Sustainability assessment

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Introduction

There are three types of sustainability assessment emerging:

1. Sustainability assessment of complex and strategic projects;
2. Sustainability assessment of policies, programs and plans; and
3. Sustainability assessment of buildings and developments.

This chapter will examine all three approaches within a global context and within the local context of recent developments in Australia, especially the State Sustainability Strategy in Western Australia (Western Australian Government 2003), which is the first sub-national strategy of its kind, and the Metropolitan Strategy in New South Wales (NSW Government 2004).

Sustainability assessment of complex and strategic projects

The approach to sustainability assessment adopted in Western Australia (WA) was created as part of the Sustainability Strategy developed over the period 2001 to 2003. The newly elected Gallop Government had a commitment to develop a Sustainability Strategy across all sections of government, and following much public discussion the definition of sustainability adopted was that of: ‘meeting the needs of current and future generations through an integration of environmental protection, social advancement and

economic prosperity'. In the framing of this definition, the Strategy sought to address what sustainability could mean for assessment. The approach taken in the Strategy was to develop a series of Background Papers on contentious issues, and eventually two papers dealing with sustainability assessment were placed on the website.[i] The second of these papers covers the results of a Working Party, which developed ideas from industry and the community. These ideas included the detailed approach adopted by Hammersley Iron (Rio Tinto Company) for sustainability assessment of projects, which was developed by the company for integrating social, environmental and economic factors into their internal project development framework. The final approach adopted by the Sustainability Strategy is relevant to sustainability assessment of all projects, whether they be large resource projects in remote areas or complex infrastructure projects in the city.

A parallel government process initiated to evaluate the major projects approvals process (the Keating Review) (Ecologically Sustainable Development 2005) also generated a commitment to sustainability assessment in WA. This commitment was based on the potential of sustainability assessment to speed up and integrate decision-making through its capacity to consider economic and social factors in parallel to the existing environmental assessment process. In the course of the Keating Review, a commitment was made to create a demonstration project; rather than shy away from controversy, it was decided that the Gorgon gas development would be subject to a sustainability assessment.[ii]

The sustainability assessment of the Gorgon project involved a steep learning curve for government agencies and consultants. It has been criticised on the grounds that it did not include enough options for assessment, but rather aimed to develop a detailed and integrated approach to the one option favoured by the company (Pope 2003, 2004). Thus, in the review of the sustainability assessment process within

government, it was decided that if a sustainability approach was going to work much greater emphasis had to be placed on the 'scoping stage' of project assessment, as well as on the final integration of economic, social and environmental factors. This realisation echoes a lot of the international discussion on sustainability assessment (for example, Gibson 2001), which has been examined in some detail by Pope, Annandale and Morrison-Saunders (2004) in a paper that uses the WA sustainability assessment experience to further conceptualise the ideas.

Essentially what was proposed in the Western Australian Sustainability Strategy was an approach to policy based on eleven sustainability principles (Table 1).

[INSERT TABLE 1 ABOUT HERE]

These principles were then applied to 42 areas of government, one of which was sustainability assessment. The Strategy proposed was that assessment should move from minimising impacts to promoting positive outcomes in an integrated way. It therefore suggested a set of criteria for sustainability assessment based on the sustainability principles, and which contrasts the traditional 'impact assessment' approach with that of 'sustainability assessment' (Table 2).

[INSERT TABLE 2 ABOUT HERE]

This framework for decision-making is a challenge for any government; it certainly has not been a straightforward task of simply adopting it in WA. That will require institutional changes to create expertise in the economic and social 'bottom line' areas, as well as to integrate these with the normal environmental assessments done through the Environmental Protection Authority. Surprisingly there is very little

economic analysis done of projects at present, and all social assessment has been stripped from the bureaucracy. Moreover, there is a recognition of the need to create an integrative function within the Department of the Premier and Cabinet which would conduct its work before options are taken to Cabinet. These institutional ideas are still being worked through, though in general it is considered that sustainability assessment will emerge as the major way that complex and strategic projects are evaluated in WA.

The next phase of sustainability assessment in WA is to apply the approach to a major new port development in the outer harbour of Fremantle and to a major new water supply project. The rationale behind the adoption of a sustainability assessment process, rather than an ordinary environmental assessment process, is that the State Government wants to see how it can address complex and strategic projects in a way that enables trade-offs to be minimised. Politicians are accustomed to addressing the full triple bottom line on projects, even where the majority of the work has traditionally been done on environmental impacts rather than socio-economic considerations. Particularly in urban systems the distinctions between these areas are blurring, and the need to provide more detailed analysis of options for politicians has become increasingly apparent. Other large industries seeking to expand to take advantage of the resources boom currently underway in WA are also asking for sustainability assessments. Sustainability assessment of complex and strategic projects is thus the next stage upon which sustainability assessment will be trialled and developed in WA.

