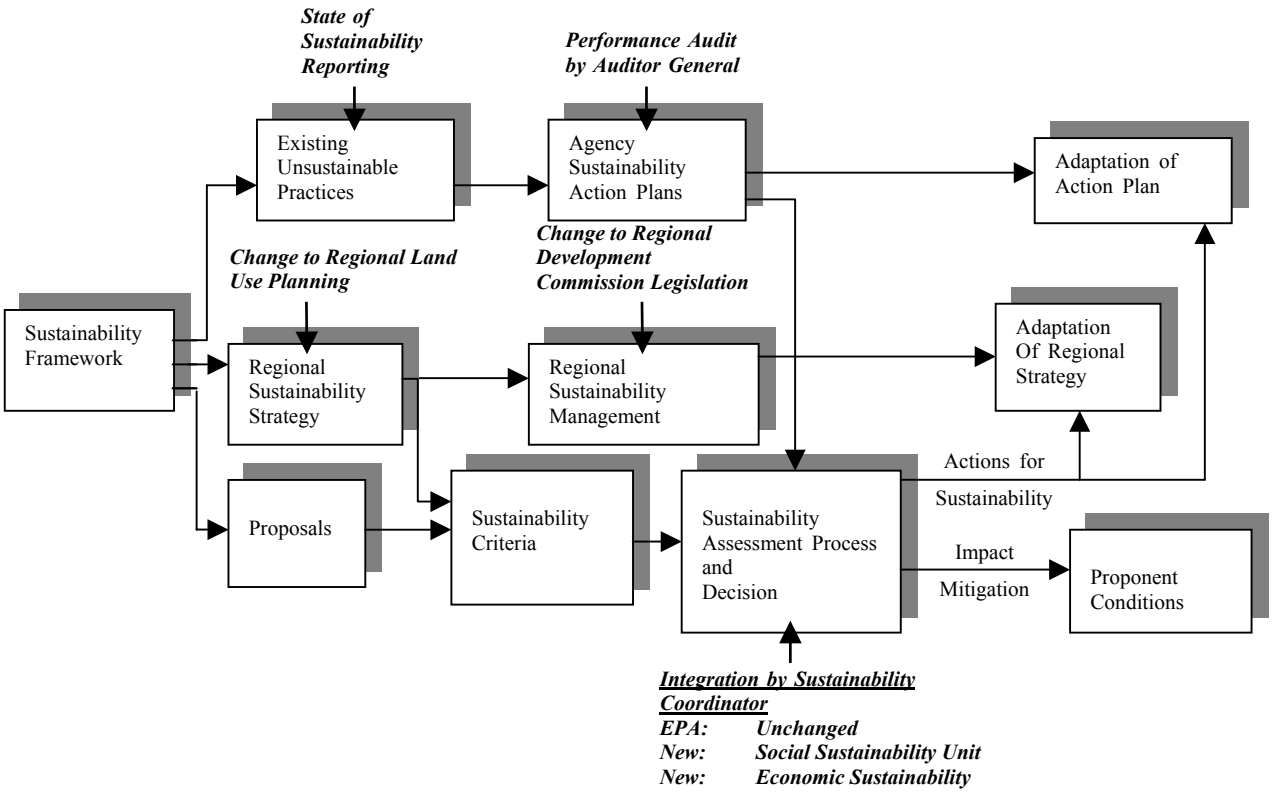

Figure 4 Proposed framework for a sustainability assessment strategy showing institutional changes needed for implementation

Contemporary political conditions in Western Australia make it very difficult to establish new bureaucratic agencies, or even to propose substantial legislative reform. As a consequence, the proposal outlined in Figure 4 is anchored in the idea that an

institutional response to the challenges presented by sustainability assessment can make only incremental changes to what we already have.

