# 4 Sustainability and settlements

**Vision for Western Australia**

Western Australia's settlements are among the most attractive places to live in the world, constantly becoming more innovative and efficient in their management of resources and wastes, while at the same time protecting liveability, cultural heritage and a 'sense of place'.

**Goal**

Plan and provide settlements that reduce the ecological footprint and enhance quality of life at the same time.

**Priority areas for action**







*We live in an urbanising world. Aside from the growth or urbanisation itself, urbanisation is the dominant demographic trend of our time. The 150 million people living in cities in 1900 swelled to 2.9 billion people by 2000, a 19-fold increase. Meanwhile, the urban share of world population increased from 10 percent to 46 percent. If recent trends continue, by 2007 more than half of us will live in cities. For the first time, we will be an urban species.*

Lester Brown[28]

Western Australia is highly urbanised with about 90% of the population living in towns and cities. The quality of urban environments both rural towns and cities, is therefore highly significant to the well-being of Western Australians. Our settlements should be both healthy and positive places to live. They should provide ready access to services, employment and recreational opportunities for people of all ages and abilities. In addition, because of the proximity of people, there should be a strong sense of community, engendered in part by the urban form.

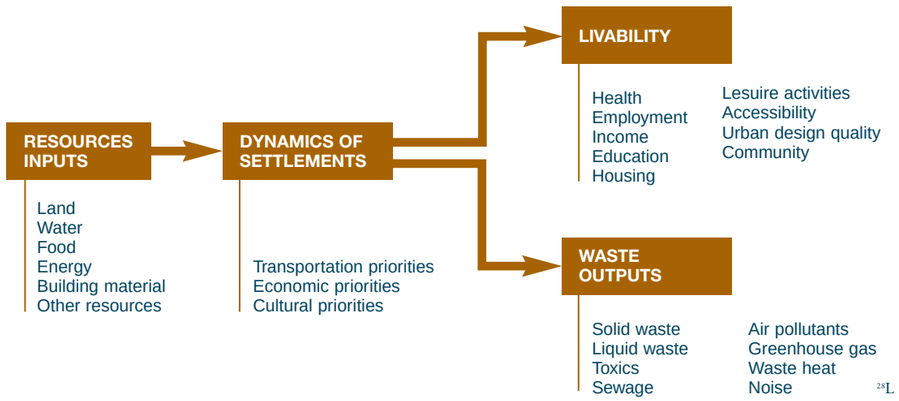
To be sustainable, settlements require the integration of environmental, social and economic dimensions. The world is littered with examples of unsustainable settlements. The drifting sands of depleted agricultural soils now cover towns in Northern Africa that once serviced the wheat belt of the Roman Empire, and the ancient Roman city of Ephesus was abandoned when its port silted up after the surrounding Turkish hills were cleared of vegetation.

Western Australia also has abandoned settlements: ghost towns left behind as goldfields were depleted or forests were cut out. More recently, Wittenoom was closed down because of environmental health concerns arising from the mining of asbestos. Some country towns are struggling to survive, for example one Shire has lost 48% of its population in the past 25 years, and Indigenous people in remote settlements have significant health problems. Parts of Perth are also facing significant decline. These places are seeking sustainable development, they are not able to change without it.

The State Sustainability Strategy promotes development for these places in a way that creates a more enduring future within global constraints. While there are important environmental considerations, the fundamental problems are largely related to social and economic factors. However, for other parts of Perth and for many coastal settlements the challenge for a sustainable future is in managing growth. These settlements and areas need new priorities, new policies and new technologies that can redirect growth more sustainably.

The State Sustainability Strategy provides opportunities to improve public access and transport, restore amenity and create urban forms that support the development and maintenance of a sense of community as well as achieving environmental gains The model for integrating these different elements of sustainability in settlements is presented in Figure 8.

**Figure 8 Extended metabolism model of human settlements**




[28] L Brown, Eco-Economy, Norton, New York, 2001, p. 187

Figure 8 shows the Extended Metabolism Model[29] developed for the 1996 and 2001 Australian State of the Environment Reports.[30,31] This model suggests that for a settlement to be sustainable, resource consumption (such as land, energy, water and materials) and waste (solid, liquid and gaseous) must be reduced, while simultaneously improving liveability (in areas such as income, housing, health, education and community). This model gives substance to the *Settlement efficiency and quality of life* sustainability principle; other principles such as *Biodiversity and ecological integrity* also apply to settlements (see *The conceptual basis*).

A range of current government initiatives and projects are addressing many aspects of settlement sustainability including:

- water supply (The Premier's Water Taskforce)
- waste (Waste Management Board)
- planning (Greater Perth)
- freight (Freight Network Review) and
- electricity (Electricity Reform Taskforce).

The Strategy discusses these matters from a sustainability perspective. Additional processes are required to consider sustainable community regeneration and sustainable building and construction.

In the section on *Planning for sustainability* a range of mechanisms within the Western Australian planning framework are examined in terms of sustainability. Here two levels of the planning framework are outlined to show how settlement sustainability issues can be addressed.

## Strategic planning and settlement sustainability

Many strategic settlement sustainability issues can be resolved through the Western Australian Planning Commission in partnership with regional councils and local governments as discussed in *Sustainability and governance*. Regional Councils arose primarily from the need for local governments to form partnerships to solve their waste problems and are now moving to take on extra involvement in other sustainability responsibilities.

The Eastern Metropolitan Regional Council (EMRC), consisting of six local government authorities, is a very good example of how effective regional councils of local government can be in resolving sustainability issues. The EMRC has some forty staff working on a range of issues to do with sustainability including natural resource management and greenhouse. A recent study by EMRC has highlighted for the first time the lack of regional approaches to managing stormwater runoff and drainage in the city and in rural areas. This has significant environmental implications for nutrient management and salinity near to the city. It has become even more critical now Perth's water crisis has focused attention on the need to use all water, including runoff, effectively (see *Sustainable urban design*). This issue illustrates the importance of a regional local government approach. If water tables are low, stormwater recharge to groundwater is needed. If water tables are too high, more rainwater tanks could remove excess groundwater recharge.

The necessity of such a 'fine-grained approach' to managing sustainability issues in urban environments is obvious for most of the issues considered in this section. Some issues can be examined directly by local authoroties, others require a more regional perspective. This could then be reflected in statutory Statements of Planning Policy and local town planning schemes where appropriate.

[29] P Newman and J Kenworthy, Sustainability and Cities, Island Press, Washington DC, 1999.

[30] P Newman et al, Human Settlements, Australia State of the Environment Report 1996, CSIRO Publishing on behalf of the Department of the Environment and Heritage, Canberra, 1996.

[31] P Newman et al, Human Settlements, Theme Report, Australia: State of the Environment 2001, CSIRO Publishing, Melbourne, 2001.





Before statutory processes can be implemented it is necessary to resolve the broad strategic issues involved. The Greater Perth plan is a very significant part of the strategic planning for the future of the metropolitan region and will reflect sustainability principles. Although Greater Perth will be finalised after the State Sustainability Strategy, it is already committed to reflecting sustainability principles and strong public participation in its development through processes like Dialogue with the City. There is a need to build on this experience and develop models of plan preparation to integrate sustainability throughout the planning process.

## Statutory development control and settlement sustainability

In all aspects of settlement sustainability there are key steps where development control at local government level can influence whether sustainability innovation occurs or not. The approach being developed by the Minister for Planning and Infrastructure is to create and demonstrate a Sustainability Scorecard where local government planners and developers can transparently address sustainability issues. Box 45 outlines BASIX, an example of a Sustainability Scorecard approach. Each section of *Sustainability and settlements* is relevant to this scorecard approach to sustainability.

### BOX 45 THE SUSTAINABILITY SCORECARD AND BASIX

The Minister for Planning and Infrastructure announced in March 2003 that there would be a 'sustainability scorecard' to manage the development control process according to principles of sustainability. The motivation for doing this is partly due to the need to give substance to sustainability but also to provide some uniform guidance and certainty for the development industry and the community. A number of local governments (at least five in Perth) have developed their own Sustainability Scorecards and there has been an increased number of conditions that are not transparent or predictable in their application.

The need for a development control system to be uniform, transparent and based on sustainability has been recognised by all Australian States. In particular the NSW Government has developed a Sustainability Scorecard called BASIX over the last two years. The BASIX Sustainability Index:

- is web based and this replaces the significant documentation currently necessary for developers and the public to access in relation to development control
- provides options for developers through setting reasonable outcomes
- can be applied to any part of Australia by changing parameters or indices for the particular location such as energy and water data, transport and transit, and climate and soil, and
- enables consideration of key sustainability criteria including energy, greenhouse, water, waste, site ecology, transport, infrastructure, materials and social issues like affordable housing and accessibility.

The NSW Government has developed BASIX along with local government and the housing and development industry. It is now being trialled in a number of local government areas throughout NSW. BASIX has been the subject of several seminars as part of the consultation process on the State Sustainability Strategy. It has met with considerable interest. A number of Western Australian developments are now likely to trial the application of BASIX as a means of developing a Sustainability Scorecard in Western Australia. The Minister for Planning and Infrastructure is supporting this proposal.

The *Settlements* section will look at growth management, revitalising declining areas, urban design, integrating transport and land use (especially to overcome car dependence), managing freight and regional transport, air quality, waste, water, energy, heritage and buildings—all through the lens of sustainability.

## > MANAGING URBAN AND REGIONAL GROWTH

**There is a need to promote growth in some areas where there is clearly real social and economic disadvantage and to redefine growth in places where development is a threat to sustainability. Western Australian inland country towns are the settlements most in need of strategies to promote growth. Redefining growth needs to occur in Perth and coastal settlements.**

*The relative isolation and small populations of rural towns compared with closer settled areas along the coastal sand plain from Gingin to west of Albany makes them ideal opportunities to develop model sustainable communities.*

Eco Town Inc.

*With a high percentage of the population concentrated in Perth and the strong link between urban form and sustainable development, the priority sustainability issue for WA is focused on future development of the city and other major centres such as Geraldton, Bunbury and Albany. The issues of economic vitality, social equity and ecological integrity are core elements of a sustainable approach to development within the city.*

Royal Australian Planning Institute

Country towns in decline have a range of environmental, social and economic needs. Regional development programs exist to address all of these needs, however there are few that are able to integrate all three. Eco Towns[32] does it through a partnership involving several Wheatbelt towns. The project is creating local employment through environmental improvement, particularly the use of stored rainfall to reduce the impact of rising saline groundwater on towns. Other 'green job' projects are also being implemented. For example, Green Skills, a Denmark-based organisation that trains people in land care, energy efficiency and other green jobs, also shares the goal of sustainability employment opportunities.

Managing growth on a large scale urban area is a relatively new approach in Australia. Both Melbourne and Adelaide have recently established growth boundaries through State government planning processes. The Western Australian Government has significant ability to manage growth through its land release programs, the Metropolitan Development Program and Country Land Development Program. Perth's sprawling form has reached the stage where clearer guidelines for land release need to be developed. Shaping city growth must be a key consideration for Greater Perth. Another powerful growth management technique is redirecting growth to 'brownfields' rather than 'greenfields', that is to areas where redevelopment can be beneficial to overcome decline, or the use of existing infrastructure can be optimised. This has many sustainability benefits and is considered under *Revitalising declining centres and suburbs*.

[32] See submission from Eco Towns Inc. to draft State Sustainability Strategy.

### BOX 46 THE ECONOMICS OF URBAN GROWTH

There are obvious environmental and social problems when a city like Perth grows outwardly so fast that it leapfrogs established infrastructure. Such areas can impact on bush and agricultural land and create highly car dependent areas with few employment opportunities and services. The economics of such growth are not often understood however.

Recent research by the Department for Planning and Infrastructure dramatically shows the costs of urban sprawl. The State Government provides significant financial support to new infrastructure including through transport, health and education services, yet is unable to recoup these costs as some other commercial service providers can (for example, the Water Corporation). The Department estimates the following costs to the State Government of different forms of development:

- Re-development in existing areas – no or minimal cost
- Development on the development 'front' - $30,000 per block
- Development off the development 'front' - $66,000 per block.