The political imperative for sustainability assessment is now quite large in a State which has a history of environmental and social awareness and which is under considerable pressure for economic expansion (eight per cent Gross State Production growth per annum in the past year). However, the language and the institutions for providing the integrative approaches required is lagging well behind this political imperative.

This process of examining the institutional framework whilst trialling the process reflects the methodological questions which are being asked internationally in academia (Biegelbauer and Borrás 2003, Lakoff 2004, Pretty 2003 and Schon and Rein 1994). These questions include:

- What are the best ways to enable the scoping phase to include all the critical factors?
- How do you integrate these to enable pre-feasibility studies to occur on the best options?
- How do you incorporate agency consideration and public participation into this phase of assessment so that a sense of the critical issues can be determined?
- What models do you use to provide integrated advice that evaluates options for decisions based on sustainability criteria that can then be evaluated by Cabinet?
- How do you bring social issues into the process in a meaningful way?

These issues will be examined in the next two areas of sustainability, which are indicating some solutions because of the scale at which they are being applied.

Sustainability assessment of policies, programs and plans

The application of sustainability to the evaluation of policies, programs and plans is a major thrust in international literature as the importance of strategic environmental assessment emerges. This process, which has evolved from the project-based environmental impact assessment process introduced in the previous section, has raised questions about why the other elements of the triple bottom line should not be included in any strategic analysis of the future (Verheem 2002). The Dutch and the Canadians are doing a lot of work in this area, as are the UK government[iii].

Strategic analysis is critical for any urban system, so that the planning system has developed to ensure that cities are able to integrate any factor into their future. Thus, planning developed in the late nineteenth century as a way to integrate the health factors associated with waste and water into the design of the city and its neighbourhoods, as well as to address other social and environmental issues such as parks and transport. Planning has since become a complex system of legal and bureaucratic processes that is reviewed every decade or so to check for any changes in strategic direction. It is in the context of this process that sustainability assessment is now emerging in a different way to the assessment of projects discussed above.

Strategic planning is based on an assessment of the underlying values guiding the long-term planning of a city as well as how the city can best accommodate the expected number of houses and businesses in an economically, socially and environmentally acceptable way. Thus it is not unexpected that strategic planning exercises on cities in the past decade have increasingly looked to sustainability as a guiding concept. In Australia, sustainability is at the heart of the Melbourne Metropolitan 2030 Strategy, the Sydney Metropolitan Strategy, the Perth 'Network City' Plan, the Tasmania Together Plan, the Brisbane SEQ 2010 Plan and the yet to be finalised Adelaide Metropolitan Strategy (personal communication).

The UK has probably gone as far as any place in directing its planning agencies to incorporate sustainability into the planning system (Benson and Jordan 2004; Selman 1996; Owens and Cowell (2002). They call it 'sustainability appraisal' and it is well established in law and in the culture of managing change in the UK.

The sustainability assessment process, as it is being applied to the strategic planning process, will be discussed in terms of the role of politics in this process and the roles of indicators and stories, as well as regional planning. These aspects of the process will be examined as a way of trying to see how the required language and institutions

for sustainability assessment can begin to catch up to the political need for action in sustainability.

Politics and sustainability assessment in planning

Owens and Cowell (2002) stress the importance of seeing that planning for sustainability cannot be divorced from politics. Any process which suggests that policies, programs and plans can be subject to a sustainability audit, integrated with a whole new set of assumptions and then given a discursive participation process, cannot expect this to be other than a highly political exercise. Technical inputs will always be needed, but in the end the changes demanded for sustainability—reduced resource consumption, less impact and greater benefit to the common good—cannot occur without some pain and some resentment from those who do not wish the change to happen. This resistance can be from financial interests, environmental interests and social interests alike. The importance of the underlying principles which guide the process is therefore highlighted, as is the realisation that sustainability assessment cannot ever become some monolithic machine that takes over from the need for elected politicians to make hard decisions. It is hoped, however, that it can help politicians to make those decisions.