Sustainability assessment

A sustainability assessment system will require Government to review environmental, social, and economic impact assessment work presented to it by proponents. Western Australia has a sophisticated environmental assessment regulatory system in place under the purview of the Environmental Protection Authority. No equivalent institutions are in place to deal with social and economic assessment. The Draft Sustainability Strategy suggests that social assessment responsibility could be assumed by the Department of Planning and Infrastructure (DPI), and that economic assessment responsibility could be assumed by the Department of the Treasury and Finance.[27] With the addition of personnel with appropriate skills these agencies could assume these responsibilities. We also see the need for transparency of such assessments equivalent to that given to the EPA's environmental assessments.

Sustainability coordinator

An effective sustainability assessment system would require some kind of "integrative" authority that would sit "above" the three assessing units mentioned in the previous paragraph, and which would provide integrated advice to Cabinet. We propose that this role be taken by a "Sustainability Coordinator". Social, economic and environmental issues overlap, the boundaries are permeable and they interact. So co-ordination of the technical content is needed so that there are no gaps in coverage and so that the overlaps and interactions are managed. There is also a need for co-ordination in terms of timing so that the assessment process proceeds expeditiously.

While final sustainable decision making is a Cabinet responsibility, there is still a bureaucratic role in devising the framework for presenting and summarising the information for decision making, as well as a quality assurance role in checking the veracity of the information generated. We suggest that this be the focus of the Sustainability Coordinator.

Sustainability performance review

While the Canadian approach of agency sustainable development strategies lacks overall policy direction, the mechanism of performance audits by the Office of the Auditor General through the Commissioner of Environment and Sustainable Development is an effective mechanism for ensuring agency compliance with the requirement.

Western Australia's Office of the Auditor General has a strong record of performance auditing of government agencies. We believe that it would be appropriate to formalise the performance review of agency Sustainability Action Plans through statutory amendments to the legislation underpinning the Office of the Auditor General.

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[27] Government of WA 2002, op cit, p.38.

Regional planning to sustainability strategies

The content of regional planning schemes is primarily focussed on land use and land development[28]. The content is limited by a schedule to the *Town Planning and Development Act* 1928 (WA). Thus if regional planning was to be the basis for the preparation and implementation of regional sustainability strategies, the scope of regional planning schemes would need to be extended.

Legislative change to implement sustainability

This paper develops a framework for integrating three components of the sustainability framework - sustainability assessment, regional sustainability assessments and agency sustainability action plans. While extensive legislative change is need to implement sustainability in a comprehensive way[29], it is considered by the authors that the minimum legislative change needed in WA to implement this proposed sustainability assessment strategy is as follows:

- the regular reporting (at least once every five years) of the 'State of Sustainability' requiring the identification and prioritisation of existing unsustainable practices, and the requirement for government response through agency sustainability action plans;
- performance auditing by the Office of the Auditor General of the development and implementation of the agency sustainability action plans;
- the change in regional statutory land use planning to broaden its scope to become regional sustainability strategies;
- the change to the statutory functions of Regional Development Commissions to include social and environmental development as well as economic development, including the local actions required to implement regional sustainability strategies through regional sustainability management plans; and
- the establishment of a sustainability assessment process with economic and social assessment to complement the existing EIA process; the creation of the Sustainability Co-ordinator role; and the ability to require adaptations to agency sustainability action plans and regional sustainability strategies to implement 'actions for sustainability' arising from the assessment process.

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[28] *Western Australian Planning Commission Act* 1985 (WA), s18.1(ba)

[29] see S Dovers 2001. Institutions for Sustainability. *Tela: Environment, Economy and Society* Issue 7, Australian Conservation Foundation, Environment Institute of Australia, and Land and Water Australia, Melbourne; D Yencken 2001. Sustainable Australia: Refocussing Government. *Tela: Environment, Economy and Society* Issue 3 Australian Conservation Foundation, Environment Institute of Australia, and Land and Water Australia, Melbourne; B Jenkins 2002. Organisation for Sustainability. *Australian Journal of Environmental Management*, forthcoming.