In the North West Corridor alone, there are currently twelve proposed developments beyond the 'front' of existing infrastructure. Yanchep and Two Rocks are communities that should be considered on the 'front'.





Western Australia has pioneered the redefinition of urban growth within new subdivisions through its internationally acclaimed Liveable Neighbourhoods code (see case study on *Liveable Neighbourhoods: Guiding New Developments for a More Sustainable Urban Future*). This voluntary code has significant sustainability benefits through encouraging reduced car use, a greater sense of community, greater access to services and more efficient use of land. Further development of this now seems warranted.

Managing growth is therefore, about where we grow, and also how we grow in the existing and future urban areas of Western Australia. The principles of sustainable urban design (see *Sustainable urban designs*) need to be used to ensure that urban development integrates economic, environmental and social sustainability objectives. In general, more sustainable urban places are typified by walkable, mixed use communities; a range of housing types to fit our diverse population; a spatial context for local services employment; and compact and site-responsive development to reduce land-take and support biodiversity.

## In short...

### Vision

Growth management is implemented to enable towns and areas of the city with significant decline problems to be developed in sustainable ways.

### Objective

Create a sustainable balance of employment, transport, housing choice and community development by managing urban and regional growth, including population change, through better urban structure.

### Actions underway

- The State Planning Strategy is being progressed through Greater Perth to develop visions for the long-term future of the South West Urban Systems.
- The Liveable Neighbourhoods code is being reviewed and finalised with a view to promoting a more sustainable policy to guide structure planning and subdivision and is being applied at major projects on the urban fringe of Perth and in key regional centres.
- Models for the provision of district-level transit-supported development are being developed in the North West Corridor.
- Infrastructure provision and land supply is being coordinated through the Metropolitan Development Program and the Country Land Development Program.
- A strategic development framework is provided for local areas through coordinating and developing local planning strategies with local government.

### Actions

4.1 Consider and decide on the establishment of an urban growth boundary as part of the Greater Perth process and fully assess new developments in terms of their economic, social and environmental impacts.

4.2 Promote ongoing public discussion and debate on the future of Perth's urban form through exercises like Dialogue with the City to raise public awareness of the issue and contribute to the solutions we can adopt.

4.3 Facilitate projects to provide sustainability gains for country towns including regional sustainability s trategies that build on the 'sense of place' stories of each community.

4.4 Through urban design encourage employment initiatives such as the creation of 'knowledge economy' jobs and small business incubator projects as a catalyst for 'growing' job opportunities in outer metropolitan and regional centres.

# In short cont'd...

4.5 Develop strategies to proactively manage the location of urban development, including:

- consultative agreements with local government on land release, and
- using the Metropolitan Development Program and the Country Land Development Program to match land supply to the cost-efficient provision of infrastructure, and building this into the operation of the Sustainability Scorecard through locational parameters impacting on employment, transport, infrastructure provision, social facilities and the environment.

4.6 Use demonstration projects that actively address the community's concerns and the perceived negative impacts of increased residential densities.

## Global opportunities

Many Western Australian urban services firms already have a presence in the Asia-Pacific region. If it can offer a model for how to manage urban and regional growth, Western Australia can build on the existing urban services exports.

## Further information

Armstrong, R & Head, G 2002, *Liveable Neighbourhoods: Guiding New Developments for a More Sustainable Urban Future*, sustainability case study, Department of the Premier and Cabinet, Perth, viewed 15 August 2002, http://www.sustainability.dpc.wa.gov.au/CaseStudies/LivableHoods/LiveableNeighbourhoods.htm

Department for Planning and Infrastructure *Greater Perth*, http://www.planning.wa.gov.au/publications/futureperth/fp_content.html

Institute for Sustainability and Technology Policy, Murdoch University, http://wwwistp.murdoch.edu.au/

*East Perth is a revitalised old industrial site that has, like many inner area developments, helped to reduce the sprawl of Perth and enables better use of urban infrastructure.*

Source: Peter Newman





## > REVITALISING DECLINING CENTRES AND SUBURBS

**Some centres and suburbs in Perth and in regional Western Australia are in physical, social and economic decline after the first phase of development has passed. Some inner city areas and regional centres are already being regenerated through a combination of government intervention and private investment, however there are other areas where further intervention and assistance is needed to promote and facilitate revitalisation with the potential to improve the quality of life for local communities, and to achieve sustainable regeneration outcomes.**

> *The social and cultural aspects of sustainability are of particular importance to Swan. Despite its proximity to the centre of Perth, the region is socially disadvantaged and lacks cultural focus (no major tertiary institution is one example). Sustainability needs to be considered in terms of the inter-and intra-regional inequities that exist in a City where growth is driven by demand for living near the coast and where investment in social infrastructure favours the wealthier areas, despite concerns about the sustainability of continued linear growth.*
>
> City of Swan

The 'renewal' of urban areas has been occurring almost since the moment that urban areas came into being, and in that historic sense can be seen as part of an evolutionary process as cities change over time. However, in addition to managing the 'natural', evolutionary change aspects of urban renewal, attention has increasingly turned to the advantages of proactively undertaking and managing renewal processes, in the interests of more sustainable urban development outcomes.

In some of its earliest manifestations, urban renewal was described and practised primarily as a process of physical regeneration: replacing outmoded buildings and infrastructure with 'modern' development. Increasingly, however, it is defined as also encompassing social and economic regeneration, and is being practised with a view to meeting those broader objectives, under the heading of 'revitalisation'.

While the management of growth on the urban fringe is a key focus for delivering sustainable development, there is also a pressing need to consider the future of existing urban areas that in some cases are declining through a combination of outmoded or inadequate infrastructure, relative economic and social deprivation, and diminishing access to opportunities and services. In these areas, there is little chance to renew housing, transport and other infrastructure in more sustainable ways unless there is a rationale for intervention and change. In this situation, an area can continue to deteriorate, eventually causing significant social problems.

Studies and research worldwide have shown that there is often a correlation between social and economic deprivation and unsustainable patterns of urban development, and that the most successful revitalisation programmes have typically been those founded upon partnerships between levels of government, with the support of the private sector, and where communities themselves have taken a central role in setting goals, determining priorities and initiating action.

In Perth, redevelopment activity initiated by the State government in partnership with local government has seen the regeneration of inner city areas such as East Perth and Subiaco, and the beginnings of improvements at regional centres including Midland and Armadale (see Box 47). Private sector redevelopment has also contributed to the regeneration of other inner city precincts, and the New Living program has made a significant impact in areas with a comparatively high level of public rental housing. However, there are areas in Perth's middle and outer suburbs where decline is evident and there is significant relative social disadvantage, expressed through poor urban structure and the reduced quality of the public domain, limited access to employment opportunities, public transport and community services, and a lack of housing diversity and low residential amenity.

### BOX 47 WESTERN AUSTRALIAN REDEVELOPMENT AUTHORITIES

Redevelopment has clear sustainability gains for a city. As shown in Box 46 there are significant economic savings to government infrastructure and service providers and considerably reduced car dependence and transport emissions, compared to development on the fringe of urban areas. However, redevelopment is complex and can require the focus of a statutory authority, especially if it is an older area with significant industrial or contaminated land.

There are currently five redevelopment projects operating in Western Australia, at East Perth, Subiaco, Midland, Armadale and Hope Valley-Wattleup. The projects collectively represent significant achievements that offer valuable lessons for the progression of further sustainable development initiatives in a revitalisation context.

The East Perth and Subiaco projects, initiated in the early 1990s as part of the 'Building Better Cities' program, have successfully focused on the regeneration of inner city areas close to the Perth CBD (see also case study on Perth and Subiaco). With the 'second generation' projects at Midland and Armadale, the focus is on the revitalisation of strategic regional centres and their communities.

While the projects differ somewhat in their approach and intent, all have a fundamental objective of making more sustainable use of existing urban infrastructure and land, and are actively promoting development that demonstrates best practice in urban renewal.

The Armadale Redevelopment Authority has adopted an Implementation Strategy for Sustainable Development with an associated action program, and the other authorities are also formalising their approaches to sustainability through the development of focused policies and guidelines.

There is no single model for revitalisation. In Western Australia, redevelopment authorities have had considerable success but require special powers and resources that will not always be available or appropriate. Other interventions on government-owned land have provided some valuable demonstration projects and lessons for new centre-focused revitalisation projects, but have limited geographic coverage. Many of these approaches, however, are not well suited to 'broad acre' revitalisation across whole suburbs, where the diversity of the issues requires a holistic approach that crosses the boundaries of professional disciplines and departmental responsibilities, and requires action at both State and local government levels.

A focus on Neighbourhood Renewal (see *Community services and development*) would seek to build connection, caring, civic pride and the notion of common good (i.e. rebuilding/strengthening civil society) through the engagement of the local community in social and cultural planning and service delivery and other community projects.

A repertoire of approaches to revitalisation is needed to support more sustainable urban forms. To realise this we must learn from experiences elsewhere, so that we can adopt best practice approaches with proven success. They must be adapted, however, to meet the specific needs in Western Australia, and the circumstances that exist across our State. It is clear that revitalisation models which are founded on partnerships between State and local government, and local communities, and which are 'place-based' and tuned to the particular needs of the areas concerned, are much more likely to succeed than imposed, 'off-the-peg' approaches.

A number of current projects and proposed initiatives are seeking to address these issues. The establishment of the Maddington-Kenwick Sustainable Communities Initiative (see Box 48) is an important step in the development and testing of appropriate models for revitalisation at a suburb level. Greater Perth will examine the revitalisation issue at a strategic level, and will also examine indicators for identifying areas of priority. As a companion to this process, the Western Australian Planning Commission is working to develop a program of revitalisation initiatives that will further extend the available mechanisms and capacity for addressing revitalisation issues at State level.





### BOX 48 THE MADDINGTON-KENWICK SUSTAINABLE COMMUNITIES INITIATIVE

The City of Gosnells is working in partnership with the State government on the Maddington-Kenwick Sustainable Communities Initiative.

A scoping analysis has identified a number of opportunities for action, including improving accessibility to public transport facilities, conserving and upgrading the natural environment, and the more effective coordinated delivery of community services and social programs. The partnership involves a number of government departments, including the Department of the Premier and Cabinet, Department for Community Development, Department of Health, and Department of Housing and Works, and the project's Technical Committee is being co-chaired by the City and the Department for Planning and Infrastructure.

A partnership forum has been held to collate information used in further defining the scope of the agreement, and a number of initiatives have been identified with the potential to deliver early benefits to the local community. The project has a five-year timeframe.

The State-Local government partnership approach being followed for Maddington-Kenwick uses a holistic framework that seeks to address physical and social issues through actions at both levels of government, and has the potential to provide valuable feedback that will contribute to the development of further revitalisation initiatives in Western Australia.

It is important that these various programs and initiatives operate in a coordinated manner to achieve the most resource-effective outcomes. The establishment within the Department for Planning and Infrastructure of a dedicated resource capacity in a new Revitalisation Directorate will assist in developing and maintaining an overview of these initiatives.

## In short...

**Vision**

The development and application, in consultation with the community, of a range of techniques and initiatives that will contribute to the sustainability and regeneration of existing centres and suburbs.

**Objective**

To revitalise existing centres and suburbs by :

- strengthening their local economies
- increasing their social capital, and
- making more sustainable use of their existing infrastructure and services.

**Actions underway**

- Ongoing work to implement outcomes of the Enquiry By Design processes used to investigate and promote revitalisation options and opportunities for centres and suburbs in Perth, including Claremont, Mirrabooka and Bassendean.
- The Maddington-Kenwick Sustainable Communities Initiative (see Box 48).
- The ongoing actions and programs of the Redevelopment Authorities operating at East Perth, Subiaco, Midland and Armadale.
- Local government-led initiatives such as the Gosnells Town Centre Revitalisation project and the City of Swan's Place Planning program in liaison with the Department for Planning and Infrastructure.
- The creation of a register of revitalisation projects by the Department for Planning and Infrastructure that will facilitate information sharing on revitalisation issues and techniques currently being applied in Western Australia.
- The preparation of a Discussion Paper on Liveability and Revitalisation as an important element of the supporting framework for the Greater Perth project.