Nothing more clearly supports Owens and Cowell's proposition than the process of strategic transport planning in cities; especially issues related to reducing car dependence, which has been the main subject of my research (see Newman and Kenworthy 1999). No city that addresses its future can any longer neglect to see the impact of the car on energy, greenhouse gases, air quality, land-take from rural areas and bushland, noise and physical separation due to large roads, community and health impacts from excessive car dependence, and loss of economic competitiveness. Yet when issues to do with car dependence are raised in strategic planning reviews there is

an immediate rush to defend political interests from within and outside government over land development and priorities in infrastructure provision, as well as the so-called Australian love affair with the car and the suburb.

Given that political realities cannot be by-passed what can sustainability assessment do to take them in hand? The main way of addressing these realities is to ensure first that good sustainability analysis of all the urban options for the future are conducted, showing data on all the variables outlined, and second that a large-scale public process is conducted to help provide an evaluation of the options available. There is substantial evidence that public servants and planning bureaucracies interpret options to overcome car dependence in much less radical ways than the public. This was demonstrated in a recent 'Dialogue for the City' conducted in WA's capital city, Perth. This process involved 1100 people in a sophisticated planning process over a weekend[iv]. Members of the public involved in the process concluded that environmental issues were much more significant, and the need for public transport a much greater priority, than had been interpreted by prevailing administrative processes. The main issues chosen by the public to be the basis for how they wished the city to be re-planned are set out in Table 3.

[INSERT TABLE 3 ABOUT HERE]

The development of future strategies to deliver this vision will always remain contested and contentious, but it is possible to translate the priorities into transport and land use plans with a degree more certainty after such a process. Strategic planning is of course a two-way process, and the educational value of delving into such issues with a large cross-section of the community cannot be discounted as a means of driving

change. The other thing that such processes do is to help develop a set of sustainability indicators for the city.

Indicators and Stories

Indicators have become part of the tool box of sustainability assessment in all three areas of sustainability assessment, but most of all when it comes to policies, programs and plans. The United Nations has developed a set of guidelines, and sustainability indicators are gathered by most nations, with Canada and the UK having perhaps the most developed examples.[v]

These international and national approaches are now being supplemented by States conducting their own sustainability strategies, which are often much more urban-oriented as they are closer to their cities.[vi] Few of these are as well developed for cities, however, as the New Zealand report 'Quality of Life in New Zealand's Eight Largest Cities'.[vii] In addition, sustainability indicators are now being extended to regions and to local governments within cities.[viii]

Sustainable Seattle was probably the first to show how indicators developed in a sustainability context could be used for assessing how decisions are made across a city. As a result of that pioneering work, Alan AtKisson has become one of the most sought after consultants on sustainability indicators in cities (AtKisson 1999).[ix] Developing the indicators requires a public process of engagement similar to the Dialogue process described above, and is to all intents and purposes a way of doing a sustainability assessment of a city's plan for the future.

The problem that arises quite quickly when indicators are seen as part of the tool box of sustainability assessment is that they rapidly grow into a totally unmanageable list when the task of managing a city is subjected to its triple bottom line, and even its refined list of integrated, sustainability indicators. The key to moving from a broad set

of sustainability indicators to effectively using them in assessment is to choose what are the critical indicators that are going to change a system – for better or for worse. The vast lists of sustainability indicators will all be of interest to particular people but they often will be only marginal in the change process that is needed for sustainability. Choosing the critical indicators, or as some say the 'killer indicators', requires an understanding of the system being evaluated. In urban systems this will invariably include an emphasis on transport infrastructure and urban design as these factors shape the way that people live in cities (Newman and Kenworthy 1999).

Planning is one of the key ways that social issues can be considered by government in how it attempts to see the future unfolding. Yet the social arena remains the area least well integrated methodologically into sustainability assessment of policies, programs and plans, especially ones that reduce social issues down to a set of measurable sustainability indicators. This is because the social cannot always be reduced to quantifiable data. Social issues such as equity, housing, health, education and so on can be quantified, but there are other issues such as identity, sense of place, heritage and belonging which are not measurable as they are about values and worldviews. The dilemma of how these may be integrated into sustainability assessment has been discussed by Bradbury and Raynor (2002) as 'reconciling the irreconcilable'. They see the 'descriptive approach' of the sciences and social sciences to have fundamental disciplinary differences to the 'interpretive approach' of the humanities but suggest that there are emerging techniques that allow the two to be reconciled in sustainability assessment.

The main approach I have found to be of value for reconciling the interpretive approach of the humanities with the descriptive approach of the sciences in sustainability assessment is to highlight and prioritise stories as well as statistics. Stories are an emerging technique in the social sciences for integrating issues and enabling their

values and political scope to be mainstreamed. As Sandercock says in her book Cosmopolis II (which is a plea for how the social dimension can be better integrated into city planning):

> For the longest time, 'story' was thought of in the social sciences as 'soft', inferior, lacking in rigour, or, worst insult of all, as a 'woman/native/other' way of knowing…. But as Alasdair MacIntyre put it: 'I can only answer the question "What can I do?" if I can answer the prior question, … "of what story or stories do I find myself a part?"' (Sandercock 2003a, p.182).

Eckstein and Throgmorton (2003) have provided an edited collection of papers that seek to establish the links between story and sustainability. These papers are a coherent collection, rich in theory and real stories about the way sustainability is being approached in American cities. Although the US is the focus of the book, the conceptual approach is such that it can be applied to any city or to any region.

The main value of the book is that it offers a way to reinvigorate democracy at the scale of the community, city and region. The global economy is making nation-state democracies impotent as it moves more and more to being a series of competing global cities. But as the editors say in the Introduction, 'sustainability, story and democracy mutually construct one another' (Eckstein and Throgmorton 2003, p. 4). The main way this happens is by giving back to the social sciences a sense of values and ethics. The triumph of the descriptive, the quantitative, has meant that not only is economic capital and natural capital understood solely through measurement, social capital has now been accounted for in this way. Thus sustainability could be seen in such a model as the integration of these three forms of capital. 'Story' makes this triumph meaningful by emphasising the importance of interpretation, of making sense of these forms of capital, and most of all, giving them policy direction.

This is not an easy exercise. Bringing together the descriptive and the interpretative is the most important challenge in the policy arena opened up by the sustainability agenda. However the approaches to doing this are rare and the simple model of ‘storytelling’ usually doesn’t appear on the policy radar. Eckstein and Throgmorton’s book is therefore of great significance as it fills a need that is being felt by academic and policy-maker alike who are seeking the holy grail of integration.

The emerging area of sustainability challenges all disciplines and professions to think more holistically, more globally and more long term. However this can still be an expert’s game, one involving the collection of data to describe a problem and the development of technical options for solutions. Important as this is, the issues of sustainability in cities and regions go broader and deeper than such analysis. Only through stories can the will to change be generated in such matters as racially segregated cities, car dependence, consumerism, declining community, the loss of habitat, and climate change. The power of the story is in its empowerment of ordinary people, the setting of boundaries around ‘place’, and the ability to ‘imagine communities’ thus creating a ‘shared sense of moral purpose at a regional scale’ (Eckstein and Throgmorton 2003, p. 5).

Leonie Sandercock (2003b) tells a number of stories in her chapter of the Eckstein and Throgmorton book and expands on them in her later (Sandercock 2003a) publication. She tells of a social planner, Wendy Sarkissian, going to a new suburb in Australia where families were struggling. After collecting statistics she felt nothing in her report truly reflected their situation and instead told the story of a typical family, their hopes and their pain as the place did not fulfil their dreams. When she took the story back to the family they said finally someone had understood them. But that was the beginning of a process to try to change their future and redeem some of their lost dreams. This was the real power of the story.

Regional planning and sustainability

Applying the idea of 'story' to a methodology for sustainability assessment seems to make most sense when it is applied to a region. Thus each major bioregion, which has natural resource boundaries that help define its natural capital and economic plans and markets that help define its economic capital, can now have a process that will help to define its social capital through telling the core story of the place. This was the conclusion of the Western Australian Sustainability Strategy on regional sustainability. It now is being applied initially in a Regional Sustainability Strategy for the Pilbara region of that State, where around 20 stories are being written around fictional characters which will be used in a community visioning process called 'Dialogue for the Pilbara'. It is aimed to make this the kind of strategic planning process that can form a basis for any future project assessment work. It is believed that this can go beyond the social impact assessment work that tends to just list problems.

Most regions are made of a city set within a bioregion. The kind of principles needed to make regional sustainability into a valuable addition to the planning system require a coherent set of sustainability principles to guide the integration process. One of the newly emerging set of principles is the Melbourne Principles which were developed through the United Nations Environment Program.[x] These Melbourne Principles, named after the Workshop where it was held in 2002, are set out in Table 4 and were adopted by local government at the World Summit on Sustainable Development (WSSD) conference in Johannesburg. They are part of an approach called Cities as Sustainability Ecosystems; a book explaining the Principles has been put together by Newman and Jennings (2004).