## In short cont'd...

- The establishment within the Department for Planning and Infrastructure of a Revitalisation Directorate, with the objective of developing, promoting and managing revitalisation programs and initiatives, and providing advice and assistance to other agencies, to local government and to the community on revitalisation issues in Western Australia.
- Continuing research into revitalisation techniques being applied in other States and internationally.

### Actions

4.7 Create a Revitalisation Directorate within the Department for Planning and Infrastructure with the objective of developing, promoting, and managing revitalisation programs and initiatives, and providing advice and assistance to other agencies, to local government and to the community on revitalisation issues in Western Australia.

4.8 Develop a program that will provide guidance and resources to assist in revitalising declining centres and suburbs, with the objective of creating viable investment opportunities through more effective planning and design, local infrastructure improvements and the promotion of partnerships between government, community and business.

4.9 Support the Maddington-Kenwick Sustainable Communities Initiative as a demonstration project and consider extending this approach to similar areas.

4.10 Link revitalisation projects to the development of the neighbourhood renewal initiative (see *Sustainability and community*).

### Global opportunities

The fostering of skills and the development of techniques that can be demonstrated to achieve the sustainable revitalisation of urban areas would attract considerable global interest and demand.

### Further information

Armstrong, RJ 2002, *Sustainable Community Regeneration*, background paper for the State Sustainability Strategy, CD-ROM

Armstrong, R & Head, G 2002 , *Liveable Neighbourhoods: Guiding New Developments for a More Sustainable Urban Future*, sustainability case study, http://www.sustainability.dpc.wa.gov.au/CaseStudies/Livable Hoods/LiveableNeighbourhoods.htm

Armstrong, R 2002, *Reurbanisation in Perth: East Perth and Subiaco Contributing to a Growing Trend Towards a More Sustainable Perth*, sustainability case study, http://www.sustainability.dpc.wa.gov.au/CaseStudies/Subiaco/Subiaco.htm

Rebbettes, D 2002, *Fremantle: Thriving Economically through an Urban Heritage Focus*, sustainability case study, Department of the Premier and Cabinet, Perth, http://www.sustainability.dpc.wa.gov.au/CaseStudies/Fremantle%20Heritage/fremantle heritage.htm





## > SUSTAINABLE URBAN DESIGN

*A city is most certainly an ecosystem.*

Grimm et al, 2000[33]

Cities and towns are like organisms or ecosystems – they grow and decline, live and die, and adapt to their surroundings. An emerging area of sustainability studies is how cities can be understood as ecosystems. These ideas build on centuries of thinking about cities by people in architecture and planning but have merged with newer ideas from urban economics and urban ecology[34]. Together these ideas enable us to see how cities are organic: they are a unique combination of people and place, and change according to similar principles and processes that determine how ecosystems change. This provides strategies for how sustainability can be designed into cities.

The section sets out how the sustainable planning and design of cities can respond to human patterns and economic processes, to ecological processes and environmental conservation. It builds on a set of principles set out in Box 49. Other elements contributing to sustainability in the design of cities and towns (e.g. human patterns and economic systems) are addressed in other sections, such as *Managing urban and regional growth, Revitalising declining centres and suburbs* and *Integrated land use and balanced transport*.

### BOX 49 PRINCIPLES OF SUSTAINABLE URBAN DESIGN

The main principles of sustainable urban design are reflected in the Liveable Neighbourhoods trial policy, but would also apply to managing change in all urban areas. These are:

- Incorporate collaboration in project planning and delivery.
- Promote urban structures that support and integrate economic, social and environmental sustainability.
- Foster community and local identity and character.
- Integrate, connect and maximise access for all users.
- Design for legibility, and local character and identity.
- Provide diversity, choice and variety.
- Build in robustness and flexibility.
- Respond appropriately to environmental features to create sense of place.
- Design for surveillance and safety.

These principles are developed further below in terms of sustainability.

*The redevelopment of Subiaco has seen the rapid development of high-density housing and commercial buildings close to public transport and facilities and is an example of successful regeneration of inner-city areas close to the Perth CBD. SubiCentro's urban design has won many awards and has attracted worldwide interest.*

Source: Peter Newman

[33]NB Grimm, JM Grove, STA Pickett and CL Redman, 'Integrated approaches to long-term studies of urban ecological systems', BioScience, vol.50, No,7, 2000, pp.571-584.

[34]People like Christopher Alexander have described cities in terms of underlying patterns that have a natural order necessary for human qualities in a city to be fulfilled. Jane Jacobs saw the economy of cities as something that emerges out of its organic processes. And Bill Mollison (the inventor of permaculture) describes the biology of cities and sets out how we should copy and work with such processes.

## Human patterns

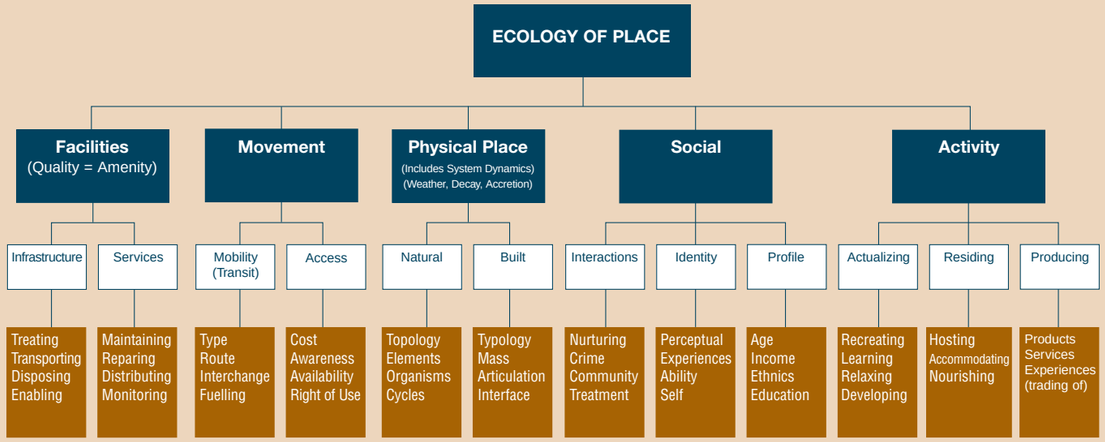
The core principles of urban design that enable cities to work for and not against human instincts for community, security, accidental interaction, walkability, beauty, vitality and delight are set out in Box 49 above and in Box 50, The Art of Place Making, below.

### BOX 50 THE ART OF PLACE MAKING[35]

People are on one level diverse and unique. On another level we have physiological and psychological needs that are universal. People like to wait where they can watch what is going on, they like to feel the sun on a winter's day or find shade out of the midday sun. They get uncomfortable when a stranger stands too close in a small space but gather close to friends to laugh and talk and exchange ideas. These fundamentals are so powerful that they have shaped great cities for millennia. Cities that have relegated people second to industry, transport or private greed have all failed to develop a rich diverse and sustainable urban ecology. In time they have either reinvented themselves as people cities or become redundant. Cities that have created places that support people's daily needs and reinforce and celebrate life's events have overcome periods of great turmoil and flourished over centuries.

Over the past two decades Perth has rediscovered and reinvested in many of its most important major places. One example is Central Perth. At first glance, Central Perth may appear the same as 10 years ago but in many ways it is a new city. People have moved back in, more space has been given to pedestrians, new trees shade benches and cafes spill out wherever there is enough space on the footpath. There is a new energy in places like Central Perth and many smaller traditional centres across Western Australia. There is also, however, a half-century's worth of suburbs designed for the motor car where local centres provide little for the local community and shops are vacant or in decline. For these suburb's Perth's centres become even more important places.

Place making reasserts the importance of outcomes. It sees processes, policies and strategies as servants to good outcomes. It says that if we get the place right for people we get it right for what cities are supposed to do. Communities will be stronger and healthier, business will be vibrant and successful and the environment will be brought back into balance with the city. Place making brings together the experts that develop and administer strategies, the people who control finances, those that have technical know-how and those that understand local issues. These specialists work together in an interactive process where each idea is tested and evaluated in an iterative process. A designer often supports this process of inquiry. The designer helps to illustrate the patterns of development that will result from the approach the team is proposing. These illustrations help reveal where improvements need to be made and highlight opportunities that may not have been realised by discussion alone. Together, these concepts and people-based processes are the basis of place making.




[35]By Brett Wood-gush, Perth urban designer





The policy framework which attempts to give substance to these principles of urban design in Western Australia is the Liveable Neighbourhoods code. This development control system was introduced as a voluntary design code in 1997 and has been applied (at least in part) to many developments since. The Liveable Neighbourhoods code is being reviewed to determine whether it should be made the preferred code in Western Australian subdivision. Further development of urban design manuals and guidelines will help make Western Australia a better place to live in.

## Economic systems

Each city and each part of a city generates its own underlying economic processes that hold it together—totally interconnected with the more social considerations outlined above. Midland is a service town for the Swan Valley and Hills region. Parts of Perth like Cockburn-Kwinana-Rockingham have an established industrial base on which the region is economically dependent. The linkage between the residents and the economic base is always changing and can be understood as a story or 'place narrative' (as outlined in *Sustainability in the regions*). Many areas of cities are rapidly moving to be more part of the knowledge economy, based around urban services and processing of information.

The links between the economy of Perth (and its region) have been studied as part of Greater Perth. The implications for policy and planning generally mean a much more flexible approach to zoning is needed to encourage mixed use of compatible service-oriented/knowledge economy jobs and housing.

## Ecological processes

Cities are part of an eco-region with its own ecological processes such as coastal processes, the water cycle, climate and soils. Cities depend on their ecological context for water supply, air quality, processing of wastes, space for recreation etc. Cities can fit within the natural carrying capacity of their region or they can exceed them and become dysfunctional with poor land use that degrades coasts, poisons aquifers, depletes water systems, creates bad air, causes wastes to build up or leaves inadequate space for passive or active recreation. In addition to the ecological imperatives to respond to the natural environment in the development of urban areas, responding to natural resource, landscape and conservation assets contributes to a city's 'sense of place', identity and cultural character.

Many of these issues are dealt with in other sections of *Sustainability and settlements* (e.g. water, air, waste, energy) and also *Sustainable natural resource management* (e.g. aquatic systems like the Swan River or Cockburn Sound).

Statements of Planning Policy provide strategic guidance on ecological processes. The Statements of Planning Policy on Environment and Natural Resources and on Coastal Planning set out these principles in a policy framework for adoption in Town Planning Schemes and Regional Schemes. They outline policies like coastal planning to minimise impacts on coastal processes like dune formation, and to protect development from coastal processes. They outline the need for water sensitive urban design, a policy that was developed in Perth and which has spread across Australia. The water sensitive urban design sets out how to enable stormwater to be recharged to local aquifers, how wetlands can be facilitated to remain as natural ecosystems within the city and how water supply needs can be minimised by building in water efficiency and local water use from tanks or groundwater.

Further Statements of Planning Policy will specify how human settlements can take account of local and regional ecological processes, so that the city or town can work with nature and not against it.

These ecological processes need to be understood by planners if they are to be worked with positively and not negatively. The links between ecosystem knowledge and planning knowledge need to be reinformed.

## Environmental conservation

Areas of natural bush are an important part of what it means to live in Perth. Unlike cities such as Melbourne, Perth has not significantly altered its landscape through large-scale European planting. There are of course many foreign plants in gardens and parks in Perth, but significant areas of urban bushland have been conserved and this tradition has been in place since Kings Park was created at the turn of the century. The Perth Metropolitan Region has approximately 50% of its area covered with native vegetation of which 40% is in reserves (Parks and Recreation and State forest) and most Wheatbelt shires have less than 5%.

Bush in the city is also important for urban habitats and can also play an important role in regional conservation. Cities are often seen as negative influences on the conservation of biodiversity. However, cities can also be partners in regional conservation as set out below.

Cities can set aside land for conservation purposes and because of the intensive population nearby can provide the resources to play an important part in a regional conservation program. Perth for example has some of the most significant areas of remnant vegetation in the south west of Western Australia. Rural areas have often been over-cleared and where reserves remain they are subject to intense invasion from feral animals and weeds. Urban reserves can be intensively rehabilitated (weeded and fenced) with strict management regimes that can ensure different habitat opportunities than in regional areas. Intensive horticulture of native plants in research areas, in schools, in backyards and urban reserves can become more and more sophisticated in assisting the biodiversity restoration of a region.