[INSERT TABLE 4 ABOUT HERE]

The regional scale of sustainability assessment and its links to the planning system is the process adopted by the New South Wales (NSW) government for its Metropolitan Strategy. The exercise is to create a visionary planning strategy that is being evaluated by three NSW Sustainability Commissioners as it is being developed. This enables more input on sustainability at the 'scoping stage' as suggested earlier.

The model of a regional plan that sees the city in its bioregion, and seeks to minimise its ecological footprint while simultaneously improving its quality of life, is at the heart of this approach to sustainability assessment. This 'extended metabolism model' of cities in their regions was first adopted by us in our book 'Sustainability and Cities' (Newman and Kenworthy 1999) and has been applied in the past two Australian State of the Environment Reports (Department of the Environment and Heritage 2001) for the chapter on settlements. The approach we adopted was to gather as much data as possible on cities so that best practice could be found, as well as to outline case studies (stories) that enable us to see how cities can change. The combination is the power of an integrated approach.

Perhaps the most advanced sustainability assessment methodology along these lines has been developed by British Colombia (BC) in Canada. A review its settlements, mostly in the Greater Vancouver Region, is given in the 'BC Sprawl Report: Economic and Livable Communities, 2004'.[xi] The approach has been to examine a range of indicators in each of the 24 communities and then to combine them into three composite indicators—the Urban Form Index, the Livability Index, and the Economic Vitality Index—and one overall index, the Overall Smart Growth Index. The power of the report is that it also tells a short story about each place first so that its indicators have policy meaning. The story and indicators are easily understood as the overall composite index is shown diagrammatically in a spider web of the 27 indicators, so that it is immediately

clear which indicators the place does well on, and which it does not. Thus policy responses are drawn out of the sustainability assessment very directly. As data on the indicators have now been collected between 2001 and 2004 it is possible to get a sense of direction for each area and for the region. The report concludes: '…communities that are developing smarter and with less dependency on automobiles, also tend to be associated with a higher quality of life, and seem to be more adept at attracting the leading edge sectors of the economy'.[xii]

Such a result would suggest that sustainability assessment of strategic policy directions in British Colombia has been very worthwhile. Some of the language and the institutions appear to be in place, perhaps because from Habitat on they have been grappling with these issues as long as any city.

The questions that arise from strategic planning and sustainability include:

- How do you make stories and statistics fit into a coherent, integrated sustainability strategy?
- How do you validate the sustainability assessment priorities chosen given the political consequences of any such choices?
- What is the best institutional arrangements for providing integrated advice from across government?
- How do you translate this sustainability assessment into a land use plan?
- Can sustainability assessment be regulated or must it always be facilitated only?

Sustainability assessment in buildings and developments

Buildings and groups of buildings (developments) are heavily regulated in the planning system. The process of seeking approval for even the simplest addition to a family dwelling has been a revelation to most people. These regulations have come from

experience over many years with health, safety, environmental and social issues and are a collection of national building by-laws, State planning requirements and local town plans. The system together is called the statutory planning system as opposed to the strategic planning system described above.

The statutory control system is the latest target of sustainability assessment. Following the 1992 UNCED conference in Rio, innovative local governments signed up to a commitment to Local Agenda 21 or Cities for Climate Protection and began seeking ways to apply sustainability. Their main power is through the statutory planning system and hence it should be no surprise that in the absence of national and State sustainability guidelines for development that local governments would seek to define their own.

Across Australia and the world local authorities have created their sustainability assessment systems for development control decisions. Often they concentrate on how to achieve green buildings, the approach taken by the City of Scotsdale in the US. Sometimes these schemes have become rather arbitrary, which was the case in NSW when one local authority would not approve any development unless it had a worm farm, and in another case when a Mayor was elected on the platform that all developments had to use photovoltaic lighting in their streets (one of the least cost effective ways to reduce greenhouse gases).

Much of the debate about these systems is similar to the debate about the statutory control system in general:

- Are these regulations really needed?
- Do they not stifle good design and in fact sometimes work against good sustainability outcomes?
- How can a system of control be more outcome or performance-oriented?