There is an increasing awareness of the importance of urban bushland and urban horticultural practices in biodiversity conservation. The 'zoos' and 'arks' that can be established in cities can become more and more the havens for rare species, for breeding and for regeneration before such species can be transplanted to areas for re-establishment. This kind of partnership between city and bush is evident in the work conducted by the Botanic Gardens and Parks Authority, the Herbarium, the Zoo and the Department of Conservation and Land Management in their research work.

The Southwest Australia Ecoregion Initiative (SAEI) is a project to create a partnership for biodiversity conservation in the south west of Western Australia (see Box 18). It is possible to imagine cities like Perth developing more and more as biodiversity partners in the regional regeneration of the SAEI. The development of the State Biodiversity Strategy and in particular the South West Eco-region project can act as catalysts for creating a regional partnership approach on biodiversity linking the city and its region.

Urban bushland is being set aside in a program called Bush Forever. Following guidelines set by the World Conservation Union, Bush Forever aims to protect at least 10% of the original vegetation in each of the twenty-six vegetation complexes within the Swan Coastal Plain portion of the Perth Metropolitan Region. This project needs to be extended next to cover the Peel and Bunbury regions.

There are 287 Bush Forever sites that make up 51,200 ha of land in the Perth Metropolitan Region. Approximately 64% of these sites have been purchased or set aside for government-owned land as part of the existing conservation estate. The remainder of the designated Bush Forever sites will be protected through various mechanisms including reservation and purchase, private conservation and negotiated outcomes to balance conservation with other land uses and developments, by 2010 under the $100m Bush Forever program.

As part of the next phase of Bush Forever (from retention to management) a Statement of Planning Policy is being created to guide all local governments in the ongoing protection and management of local and regional bushland. Local Bushland Protection Strategies are to be the mechanism for creating a statutory and local community-oriented strategy. These strategies can become an important part of regional biodiversity protection, especially if they are linked to the partnership on biodiversity in the south west (above).





# In short...

### Vision

Sustainable urban planning and design is more attuned to the human, economic and regional ecological processes that the city's residents live within, creating opportunities for a more sustainable urban future.

### Objectives

- Plan and manage urban environments to facilitate human and economic dimensions of sustainability and to contribute to their regional biodiversity and maintenance of ecological processes.

### Actions underway

- Implementation of Bush Forever.
- Establishment of a Statement of Planning Policy for Environment and Natural Resources.
- The Liveable Neighbourhoods code is being reviewed and finalised with a view to promoting a more sustainable policy to guide structure planning and subdivision and is being applied at major projects on the urban fringe of Perth and in key regional centres.

### Actions

4.11 Based on the review of the Liveable Neighbourhoods design code, ensure that there is an increased commitment to sustainable urban design which creates community-oriented city spaces and networks, economically facilitated mixes of housing types and business spaces, and ecologically sensitive design.

4.12 Develop a state urban design charter to promote development based on the principles of sustainable urban design, to guide the private and public sectors, and develop a manual of guidelines for urban design in Western Australia.

4.13 Continue the development of Statements of Planning Policy linking ecological processes to strategic and statutory planning. Develop local planning strategies that can apply these general principles to specific areas and regions.

4.14 Extend and expand educational programs to enable more ecological understanding to be integrated into planning and design knowledge and practices.

4.15 Complete implementation of Bush Forever through amendments to the Metropolitan Region Scheme and an associated Statement of Planning Policy to guide the management of urban conservation and preparation of local bush protection strategies that can build on community involvement and help create 'sense of place'.

4.16 Extend Bush Forever to the Peel and Bunbury regions.

4.17 Use the development of the State Biodiversity Strategy and the Southwest Australia Ecoregion Initiative to develop a partnership approach between city and regional biodiversity management. The partnership should involve Botanic Gardens and Parks Authority, the Herbarium, the Zoo, Department of Conservation and Land Management, regional natural resource management groups, community organisations, schools, volunteers and local government through local bush protection strategies. The partnership will help create biodiversity refuges, rehabilitation areas and intensive horticultural production of rare plant species.

# In short cont'd...

## Global opportunities

Urban design is a rapidly growing global profession. With sustainability as its focus, it is possible for Western Australian urban design professionals to participate in large overseas projects that build on an already strong reputation for excellence in planning.

## Further information

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English Partnerships and The Housing Corporation, 2000, *Urban Design Compendium*, http://www.englishpartnerships.co.uk

*A recent study undertaken by the Botanic Gardens and Parks Authority and the Department of Conservation and Land Management has shown that Perth is one of the most floristically diverse cities on Earth. Over 1000 plant species have been identified. Through research and urban bushland management involving the community, biodiversity is being protected at a level that is globally significant. See www.bgpa.wa.gov.au*





## > INTEGRATING LAND USE AND BALANCED TRANSPORT

**Sustainability in settlements is strongly influenced by the priority given to transport modes and by how land use is integrated with these modes. Perth's development has been heavily influenced by our dependence on the car and truck and this needs to be more balanced with better integrated land use and transport.**

> *Eighty four percent of people in the metropolitan area want transport policy and planning to favour environmentally friendly modes, and half of the population believe planners have an exaggerated impression of the community's demand for car-oriented planning.*
>
> Subiaco Bicycle Users Group

Car dependence arises when cities are built with 'scattered' suburbs, forcing people to rely heavily on cars to reach services, jobs, schools and shops. Around the world, planning is being undertaken to avoid this phenomenon; to build and rebuild cities where land use is integrated with public transport, walking and cycling so that there is a much more balanced transport system and more focused land use. As Professor Ian Lowe says, 'better urban planning would provide accessibility without requiring mobility'.[36]

Overcoming car dependence is fundamental to sustainability in cities. In environmental terms this will reduce the land required, transport energy, water use and pollution and greenhouse gases. In social terms, integrated land use and balanced transport can contribute to a reduction in crime, healthier people through increased walking and cycling, more community opportunities and enhanced 'sense of place'. This can also provide increased opportunities for people who don't own a car over half of the total population. Integrated land use and balanced transport can also achieve economic gains by providing more efficient transport, less infrastructure (shorter pipes and cables) and better community facilities. In addition, because of the reduced demand for infrastructure, more capital is available to the productive economy, greater employment opportunities arise, for example through the location of knowledge-oriented jobs. Finally, it has been estimated that individual households could save up to an additional $750,000 in superannuation over a lifetime by having one less car. In some poorer outer suburbs over 40% of household income is being spent on cars and travel.

The recently developed National Charter of Integrated Land Use and Transport Planning is a high level agreement between land use and transport planning Ministers (see *Planning for sustainability*). It provides the principles, aims and outcomes to facilitate effective and sustainable urban and regional development across Australia through better transport and land use integration. The document recognises the need for better coordination between all three levels of government in the achievement of a number of aims, which include:

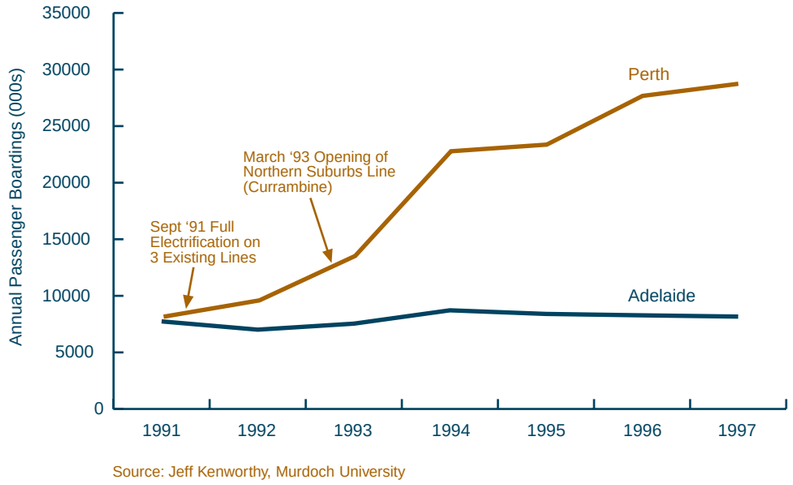
- increased accessibility by widening choices in transport modes and reducing vehicle travel demand and impacts
- creation of places and living areas where transport and land use management support the achievement of quality of life outcomes
- increased opportunities for access in both the present and longer term, and
- a safer and healthier community.

The Charter can provide the context for the development of State and local level policies, plans and strategies aimed at improving the sustainability of urban and regional areas through better land use and transport integration.

In Western Australia, there have been some important innovations in overcoming car dependence that have attracted worldwide attention, particularly the Liveable Neighbourhoods code, the new electric train system and the TravelSmart Household program.

[36]Professor Ian Lowe, quoted in Sustainable Population Australia's submission to the draft State Sustainability Strategy.

**Figure 9 Rail patronage in Perth and Adelaide 1991-1997**




Source: Jeff Kenworthy, Murdoch University

## Liveable Neighbourhoods

Liveable Neighbourhoods is the code for planning of new suburbs that enables development to be more walkable and transit oriented. The code has won several national and international awards and is increasingly becoming the norm especially in joint venture-State Government projects like LandCorp's Atwell South and LandStart's Butler, Brighton, Clarkson and Leda developments.

The Liveable Neighbourhoods code needs to be reviewed as a step towards making it mandatory. The Sustainability Scorecard can incorporate extra points for integrated transport and land use as provided through the Liveable Neighbourhoods code.

## Electric train system

The Perth electric rail system has been an outstanding success story with patronage growing from 9.5 million passenger boardings per year in 1992 to 30 million seven years later. This is likely to double again with the southern rail extension to Mandurah. No other city has achieved such growth (see Figure 9).

The train's success has been due to its speed, comfort and integration into a broader system. This major upgrading of transport infrastructure has provided an opportunity to revitalise sub-centres (and the city centre), to integrate other forms of transport into station precincts and to shape new development in less car dependent ways.

The new rail system provides a 'spine' of fast transport services but not all of Perth has access to this and increasingly journeys are across the city between corridors. There are successful cross-city bus services but some of these are reaching capacity. Integrated bus service expansion and extended rail services need to be planned into the longer-term. The potential for light rail and other innovative new services to provide links between corridors and sub-centres needs to be explored. A long-term public transport plan is needed to guide the city into the future. This can be done as part of the updating of the Metropolitan Transport Strategy and Greater Perth.

## Bus system

The provision of bus priority measures throughout Perth at points where buses are delayed by any substantial traffic congestion will improve the reliability and therefore the attractiveness of Transperth bus services as a transport option. While the Transperth train system provides a very effective and desirable heavy passenger transport spine, it is not available to a large number of Perth residents. Currently buses carry approximately 60% of public transport passengers compared to rail's 40%. While this proportion will change when the expanded rail system opens, for many Perth residents buses will continue to be their key mode of public transport. Unlike trains, buses must compete with cars for road space and bus priority measures are essential at key congestion points. Greater opportunities for bus priority need to be considered in future capital programs. Such priority measures may well establish the reserves required for light rail systems when patronage builds and warrants light rail.





## Ticketing

Promotion of public transport can occur through the use of new smart card ticketing and technology providing for faster boarding on buses, trains and ferries and greater security for passengers if the card is lost.

## Fuel

The government now requires that all Transperth buses procured after June 2002 are powered by environmentally friendly natural gas, a fuel sourced from within the State. Notwithstanding this, other alternative fuels are being assessed. Perth is the only southern hemisphere city participating in a world trial of the latest fuel cell bus technology, with three fuel cell buses to be delivered into the Transperth fleet in mid-2004. This visionary project has involved key industry stakeholders in Western Australia and also Murdoch University, which will be undertaking associated fuel cell studies during the bus trial. Transperth is also working with interested parties to undertake bio-fuel trials. The Minister for Planning and Infrastructure has established a Sustainable Transport Energy Program that will incorporate these trials and research projects and will also include an initiative to reduce the use of fossil fuels (see *Oil vulnerability, the gas transition and the hydrogen economy*).

## TravelSmart Program

The TravelSmart household program was pioneered in Perth and has successfully demonstrated a shift toward more balanced transport usage. The program provides information and motivation to residents in such a way that they reduce car use and choose existing alternatives. Car driver trip reductions of between seven and fourteen per cent have been achieved. These results wipe out around ten years of local traffic growth, contribute significant pollution and greenhouse gas reductions and deliver a cost-effective package of health and other social benefits.

A series of TravelSmart demonstration projects are underway across the metropolitan area with early results indicating that the Household program can be successfully transferred to many urban and socio-economic environments. Following its success in Perth, the program has been taken up by most other States and five overseas countries.

The TravelSmart household program is supported by a suite of TravelSmart programs that are delivered in different settings including local government, schools, workplaces, and major destinations. These programs focus on providing information and encouragement for people to change travel behaviour and influencing policy and decision-making in these settings in favour of balanced transport.

The TravelSmart Local Government program provides support for TravelSmart officers in local governments to:

- deliver local action plans and community education and information strategies that contribute towards balanced transport, and
- encourage consideration of alternative modes in local government policy and decision-making.

The TravelSmart schools program helps local school communities to reduce traffic congestion around their schools. This program is curriculum based and incorporates strategies that engage students and schools with a focus on student-centred learning and development of leadership skills. The program is delivered in partnership with Millenium Kids, a local non–profit youth based environmental group that empowers youth to contribute to the environment. The Walking School Bus supports the TravelSmart to Schools program by enabling groups of parents to take action in making walking to school safer and more convenient.

*A walking school bus in Perth that delights in the local walk to school, creating community and 'sense of place' as well as health outcomes.*

Source: Department for Planning and Infrastructure

The Department of Environment and the Department for Planning and Infrastructure jointly deliver the TravelSmart Workplace program. The program offers support for both government and non-government employers to manage work-related travel. The focus is on reducing car use by improving and promoting travel alternatives, particularly to staff by assisting workplaces to develop, implement and evaluate Green Transport Plans.

Both the TravelSmart Workplace and Local Government programs provide support for TravelSmart officers and facility management in major destinations (i.e. universities, hospitals) to promote reduced car use and increased use of the travel alternatives to access these facilities.

### Walking/cycling

Forms of transport including cycling and walking are critical to sustainable urban development. The Physical Activity Taskforce (see *Sustaining healthy communities* and case study on the Taskforce) has demonstrated the multiple benefits of increased physical activity in our daily lives. Social benefits from an increase in walking and cycling are also being discovered. The Pedestrian Advisory Committee of Western Australia conducted a seminar in May 2002 called *Battery Reared or Free-Range Children*. This seminar considered a British study which found that children who are driven to school do not develop the same 'sense of place' and confidence in taking risks as those who walk, and therefore are less able to mature in this area of their personal development.

Local government land use and development decisions determine density, mixed use and physical layout of neighbourhoods that in turn profoundly influence the level of auto dependency in the community. The newer dense areas of Subiaco and East Perth, like the older areas of Fremantle, are far more attractive for walking and cycling than low-density suburbs. Local government can also influence how the community travel in their municipality through bike plans, pedestrian access and transport nodes around commercial centres.

Facilitation of pedestrian activity and cycling requires more design and infrastructure (especially at the local level), support in the form of engineering codes and educational campaigns. This should include a revamped Perth Bicycle Plan and a focused strategy of working with local Bicycle User Groups.





### Funding priorities

A better balance of transport modes and integration of these with land use planning can be achieved through the funding of infrastructure and services. Within the Planning and Infrastructure portfolio, portfolio priorities for the assessment of capital funding proposals have been developed by incorporating sustainability considerations. The jointly developed Portfolio Directions statement (based on the draft State Sustainability Strategy) sets out broadly how the portfolio agencies will create better places for all West Australians to live, with progressive alignment by agencies of their plans and resource requirements to meet sustainability objectives.

## In short...

### Vision

Transport and land use decisions are so interconnected and synergistic that a more balanced, less car dependent city rapidly emerges and solves multiple urban sustainability problems.

### Objectives

- Maximise the opportunity to increase residential, employment, retail, community and entertainment activity around key transport nodes and in major centres.
- Achieve a more sustainable balance between car use and other transport options through the promotion and provision of efficient and effective public transport and non-motorised personal transport alternatives.

### Actions underway

- Agencies have been restructured to integrate planning and transport functions into the Department for Planning and Infrastructure.
- The new Public Transport Authority has been created within the Planning and Infrastructure portfolio with a core focus on delivery of safe, reliable and high quality public transport services around the State. Improving the quality of public transport services is a key to changing travel demand, increasing patronage and thereby balancing the transport task.
- The New Metro Rail Project will almost double the existing suburban rail system and includes the 74 km $1.4b southern rail line and rail extensions to Clarkson and to Thornlie.
- Associated with the large-scale rail expansion, work is underway to improve land use around rail stations and public transport transit corridors, thereby maximising the environmental and economic benefits of the rail investment.
- Bus and trains services are integrated whenever possible, including integrated timetables. Through the Building Better Stations program, options have been examined to improve and implement transport land use integration for existing train stations. Opportunities are also being examined for maximising population and employment at future stations on the South West Metropolitan Railway.
- The Western Australian Pedestrian Advisory Committee has been established and holding public seminars on pedestrian issues.
- In consultation with the local communities, a number of sub-regional Integrated Transport Plans are being prepared which prioritise improvements for public transport, cycling, and walking facilities over 5, 10 and 20 year timeframes.

# In short cont'd...

- The TravelSmart Household program is being implemented incrementally to reduce car use and increase walking, cycling, and public transport patronage, thereby making better use of existing transport facilities and services.
- A suite of TravelSmart initiatives are being trialled and implemented in different settings including local government, schools, workplaces, and major destinations. These programs focus on providing information and encouragement for people to change travel behaviour and influencing decision-making in these settings in favour of balanced transport.
- The Western Australian Bicycle Committee has been continued and Bikewest has been re-established in the Department for Planning and Infrastructure to undertake a coordinating role in bicycle infrastructure development and advocacy activities.
- Concession fares have been frozen and time validity increased for public transport ticketing.
- Environmentally friendly gas-powered buses are being introduced into the Transperth bus fleet from June 2002.
- A Sustainable Transport Energy Program has been developed including the preparation of a strategy for Western Australia by a specially appointed Ministerial Committee, and the fuel-cell bus trial.
- Community acceptance and trial implementation of Liveable Neighbourhoods planning and design policies which facilitate and provide for walking and cycling as a necessary element of a community.
- Development of a Statement of Planning Policy on the sustainable planning, provision and maintenance of transport and infrastructure and the integration of land use and transport.
- Department for Planning and Infrastructure participates in the development of the National Charter of Integrated Land Use and Transport Planning.
- A recent partnership between the Disability Services Commission and the Main Roads Department has been established to develop a video ('Easy Street') which looks at planning for an accessible pedestrian environment.

## Actions

4.18 Provide by the end of 2004 a world-best SmartRider ticketing system for integrated public transport incorporating promotional and incentive activities for passengers, greater security at stations and faster boarding.

4.19 Reduce the need to travel by car through:

- the application of locational and design criteria in the Sustainability Scorecard
- application of the Liveable Neighbourhoods Community Code and related policy options
- continuing to improve public transport infrastructure (eg the Building Better Stations program) and encourage behaviour change (e.g. the TravelSmart Household program) in favour of public transport and other transport options, and
- initiatives to promote regional and district centres and encourage jobs growth in non-CBD locations (thereby developing an opportunity to increase travel demand in non-peak directions and allow greater use of existing resources and capacity on the Transperth train and bus system).





# In short cont'd...

4.20 Encourage pedestrians and bicycle use through:

- developing friendly environments in town centres
- improving pedestrian and bicycle access on local streets
- continuing the implementation of the TravelSmart Household program and complementary TravelSmart initiatives
- providing guidelines which assist local government authorities to audit and improve the accessibility of their pedestrian and cyclist infrastructure, and
- updating the Perth Bicycle Network Plan.

4.21 Promote further integration of buses and other travel modes such as cycling to the existing train system, and actively prioritise improvements to new station precincts where better integration is possible, thereby ensuring that residents have the opportunity to complete their entire journey using public transport.

4.22 Research and document vehicle trip behaviour and personal travel mode choices to establish planning implications for land development, traffic management, bus priority measures and cycling infrastructure projects.

4.23 Provide safe and economical bike parking at train and bus stations and car parking at designated Park and Ride Stations.

4.24 Develop programs that increase mixed-use development in strategic and other regional centres with good public transport provision, and where possible identify public transport requirements and funding support as part of development applications.

4.25 Encourage local government to provide for flexibility in residential zoning, which allows small businesses and 'corner shop' retail facilities to locate in existing suburban communities.

4.26 Encourage flexibility in local government parking policy in areas where there is good public transport; research parking demand at suburban centres and build on the success of the *Perth Parking Management Act 1999*.

4.27 Review and update the Metropolitan Transport Strategy and develop a long-term public transport strategy which reflects the New Metro Rail Project, the integrated bus, pedestrian and cycle networks with potential future upgrading, and the continuation of the TravelSmart program.

4.28 Support Commonwealth Government investigations into the extension of Australian Design Rules to cover noise and other environmental issues for all vehicles.

4.29 Work to remove inequitable taxation treatments and salary packaging arrangements that do not allow public transport and bicycles as travel options.

4.30 Within the Department for Planning and Infrastructure establish and implement a whole of portfolio prioritisation model to enable funding priorities for integrated land use and transport planning and balanced multi-modal transport based on sustainability objectives.

4.31 Consider the cross-government benefits of cycling and pedestrian programs for health and environmental benefits in an effort to better coordinate program and funding arrangements.

4.32 Expand research and training on the integration of transport and land use for more balanced transport outcomes and recommend this for inclusion in the proposed Masters in Transport Studies being established between the universities.

# In short cont'd...

4.33 Continue integrated transport planning across regional council groupings in association with the development of corridors and sub-regional areas.

4.34 Develop a Statement of Planning Policy on the sustainable planning, provision and maintenance of transport and infrastructure and the integration of land use and transport.

## Global opportunities

Cities around the world are attempting to better integrate land use and transport planning. Western Australia's experience could be globally significant. The TravelSmart Household program has been adopted by the Commonwealth Government and is currently being replicated in Queensland, Victoria, South Australia, United Kingdom, United States, Sweden, Germany and France. Now recognised as the pioneer of an effective transport innovation, many countries are looking to Western Australia for leadership in this approach.

## Further information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*The Perth to Mandurah Raliway is the largest and most comprehensive integrated transport project ever undertaken in Western Australia. It will create a 48-minute link over the 71km journey (20 minutes faster than an average car trip).*

Source: New Metro Rail





## > MANAGING FREIGHT AND REGIONAL TRANSPORT

**The Western Australian Government made a commitment to review the freight network and began this soon after taking office through a series of innovative public forums, built around the concept of sustainability. This process has been highly successful and has demonstrated that a transparent process, engaging all stakeholders with the goal of sustainability, can come up with mutually supportive solutions that are better for the economy, the community and the environment.**

> *It is ironic that the very cars and trucks that have made massive urbanisation possible are now contributing to the deterioration of cities.*
>
> Lester Brown[37]

The Freight Network Review began with a role-playing exercise involving the trucking industry and community groups in the Hills area that helped find solutions to a noise problem and did not require the construction of a proposed bypass.

A Freight Congress was held involving 150 people from all major stakeholder groups as well as randomly selected members of the public. The Congress set the agenda for 9 months of intensive work by six working groups. The first group created a paper on *Sustainability in Relation to Freight*. This set the principles for the other groups and a master plan and also recommended the use of a public multi-criteria analysis process to consider some major road planning proposals.

The Fremantle Eastern Bypass and the extension of Roe Highway through Bibra Lake have generated serious divisions in the community. The multi criteria analysis process was applied to these situations through a series of workshops involving Dr David Annandale from Murdoch University. This process identified twenty-three alternative options and developed thirty-seven environmental, social and economic criteria. A community committee worked with experts to translate these criteria into measurable factors and weighted the criteria to reflect community and industry values. These weighted scores were then applied to the alternative routes.