National approaches to green buildings have been implemented mostly on a voluntary basis, with accreditation being provided to any innovative builder. The US system is

called Leadership in Energy and Environment Design (LEED) but there are many others (Beyer 2002)

Because of the chaotic approach to these issues in Australia there has been increased interest by State governments in how they could create a State-based 'Sustainability Scorecard' for all developments. This has the potential to help industry have greater certainty, communities to have a better way to reduce their ecological footprint, and government to have a coherent way of achieving their sustainability objectives. This kind of partnership, which the World Business Council for Sustainable Development calls 'Jazz', is in contrast to leaving the market to find its own way, or imposing heavily from above.[xiii]

The system that has been adopted in NSW to provide a Sustainability Scorecard for residential development is called BASIX, or the Building Sustainability Index.[xiv] There are other models that have been developed, like First Rate and NatHers (Government of South Australia 2004) but this is the first system with the following characteristics:

- A tool for developers and councils (regulated and now in operation since 1st July 2005 in Sydney).
- Web-based (this removes the huge need for documentation on most sustainability issues but allows information to be found for any particular problem through the links and the tool kit provided).
- Measures potential performance against sustainability indices (this is via a stepwise process, and although it only been applied to water and energy so far, it will be developed for other important areas like construction materials, waste in construction, site ecology, universal design for disability access, and so on).

- Applicable to all residential dwellings (this applies to new buildings and renovations).

Local Councils deliver the BASIX certification once it is clear that a development can meet the requirements of 40 per cent less water and 25 per cent less energy (measured as greenhouse gases) compared to the average Sydney home. These are heroic goals in the sustainability arena and few other places in the world could claim such a system, yet it has happened in just a few years and with a partnership between key stakeholders. A benefit-cost analysis shows it has a positive outcome for the economy. Some considerable concern is now being expressed by elements of the housing industry who hadn't quite seen that they would indeed have to change from the normal project home. It is due to be applied to other areas of NSW from 1st July 2005. As far as current housing goes it is hoped that BASIX certification will be seen by homeowners as a way to upgrade their homes before selling, or just as a way to make their contribution to sustainability. It could be regulated in future on all homes that are to be re-sold.

Across Australia there is considerable interest in the BASIX system. National seminars have been held and the Western Australian Minister for Planning has announced that WA will be the second State to adopt BASIX. Others are likely to follow, although State government bureaucracies are often taking the position that they would prefer their particular voluntary rating tools to be kept. Some scientific work to validate the BASIX model for different areas is needed. This does not need to prevent its application in trials as the approach to assessing the outcomes of different designs is still relevant, only the level of savings will be uncertain.

The idea of BASIX as a tool for sustainability assessment in buildings could be extended to commercial construction. The Green Building Council has a well developed rating scheme and those developments (for example, '60 L' or '30 The Bond') have

shown that 5 star rating does not damage commercial outcomes and creates much better working arrangements.[xv] The question remains as to whether this standard should be regulated more.

The next phase of sustainability assessment is at the sub-division or neighbourhood scale where urban design issues can be dealt with, such as: water sensitive urban design, solar orientation of streets, transit-orientation, walkability and permeability of streets, level of mix in terms of housing diversity and commercial/services, and other community-oriented issues. In NSW a system is being developed called METRIX.

There are a number of experiments in this area, indeed local governments and NGOs are developing them all across Australia. State governments are beginning to create these subdivision scale models, such as WA's Liveable Neighbourhoods Design Code and a new form of Sustainability Accreditation based on web processes by the Armadale Redevelopment Authority.[xvi] In addition, the Total Environment Centre in NSW has developed a set of criteria for subdivisions (Alexandra and Associates 1998) and the Australian Housing and Urban Research Institute have a new project to assess affordability and sustainability in traditional developments compared to master planned communities (Blair et al. 2004). This latter study concluded that:

- the methodology of using sustainability assessment via a set of indicators does work, though they need to be reduced in number and integrated more;
- designed communities are better off in sustainability terms than traditional development (car dependent with mostly monocultural project homes);
- the most significant measures for achieving affordability and sustainability are increasing development densities and starting a trend to smaller houses;
- the more radical notions of having more co-operative systems for house construction, using unconventional materials, and introducing full cost

pricing on housing developments, are also raised as ways to assist urban design in achieving sustainability outcomes.

The language and institutional processes for dealing with sustainability assessment down at the building and neighbourhood scale are starting to appear as quite manageable. This is mostly because local government has had a much longer history in dealing with these issues. Whether this can be achieved at the right scale for the larger, more bioregional level of sustainability issues remains to be seen. City-wide and bioregional groupings of local government will almost certainly be needed.