The final workshop found that the four groups in the process—industry, community, environmental and government—all agreed on the best options. None of the options involved a road through the Bibra Lake wetlands that had previously been proposed as part of the controversial Roe Freeway Stage 8. This sophisticated and transparent process has pioneered a technique in Western Australia for applying sustainability to the resolution of a complex planning problem with practical outcomes. The multi-criteria technique can now be applied to any complex planning decision with confidence. Those involved in the process have developed capacity that is arguably world's best practice.

The particular road planning options need to be part of a broader strategic planning solution and this was developed by the Freight Network Review Working Groups, and approved by a reconvened Freight Congress in June. The solution involved a strategy to increase the use of rail from the Port of Fremantle (the focus of many of the freight problems) from 3% to 30% as well as reducing the number of empty truck movements so that the growth of truck traffic could be curtailed to keep it at present levels. Other identified needs were for planning to begin immediately on the development of an Outer Harbour container terminal and determining rail and road connections and a freight interchange node.

The Congress also considered that the Freight Network Review should be more broadly applied to the development of road-rail nodal interchange points (to ensure that freight routes are clearly planned and not compromised) and that demand management should be put on the agenda. The review could be usefully extended to the rest of the State.

[37] L Brown, *Eco-Economy*, Norton, New York, 2001, p. 208

The process of developing Regional Transport Plans could be the mechanism for extending the Freight Network Review. It can also provide the opportunity to incorporate local and regional perspectives on passenger transport futures, particularly in light of the oil vulnerability issues (see *Oil vulnerability, the gas transition and the hydrogen economy*).

## In short...

### Vision

Freight becomes more efficient, more rail-based and more connected through inter-modal centres so that the expected large growth in truck movements does not occur. Simultaneously, improved regional passenger transport also becomes available.

### Objectives

- To achieve an integrated and safe freight transport system that is economically and environmentally sustainable and minimises community conflict.
- To enable transport to meet the needs of regional communities.

### Actions underway

- The Freight Network Review was undertaken in close consultation with community and industry.
- Accreditation for the road transport industry is occurring.
- Strategic planning to support freight rail in limited markets is being undertaken.
- The government is participating in national processes to achieve uniformity of regulations and standards.
- The new Australian Design Rules for vehicle emissions are being introduced.
- The Prospector train is being upgraded.
- The development of a Statement of Planning Policy on the provision of an efficient freight network that is socially and environmentally responsive.

### Actions

4.35 Implement the Freight Network Review including the switch to rail freight in the Fremantle Port from 3% to 30% of all containers, the more efficient use of trucks through modal interchange nodes and an acceleration of strategic planning for the Outer Harbour.

4.36 Extend the Freight Network Review principles and concepts to the whole State, through discrete projects in the regions.

4.37 Develop a mechanism to manage conflicts between freight and residential activity, using zoning options to create incentives for property owners and site management options where necessary.

4.38 Encourage the expansion of freight rail infrastructure to effect modal change.

4.39 Ensure that all complex and contentious road and rail planning is done using sustainability techniques such as the multi-criteria analysis process developed for the review of Roe Highway, the citizen jury approach used for Reid Highway and land use/transport modelling (see *Sustainability and governance: Sustainability assessment*).





## In short cont'd...

4.40 Develop a long-term strategy for country passenger rail.

4.41 Create Regional Transport Plans with Regional Councils for freight and passenger services in country and city regions.

### Global opportunities

The need to develop sustainable freight movement in cites and regional areas is a global issue.

### Further information

Department for Planning and Infrastructure
http://www.dpi.wa.gov.au/hotspots

*The Freight Strategy is shifting containers at Fremantle Port from road to rail. The change from 3% to 30% of containers by rail will mean thousands fewer trucks on the road.*

Source: Department for Planning and Infrastructure

## > PRESERVING AIR QUALITY

**Clean air is essential to a healthy population and a healthy environment.**

*The vision for Western Australian air quality is to have the air in every community healthy to breathe, to reduce damage to the environment from air pollution and address global air quality problems. The Western Australian government, industry and the community must be charged with protecting air quality and progress improvements in air quality, despite opposing trends in population, economic, and transportation growth.*

Air quality and community exposure to air pollutants across the State are being influenced by personal lifestyle and behaviour decisions (such as vehicle use and home heating choices), industrial emissions and activities such as fire management.

Haze (particle pollution) is most evident during colder months, when atmospheric inversion layers trap emissions for extended periods of time. The primary source of urban haze events is domestic wood fires. Fuel reduction burns, motor vehicles, off-road vehicles and industry are also significant sources of particles; however, due to the type, location and temporal period of the emissions from these sources, they are less significant to the formation of haze. Wood fires, particularly open fires are progressively being phased out of most modern cities along with coal burning.

Photochemical smog is primarily composed of lower atmospheric ozone, which is the result of the chemical reaction between nitrogen oxides and reactive organic compounds, in the presence of heat and light. Their principal sources are motor vehicles, combustion processes (for nitrogen oxides), and refining, petrochemical and solvent-based industries (for reactive organic compounds). Motor vehicles produce both reactive organic compounds and nitrogen oxides which combine to form photochemical smog during inversion events (most in winter and spring).

'Air toxics' are gaseous, aerosol or particulate pollutants that are present in the air in low concentrations with characteristics such as toxicity or persistence so as to be a hazard to human, plant or animal life. Air toxics are emitted into ambient air from a wide range of sources. Exposure to these substances is dependent on individual lifestyle and places of work and residence.

Several scientific air quality studies have been undertaken to investigate and understand air quality pollution levels, air pollution development processes and community exposure to air pollutants. Examples of these studies include the Perth Haze Study, the Perth Photochemical Smog Study, Air Emissions Inventories for the Perth, Pilbara and Bunbury airsheds and the BTEX Personal Exposure Monitoring in Four Australian Cities.

An important common finding of current research is that the most significant source of air pollution in most urban areas of Western Australia is not industry but the community. Domestic woodheaters in winter and vehicle use are the largest causes of air pollution. The community needs to recognise that individual behaviour is the fundamental cause of air pollution.

Although there are economic implications in addressing pollutants, they are minor compared to the resulting health, social and environmental costs of air pollution to the Western Australian community. It has been estimated that up to 2,400 deaths per year in Australia can be linked to particle pollution alone, with an associated health cost of $17.2 billion (Environment Australia, 2003). As early as the 1970s air quality monitoring has revealed significant health threats on 10 to 20 days a year in the Perth metropolitan area. A recent study of air quality in Perth has confirmed that air pollution is still affecting the health of Western Australians. Researchers found that increases in smog concentrations were associated with increases in the number of deaths in Perth (Department of Environment, 2003). They also found links between air pollution and hospital visits for asthma, pneumonia and other respiratory diseases.





The State Government in association with local governments, industry, education institutions and community associations has been and continues to implement air quality management initiatives to maintain and improve regional and local air quality across the State. This is achieved through management tools such as Environmental Protection Policies (EPP), regulation and management plans.

At present there are two EPPs which deal with air quality. The Kwinana and Goldfields EPPs both address industrial air emissions in specific airsheds. A State Air EPP is currently under development to fulfil a commitment to implement the Ambient Air Quality National Environment Protection Measure in Western Australia.

Regulations such as the Environmental Protection (Diesel and Petrol) Regulations 1999 and Environmental Protection (Domestic Solid Fuel Burning Appliances and Firewood Supply) Regulations 1998 have been developed to maintain and improve emissions from specific sources. The introduction of 'Clean Fuel' Regulations saw Western Australia become the national leader in clean transport fuels. These regulations have seen a reduction in sulfur from diesel fuel, a reduction in benzene and hydrocarbons from petrol and the removal of the toxic additive MTBE and lead from petrol. The health benefits of this regulation have been identified in a recent study which found that Perth participants' average exposure to benzene, toluene, ethyl benzene and xylenes was significantly lower than those participants from Melbourne, Sydney and Adelaide (Environment Australia 2003). Since the introduction of unleaded fuel, ambient lead concentrations have significantly decreased in Western Australia. The most recent Western Australian fuel quality regulations further contribute to this trend.

The Domestic Solid Fuel Burning Appliances and Firewood Supply Regulations ban the sale of green firewood and woodheaters that do not comply with the Australian Standard (AS4013).

The Perth Air Quality Management Plan (AQMP) has bipartisan support and sets out priority actions for the Perth airshed. The Implementation Strategy (2002) outlines how and when the programs are to be undertaken. The primary focus of the AQMP is:

- land use transport and planning to reduce car dependence and enable more balanced transport options
- vehicle emissions programs, incorporating the National Environment Protection Measures
- community education and behaviour change programs related particularly to the issues of individual responsibility, domestic woodheaters and car use, and
- industry emissions, particularly those in the Kwinana region.

The programs within the Perth AQMP need to be continued and accelerated where feasible. Similar strategies need to be considered and developed for growing regional centres. The innovations suggested in land use and transport policy are outlined in *Integrating land use and balanced transport*. The vehicle emissions programs are part of a Commonwealth Government process and the Western Australian Government needs to ensure that no attempt is made to weaken this and avoid compliance with world best practice.

The next stage to preserving air quality will be to investigate in detail some of the air toxics emitted from woodheater use, industry and transport fuels. Domestic woodheater use needs to be carefully monitored and if the educational process is not working sufficiently, then mandating standards may be required. Monitoring should ensure industry emissions continue to improve across the State.

Many actions that address air quality are included in other sections of the State Sustainability Strategy including *Integrating land use and balanced transport, Managing freight and regional transport, Sustainable energy* and *Building sustainably*.

# In short...

## Vision

To have the air in Western Australia healthy to breathe, to reduce damage to the environment from air pollution and address global air quality problems.

## Objectives

- Maintain and improve air quality for this and future generations.
- Reduce the impacts of air pollution on human health and the environment, including biodiversity.
- Ensure future development recognises and manages air quality issues and reduces emissions to the maximum practical extent.
- Educate the community to recognise that reducing air pollution is the responsibility of everyone, not only industry. Individuals can make a difference.

## Actions underway

- Government is currently implementing the Perth Air Quality Management Plan with the support of its major stakeholders, involving priority actions in the areas of land use transport and planning, vehicle emissions, community education and behaviour change and industry emissions.
- The Environmental Protection Authority is developing a State Air Environmental Protection Policy to provide a strong legislative foundation to protect air quality around Western Australia.
- Monitoring programs for the National Environment Protection Measures for ambient air quality (for the priority air pollutants of NOx, $SO_2$, lead, CO, $PM_{10}$ particulates, ozone) are well established.
- Development of National Environment Protection Measures for air toxics is in progress and the government is implementing the National Environment Protection Measures for the testing of diesel emissions.
- The Kwinana Gap Emissions Study is a desktop study of the current licensing arrangements for air pollutants emitted from major and significant industrial premises in the Kwinana Industrial Airshed, and a comprehensive review of the appropriateness of current ambient monitoring programs in place.
- Inter-agency cooperation (whole of government protocols) to ensure there is a reduced frequency in the smoke events from fuel reduction burns.

## Actions

4.42 Continue implementation of the Perth Air Quality Management Plan, focusing on coordinated action to work towards Perth having the cleanest air of any city of its size in the world.

4.43 Develop a Statement of Planning Policy for Integrated Land Use Planning and Transport that demonstrates, among other things, how local planning can minimise air pollution.

4.44 Work with local government to help them in general community liaison on air pollution issues, especially smoke haze from woodheaters, and through the application of the Sustainability Scorecard to air emissions from housing, and location of development.

4.45 Continue to provide community information and education aimed at changing individual behaviour, especially the use of domestic woodheaters, and to encourage a shift to non-car modes of transport.





# In short cont'd...

4.46 Continue to monitor the air quality criteria set by National Environmental Protection Measures.

4.47 Continue to develop air quality guidelines and standards through national forums and further develop methods for assessing the impacts of air quality on human health and the environment.

4.48 Ensure that air quality factors are fully considered in sustainability assessments.

## Global opportunities

Western Australia has developed world-class expertise and experience in managing air quality issues and there are opportunities for this expertise to be exported and offered to developing countries with similar air quality problems.

## Further information

Air Quality in Western Australia
http://aqmpweb.environ.wa.gov.au/air_quality

Department of Environmental Protection, 2001, *Air Quality in Perth* 1992-1999, viewed August 2002, http://www.environ.wa.gov.au/downloads/Technical_Series/109.pdf

Department of Environmental Protection, 2002, *Implementing the Perth Air Quality Management Plan*, Government of Western Australia.

Department of Environmental Protection, 2003, *Research on Health and Air Pollution in Perth Morbidity and Mortality: A Case-Crossover Analysis 1992-1997*, Technical Series 114, Government of Western Australia

Environment Australia, 2003, *Technical Report No. 6: BTEX Personal Exposure Monitoring In Four Australian Cities*, Environment Australia, Canberra.

*Perth prides itself on its clean and green image. But the city is faced with challenges to its air quality, including car dependence and urban sprawl, which contribute to photochemical smog and subsequent impacts on human health.*

Source: Department of Industry and Resources

## > REDUCING WASTE AND MANAGING IT AS A RESOURCE

**Reducing and managing wastes in settlements is fundamental to ensuring a healthy environment and good quality of life. Recent management experience has revealed continuing improvement and innovation in solid waste management but problems with hazardous waste.**

> *... it is imperative that the State Sustainability Strategy for Western Australia take a deliberate and detailed look at the issues evolving in waste management particularly the importance of ensuring the maximisation of the recovery and recycling of resources from waste.*
>
> Amcor Recycling

Waste, in all its forms, can be used to monitor our journey toward a sustainable lifestyle. The government through the Draft Strategic Framework for Waste Management has set an action agenda for how we can move toward a waste-free society, embracing the vision *'toward zero waste by 2020'* developed by the WAste 2020 Strategy.

To achieve this requires a shift toward a closed loop economy, where we optimise consumption and where wastes from one part of society become the raw materials for another. Accurate data on the waste streams will be required in order to monitor progress and identify opportunities for improvements. Programs will also be needed to support waste avoidance initiatives and develop markets for recycled materials.

Government will take an active role in stimulating the development of markets for recycled materials through its own purchasing requirements as outlined in *Embracing sustainability in government agencies*.

In order to implement strategic directions for waste, the Western Australian Government has developed a model to achieve zero waste. This has been designed to aid decision-making and illustrate the thinking required to implement the waste management hierarchy (Figure 10). The application of the model is built on a cycle of continual improvement and will require the commitment and participation of all stakeholders to:

- prevent the generation of waste
- maximise recovery and recycling of resources from waste, and
- analyse the residual waste stream and make improvements to move toward zero waste by 2020.

The WAste 2020 Strategy identified the need to establish an effective structure to coordinate the implementation of the toward zero waste vision. The government established the Waste Management Board to undertake this role.

The future direction of waste management as described by the 'zero waste' model will utilise the waste management hierarchy as a decision support tool and product life cycle management to help guide product design. Both social and intergenerational equity issues need to be addressed by ensuring all waste is managed in time and space as close to the point of generation as possible.

Specific issues such as converting waste to energy, should only be considered after all other alternate strategies, consistent with the waste management hierarchy, have been considered.

The community is more aware of the negative impact wastes have on our quality of life, especially since the Bellevue chemical fire in February 2001. As a result, technologies for treating and storing wastes and the location of waste facilities have been of great concern to many in the community, leading to demands for preventative strategies to minimise wastes and particularly those that can enable the elimination of hazardous wastes. The government has made a number of commitments over time that has led to a policy of containing the nuclear industry with its hazardous wastes. The history of this and the latest step to legislate to prevent an intermediate nuclear waste facility being sited in Western Australia, is set out in Box 51.





### BOX 51 A NUCLEAR-FREE WESTERN AUSTRALIA

The nuclear fuel cycle continues to produce the most dangerous weapons, energy and wastes known. Nuclear power currently generates 17% of the world's electricity, but the industry is rapidly in decline because it is so capital intensive, and environmentally and socially unacceptable.

The Western Australian Government is committed to remaining nuclear free. The State is taking a global leadership role in putting an end to the dangers of the nuclear industry. The government has put in place policy and is introducing legislation to prevent uranium mining and is committed to prevent the use of Western Australia as a dumping ground for nuclear waste generated elsewhere.

There is a push on in Australia for more uranium mines, a new nuclear reactor and national and international radioactive waste dumps. The State Government believes it is unacceptable that Western Australia provides support for this industry and becomes a repository for its waste. Nuclear energy cannot compete with cheaper and newer forms of energy such as combined cycle gas turbines and it is the most expensive and dangerous way of addressing global warming. The problems of nuclear waste remain unsolved and subject to intense community concern. The Western Australian Government is working toward solutions and is fighting any attempts to impose a nuclear waste dump that would tarnish its clean and green reputation.

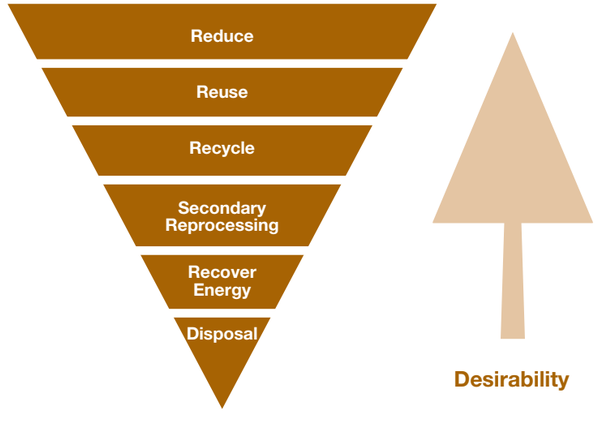
The government is also committed to establishing guidelines in conjunction with the community and industry for the selection, siting and management of secondary waste reprocessing facilities. Hazardous wastes need to be slowly phased out along with all other wastes, and in Western Australia this goal is set to be achieved by 2020. The phasing out of hazardous waste will require technological breakthroughs as well as institutional change (such as extended producer responsibility – see below). Plans will be developed for this phasing out and for an interim solution to hazardous waste siting.

A Resource Recovery and Waste Avoidance Bill will be drafted containing modern provisions for achieving world best practice in the sustainable minimisation and management of waste and resource consumption. This Bill will ensure a coordinated approach across the State to maximise the recovery of waste resources, and will begin to establish requirements for extended producer responsibility of materials and wastes.

There is a need for consumers and producers to become more responsible for the life cycle of products and services. One key mechanism developing overseas for closing the loop is through requirements to extend a producer's responsibility beyond the point of sale of a product. This means that a producer is responsible for their products throughout their life cycle, which has led to advancements in design. A policy position paper will be developed on the application of extended producer responsibility in Western Australia.

At a national level a voluntary National Packaging Covenant has been established to reduce the amount of packaging being consumed in Australia. The Western Australian Government has prepared an Action Plan to implement the Covenant and will introduce the necessary regulations under the *Environmental Protection Act 1986*.

**Figure 10 Waste management hierarchy**



# In short...

**Vision**

Toward zero waste by 2020.

**Objectives**

- Manufacturing and other industrial processes are operated in a sustainable manner that minimises the quantity of wastes produced.
- Products and services are designed and/or packaged to minimise waste and facilitate re-use and resource recovery.
- Information and data on waste generation are continuously collected, analysed and reported.
- All wastes are segregated and sorted close to source in a manner that optimises resource recovery for higher end-uses.
- Hazardous components in goods and services are replaced to increase resource recovery options.
- Comprehensive suites of treatment facilities are established which maximise resource recovery.
- Residual waste streams are continuously assessed and actions taken to enhance recovery.
- A community that understands the impact of purchasing choices and actively participates in waste reduction and recycling activities.

**Actions underway**

- Implementing the WAste 2020 Strategy.
- Establishing the Waste Management Board.
- Developing a whole of government procurement policy for waste paper recycling.
- Conducting research on solid waste management through the waste levy.
- Conducting the Parliamentary Inquiry into the Bellevue Chemical Fire and acting upon its recommendations, including initiating a comprehensive review into hazardous waste management in Western Australia.
- Establishment of the National Packaging Covenant program and regulations.
- Survey and review into hazardous waste generation.
- In 1999 the Western Australia Parliament passed the *Nuclear Waste Facility (Prohibition) Bill 1999* that banned the storage of overseas nuclear waste, to stop Pangea Resources from establishing a high level nuclear waste dump in Western Australia.
- Since 22 June 2002, the Government has placed a limitation on all new leases for mining uranium.





# In short cont'd...

**Actions**

4.49 Finalise the Strategic Framework for Waste Management to guide the management of waste in Western Australia towards zero waste by 2020 and liaise with stakeholders and the community on the implementation of the Framework.

4.50 Recognise the success of those individuals, innovators, industries and councils who are successfully implementing a Zero Waste Framework.

4.51 Introduce and enact the Resource Recovery and Waste Avoidance Bill.

4.52 Enact the Contaminated Sites Bill.

4.53 Prepare detailed business plans to support and prioritise the strategic activities to support the goal of moving towards zero waste by 2020.

4.54 Encourage all government agencies to reduce consumption and waste by undertaking a comprehensive audit of resource consumption and waste and setting targets for reductions as part of their Sustainability Action Plans.

4.55 Encourage the use of recycled products by all government agencies through the Government's Sustainability Procurement Policy.

4.56 Encourage recycling of paper, glass, plastics, metals and organic waste using the Sustainability Code of Practice for government agencies.

4.57 Work with local governments to expand the scope of their waste management plans to be consistent with the Strategic Framework for Waste Management, and support markets for recovered materials through the use of the Sustainability Scorecard in development applications involving construction and demolition waste.

4.58 Examine how the landfill levy can better reflect environmental and social costs of waste disposal.

4.59 Set mandatory hazardous waste targets for industry and target cleaner production programs towards industries producing hazardous waste so that a plan can be created for zero hazardous waste by 2020.

4.60 Develop policies and legislation to encourage or require producers of hazardous and problematic wastes to share the responsibility for managing and reducing these wastes until they are phased out by 2020.

4.61 Actively engage the community to determine appropriate siting and establishment of industrial/hazardous waste precincts for the metropolitan region until such waste is phased out by 2020.

4.62 Ensure appropriate regulations exist to effect the safe transportation, storage and disposal of hazardous and controlled wastes in the period leading to the phase out of such wastes.

4.63 Develop a comprehensive and clear waste classification and recording system for all wastes across Western Australia.

4.64 Develop and report effective indicators to measure progress toward zero waste for each sector of society, including industry, community and government.

4.65 Strengthen the *Nuclear Waste Facility (Prohibition) Act 1999* so that it prohibits the transportation or storage of any nuclear waste in Western Australia.

4.66 Prevent the establishment of an intermediate level radioactive waste repository in Western Australia.

# In short cont'd...

## Global opportunities

Western Australia has developed a number of innovative waste management technologies and with strong regulatory controls on waste this innovation will continue. The Waste Management and Recycling Fund will be used to target initiatives that reduce waste and support resource recovery. Global opportunities are considerable.

## Further information

Department of Environmental Protection 2001, *Waste 2020 TaskForce Report and Recommendations,* draft, viewed August 2002, http://www.environ.wa.gov.au/downloads/WAste_2020/Controlled_Waste.pdf

Murdoch University, Environmental Technology Centre http://wwwies.murdoch.edu.au/etc/

*Resource recovery turns materials traditionally seen as waste into valuable products for reuse. With strong community support in separating household waste, the Southern Metropolitan Regional Council's regional resource recovery centre (RRRC) provides an integrated processing facility which recovers 85% of domestic material from landfill. It is considered a model of best practice in sustainable waste management. The centre marries a user-friendly domestic collection system with three state of the art processing facilities: a green waste processing plant; a composting plant; and a materials recovery facility.*

Source: Southern Metropolitan Regional Council





## > OUR WATER FUTURE

**The sustainability of our water supply is an issue of concern to many Western Australians. There is a need to provide a vision for the future, new sources of supply and new ways to save water.**

*Effectively managing water supplies is a key task for our state. It requires thorough investigation into the options, and commitment to tough choices and actions where necessary.We must ensure we have enough water to meet our needs.*

*Meeting the challenge of creating and securing a sustainable water future forWestern Australia is a high priority for Government and is a unique opportunity for us to work together in achieving this goal.*

Hon Dr Geoff Gallop, Premier of Western Australia[38]

Water supply is a major issue in the South West of Western Australia with a 50% decline in the runoff to metropolitan dams being experienced in the past 25 years.