Monitoring remains an issue for all aspects of urban sustainability. Sustainability assessment can deliver ways of designing better suburbs and better houses, even mandating better appliances and new efficient and renewable infrastructure technologies. However, the operational aspects of all this depend on household behaviour as well as management systems that can monitor and report on progress. Often such monitoring has to be done by utilities and agencies whose main task is to sell more rather than to reduce consumption of resources, whether it be water, energy, or urban land.

Conclusions

1. The value of sustainability assessment is so inherently obvious it is bound to develop as a methodology and as a priority for government, business and the community. However, the disciplinary and professional understanding of how to do this is lagging behind the political will to implement it, especially in cities.
2. Sustainability assessment needs to progress at all levels from the assessment of complex and strategic projects, to the strategic planning process associated with policies, programs and plans, to the statutory planning process associated with buildings and developments.

3. Demonstrations are still needed in all three areas. As State governments are the main authorities responsible for managing cities and their bioregions, it is necessary for strong leadership to be shown at this level of government. Only in this way can an integrated, partnership approach be developed.
4. Sustainability assessment needs to be seen as an aid in the politics of more sustainable decision-making, rather than as a monolithic process that somehow will avoid politics. Change will still demand hard decisions, though the goal of sustainability assessment is still to enable politicians to have better options to consider.
5. Regulating for sustainability assessment should be seen as a goal to be implemented when the various demonstration projects have been evaluated and it is clear that benefit can be derived overall.
6. Institutional processes are not proceeding quickly enough to cope with the integrative processes required within government to enable sustainability assessment to occur. The importance of local government and regions of local government in sustainability assessment will grow.
7. The language for sustainability assessment continues to lag behind the need. The importance of finding a balance of statistics and stories to adequately express the insights of all disciplines cannot be underestimated. Disciplinary and professional change may have to be led by institutional change or the political opportunity for sustainability assessment may be lost.
8. Monitoring of the results of sustainability assessment should be instituted to ensure that indicators and stories of sustainability can be evaluated and communicated.

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Table 1: Sustainability Principles as developed for the Western Australian State Sustainability Strategy.

FOUNDATION PRINCIPLES

Long-term economic health

Sustainability recognises the needs of current and future generations for longterm economic health, innovation, diversity and productivity of the earth.

Equity and human rights

Sustainability recognises that an environment needs to be created where all people can express their full potential and lead productive lives and that significant gaps in sufficiency, safety, and opportunity endanger the earth.

Biodiversity and ecological integrity

Sustainability recognises that all life has intrinsic value, is interconnected and that biodiversity and ecological integrity are part of the irreplaceable life support systems upon which the earth depends.

Settlement efficiency and quality of life

Sustainability recognises that settlements need to reduce their ecological footprint (ie. less material and energy demands and reduction in waste), while they simultaneously improve their quality of life (health, housing, employment, community...).

Community, regions, 'sense of place' and heritage

Sustainability recognises the significance and diversity of community and regions for the management of the earth, and the critical importance of 'sense of place' and heritage (buildings, townscapes, landscapes and culture) in any plans for the future.

Net benefit from development

Sustainability means that all development, and particularly development involving extraction of non-renewable resources, should strive to provide net environmental, social and economic benefit for future generations.

Common good from planning

Sustainability recognises that planning for the common good requires equitable distribution of public resources (like air, water and open space) so that ecosystem functions are maintained and so that a shared resource is available to all.

PROCESS PRINCIPLES

Integration of the triple bottom line

Sustainability requires that economic, social and environmental factors be integrated by simultaneous application of these principles, seeking mutually supportive benefits with minimal trade offs.

Accountability, transparency and engagement

Sustainability recognises that people should have access to information on sustainability issues, that institutions should have triple bottom line accountability, that regular sustainability audits of programs and policies should be conducted, and that public engagement lies at the heart of all sustainability principles.

Precaution

Sustainability requires caution, avoiding poorly understood risks of serious or irreversible damage to environmental, economic or social capital, designing for surprise and managing for adaptation.

Hope, vision, symbolic and iterative change

Sustainability recognises that applying these principles as part of a broad strategic vision for the earth can generate hope in the future, and thus it will involve symbolic change that is part of many successive steps over generations.

Table 2 Criteria for sustainability assessment in WA Sustainability Strategy.

Managing the Negative (impact assessment)	**Promoting the Positive (sustainability assessment)**
Provides short term economic gain but long term is uncertain.	Provides both short and long term economic gain.
Minimises impacts on access, equity and human rights in the provision of material security and effective choices.	Increases access, equity and human rights in the provision of material security and effective choices.
Avoids damage to biodiversity, ecological integrity and life support systems.	Improves biodiversity and ecological integrity and builds life support systems.
Minimises the increase in ecological footprint while improving the quality of life.	Reduces the ecological footprint while improving the quality of life.
Minimises impacts on community and regions, 'sense of place' and heritage protection.	Builds up community and regions, 'sense of place' and heritage protection.
Minimises conservation loss and social impact while providing economic benefit.	Provides conservation benefit and net social-economic benefit.
Minimises the reduction of 'common good' resources.	Increases 'common good' resources.
Minimises the risks that are not	Ensures there are acceptable levels

understood.	of risk with adaptation processes for the worst scenarios.
Brings change without hope for the future as it is not part of a broader strategic vision.	Brings change and a sense of hope for the future as it is linked to a broader strategic vision.

Table 3 Vision priorities from the Dialogue for the City process in Perth, 2003.

1. Strong local communities (city of villages).
2. Clean, green city.
3. Urban growth boundary.
4. Connected, multi-centred city.
5. Reduced car dependence- better public transport, especially more rail, better local bike/walk and integrated transport/land use.
6. Housing diversity (more options).
7. Access to city services for all.

Table 4: The Melbourne Principles for Cities as Sustainable Ecosystems.	
1. VISION	Provide a long-term vision for cities based on: intergenerational, social, economic and political equity; and their individuality.
2. ECONOMY & SOCIETY	Achieve long-term economic and social security.
3. BIODIVERSITY	Recognise the intrinsic value of biodiversity and natural ecosystems, and protect and restore them.
4. ECOLOGICAL FOOTPRINT	Enable communities to minimise their ecological footprint.
5. MODEL CITIES ON ECOSYSTEMS	Build on the characteristics of ecosystems in the development and nurturing of healthy and sustainable cities.
6. SENSE OF PLACE	Recognise and build on the distinctive characteristics of cities, including their human and cultural values, history and natural systems.
7. EMPOWERMENT	Empower people and foster participation.
8. PARTNERSHIPS	Expand and enable co-operative networks to work towards a common, sustainable future.
9. TECHNOLOGY	Promote sustainable production and consumption, through appropriate use of environmentally sound technologies and

	effective demand management.
10. GOVERNANCE & HOPE	Enable continual improvement, based on accountability, transparency and good governance.

[i] These documents and others can be found at www.sustainability.dpc.wa.gov.au.

[ii] For details of the assessment, see www.industry.wa.gov.au

[iii] See Dutch: http://www.kit.nl/development/, Canada: http://www.cic.gc.ca/sd-dd/, UK: http://www.odpm.gov.uk/settlement/.

[iv] See www.planning.wa.gov.au/dialogue.

[v] The UN guidelines are available at www.un.org/esa/sustdev/natinfo/indicators/isd. National approaches to sustainability indicators are also available for Canada (www.nrtee-trnee.ca/eng/programs/currentprograms/SDIndicators), the UK (www.sd-commission.gov.uk/pubs/assessment) and Australia (www.deh.gov.au/esd/national/indicators/report/).

[vi] States conducting sustainability assessments include Oregon and Minnesota in the US (Dernbach 2005, and www.cbs.state.or.us/external), and in Australia the ACT (www.sustainability.act.gov.au/), Victoria (www.dpc.vic.gov.au/) and Tasmania (www.tasmaniatogether.tas.gov/).

[vii] The report is available online at www.bigcities.govt.nz.

[viii] Especially well developed are the local government approach taken by the City of Melbourne (www.melbourne.vic.gov.au/), and the regional approach taken in Western Australia (www.dlrgd.wa.gov.au).

[ix] See also www.AtKisson.com.

[x] See www.unep.ietc.jp.or.

[xi] See www.smartgrowth.bc.ca.

[xii] The report is available at www.smartgrowth.bc.ca.

[xiii] See www.wbcsd.ch.

[xiv] See www.planning.nsw.gov.au/settingthedirection/basix

[xv] See www.gbcaus.org

[xvi] WA's Liveable Neighbourhoods Design Code is available at www.wapc.wa.gov.au/publications/liveable, and the Armadale Redevelopment Authority's Sustainability Accreditation is available at www.ara.wa.gov.au/sustainability.