The Premier's Water Taskforce produced the Draft State Water Strategy in December 2002 after widespread public consultation. The final Strategy was released by the Premier in February 2003. The State Water Strategy (see Box 52) set out how to simultaneously increase water supply options and reduce per capita water consumption. The objectives of the State Water Strategy are to ensure a sustainable water future for all Western Australians by:

- improving water use efficiency in all sectors
- achieving significant advances in water re-use
- fostering innovation and research
- planning and developing new sources of water in a timely manner, and
- protecting the value of our water resources.

### BOX 52 SUMMARY OF MAJOR INITIATIVES CURRENTLY BEING UNDERTAKEN THROUGH THE STATE WATER STRATEGY

- Project Director appointed to coordinate the implementation of the eighty-four tasks in the State Water Strategy.
- A Water Re-use Steering Committee has been created to oversee the development of an implementation plan to achieve the 20% re-use target by 2012.
- Project plan signed off for the Local Government Water Campaign to be implemented by the International Council for Local Environmental Initiatives (ICLEI).
- A model is being developed which will assist in the development of an integrated resource planning process (which will ensure that when planning new sources water conservation and water use efficiency are also considered as part of the planning process).
- Reviewing the current land subdivision process to evaluate how water efficiency can be built in as part of this process.
- Price of water for domestic consumption has been increased for those users who use more than 550 kilolitres to $1.20 per kilolitre.
- Review of the irrigation industries about to commence in Western Australia .
- A process for the introduction of a water conservation plan to be submitted when a licence is renewed or applied for is nearing completion.
- Legislation amended to ensure no watering between 9 am and 6 pm.
- Water Wise Rebate Scheme established for rebates on rainwater tanks, showerheads, washing machines and garden bores.
- Joint projects being established with CSIRO under their flagship project 'Healthy Country'.
- Pilot project being scoped for a Water Wise on the Farm project.

[38]Hon Geoff Gallop, Government of Western Australia, Our Water Future: Its up to all of us, 2002

### BOX 53 SHENTON SUSTAINABILITY PARK: INTEGRATED SOLID AND LIQUID WASTE RECYCLING

The Shenton Sustainability Park proposal is an innovative project aimed at promoting and facilitating resource recovery and eco-efficiency in municipal waste and wastewater management as well as contributing to broader sustainability in urban settlements.

This proposal aims to 'close the loop on wastes' by producing useful products from the existing waste streams in the Shenton Precinct, including treated wastewater and sludges/biosolids from the Water Corporation's Subiaco Wastewater Treatment Plant, and solid municipal wastes and household recyclables managed by the Western Metropolitan Regional Council and its member local governments.

Through the Water Corporation the government has undertaken a full feasibility study of this concept. The study recommends that the Shenton Sustainability Park comprise:

- a Centre of Excellence in Municipal Resource Recovery and Re-use to address the significant technological, social and environmental research challenges in developing new products from solid wastes and achieving large-scale re-use of treated domestic wastewater
- demonstration of hydroponic horticulture and ornamental aquaculture activities to re-use treated wastewater and
- a Sustainable Urban Living Interpretive Centre to operate as a learning centre for children through to adults and to promote resource recovery and re-use and to maximise community participation in the Park's activities.

The Shenton Sustainability Park is envisaged as being Australia's first integrated eco-industrial park and a major initiative in implementing the State Water Strategy; it supports the State Government's objective of moving towards zero waste by 2020. It also supports the development of an informed community committed to taking responsibility for reducing the environmental footprint of its consumption patterns.

The Water Corporation, together with key stakeholders in the Park, is currently developing a community consultation strategy and an implementation strategy to see this project come to fruition over the next few years.

## In short...

### Vision

Water is used with care and is provided sustainably to meet needs.

### Objectives

- Reduce water consumption.
- Extend responsibility for water supply to the planning system (water sensitive design) and to local government (Regional Councils) for groundwater supplies.
- Achieve significant wastewater re-use.
- Investigate long-term innovative water supply options that have broad sustainability outcomes.

### Actions underway

- The Premier's Water Taskforce has developed the State Water Strategy.
- A draft State Water Conservation Strategy has been released for public comment in 2002 and integrated into the State Water Strategy.
- Draft guidelines for the re-use of grey water by households have been released.
- The Water Corporation and Department of Environment operate a number of programs directed at water conservation.
- The Premier's Water Foundation is in the process of being established.





## In short cont'd...

### Actions

4.67 Implement the State Water Strategy.

4.68 Use the Sustainability Scorecard to demonstrate sustainable water use in building and development before phasing it in to all development controls.

4.69 Through the Sustainability Roundtable create demonstration projects with local government and regional councils on how to manage regional groundwater and drainage.

4.70 Establish a local government water campaign to implement a sustainable water management program in partnership with the Western Australian Local Government Association and the International Council of Local Environmental Initiatives, to assist local government to address local water management issues. Include initiatives such as:

- research and trial innovative approaches to support sustainable drainage management and establish a series of pilot projects for drainage water re-use at neighbourhood and/or streetscape level
- undertake education and training of local government and key stakeholders on good planning and on-ground stormwater management using the Stormwater Management Planning approach.

4.71 Review the irrigation system to ensure it complies with sustainability principles.

4.72 Provide for Perth's long-term water supply needs through a sustainability assessment of the next major water supply source.

### Global opportunities in sustainable water

Other areas of the world have water constraints like Perth. If the city can overcome these in a sustainable way then the results will be seen globally.

### Further information

www.watercorporation.com.au/owf

*The Government is commited to achieving 20 per cent reuse of treated wastewater by 2012. Significantly increased use of reclaimed water for industry will be required to achieve this target.*

Source: Water Corporation

## > SUSTAINABLE ENERGY

**Energy is central to all aspects of human activity. Whether the energy is used for domestic, commercial or industrial purposes, there are opportunities to practise energy conservation and to utilise alternative fuels, technologies and energy sources to provide an efficient and sustainable service to the economy while helping to build communities in a healthy environment.**

Developing a pathway to a more sustainable energy system will position Western Australia to respond and adapt to changing environmental imperatives as well as profit from any opportunities that arise. Achieving this will depend on encouraging and facilitating movement away from our current reliance on combustion of fossil fuels to practices that conserve energy and encourage the use of more benign alternative forms of energy, including renewable energy.

Many alternative energy technologies are now commercially proven while numerous others are under development and, over time, may prove effective. Western Australia has a fertile history of activity and innovation in developing and commercialising new energy efficiency and renewable energy technologies. Some examples are:

- solar water heating (Western Australia has led the world in this technology)
- remote area power systems that use solar photovoltaic and wind turbines combined with diesel generators for small, isolated communities
- the Albany wind farm that uses world best practice turbine technology and has demonstrated a new control system that maximises wind turbine performance
- an innovative 1 MW integrated wood processing plant at Narrogin using oil mallee biomass that has the potential to provide multiple sustainability benefits to rural Western Australia, and
- the hydrogen fuel cell bus project.

In order to fulfill the commitment made in its Sustainable Energy for the Future policy, the Western Australian Government has created the Sustainable Energy Development Office. The Sustainable Energy Development Office is charged with implementing government sustainable energy policy, advising government on sustainable energy issues and providing information and assistance regarding sustainable energy practices to business, government and the community.

### BOX 54 EDUCATION/INCENTIVE PROGRAMS FOR SUSTAINABLE ENERGY

The programs currently managed by the Sustainable Energy Development Office which provide information and support renewable energy include:

- Energy Smart Line (telephone advice service)
- Energy Smart Community and Business Brochures
- Reach for the Stars (high efficiency appliance program)
- Sustainable Energy Seminars
- Australian Building Greenhouse Rating for commercial office buildings
- FirstRate for new houses
- Solar Water Heating Subsidy
- Photovoltaic Rebate Program
- Renewable Remote Power Generation Program
- Renewable Energy Water Pumping Program
- Remote Area Power Supply Program, and
- Sustainable Energy Development Office Grants Committee Funding Rounds





### BOX 55 GEOTHERMAL-BASED HEATING AND COOLING AT EDITH COWAN UNIVERSITY, JOONDALUP

Source: Edith Cowan University

The new Ecology and Health building at the Joondalup campus of Edith Cowan University is an eco-design that utilises geothermal energy. A deep bore supplies hot water that provides air-conditioning for the building and all other buildings on the campus through a heat exchanger and heat pumps.

There are several important initiatives occurring within the energy portfolio that have the potential to lead to more sustainable outcomes in the development of our energy systems and to move Western Australians towards more sustainable practices in the way we view and use energy. Initiatives include:

- Public power procurement processes to facilitate the replacement of old inefficient electricity generators in regional areas of the State with new, cleaner and more efficient technologies at the most economic price.
- The Electricity Reform Implementation Process is examining institutional aspects of electricity provision and in combination with State actions and Federal initiatives, such as MRET (see Box 56), will act to increase the amount of energy generated from renewable sources and recognise the benefits of demand-side initiatives for energy conservation. Overseas evidence suggests that renewable energy growth is associated with electricity market liberalisation (see Reuters Business Insight 2003).
- A Western Power public procurement process aimed at ensuring as much of Western Australia's MRET requirement is met through locally produced renewable energy certificates as possible.

### BOX 56 MANDATORY RENEWABLE ENERGY TARGET

The Mandatory Renewable Energy Target (MRET) was announced by the Prime Minister in his 'Safeguarding the Future' policy in 1997 and, after several years of development, launched nationally in 2001. The MRET is a market-based scheme designed to encourage investment in renewable energy generation capacity, contribute to development of an Australian renewable energy industry and to cut greenhouse gas emissions from electricity generation. MRET operates by placing a responsibility on wholesale electricity purchasers to source an additional 9500 GWh (total) of electricity annually from renewable sources by 2010.

The Western Australian Government has been active in supporting the national target and in attracting renewable energy investors to provide the renewable energy certificates necessary to satisfy Western Australia's liability from within the State.

The focus on sustainable energy practices and systems will continue and is likely to increase over time. As our capacity to predict the future improves and the need for action is reinforced we will need to respond to those new imperatives. Building in flexibility to account for a rapidly changing global environment and markets is vital. Moreover, the need for policies promoting sustainable energy to interact with the other sections of this strategy and other strategies produced by the Western Australian Government will be crucial.

### BOX 57 BIOENERGY AND BIO-PRODUCTS – NEW INTEGRATED SUSTAINABLE INDUSTRY DEVELOPMENT

Throughout Western Australia there are established, new and emerging industries that are based on biological sources and which produce a range of products, including energy. These industries have the potential to be scaled to fit easily into local economies and ecosystems, to assist in the amelioration of environmental problems such as salinity and land degradation, and to produce energy with relatively low levels of associated greenhouse gas emissions. They signal a move towards adding value to the current resource-based economy and are also likely to provide significant local employment and hence contribute to local communities.

Projects are emerging based on oil mallees (see case study) and other tree crops, on aquaculture, on cultivation of native species, and a whole range of integrated associated industries based on recycling and re-use. Extraction and processing of local products (e.g. the sandalwood and emu oil-based products of Mt Romance in Albany) are also part of this growing local industry.

Another example of the potential for regional-based integrated sustainable industries is a proposal for the Great Southern District to use residues from timber plantations to produce electricity, some of which would be used for a desalination plant to provide water for vineyards and town supply. The plant would also produce bio-fertilizer from ash and fish waste for use on plantations and vineyards, and the co-production of veneer, activated carbon and other products. The siting can enable an inland port to be created around the complex with many future synergies by co-location. High technology geo-polymers and other materials can emerge from these new bio-industries.

The proposed project involves development of technology and a centre of excellence in bioenergy technologies and in water treatment, with forty people directly employed. During this decade the project will produce 60 MW of electricity from renewable sources. However, it has been estimated with the long-term potential for energy crops qualifying for Renewable Energy Certificates there could be many modular expansions of this electricity generation capacity in the South West. Western Australia's long-term economic future can begin to be seen in these emerging bio-industries.

## In short...

### Vision

Western Australia's transition to a sustainable energy future is globally responsible and locally innovative.

### Objectives

- Reduced reliance on fossil fuels and increased reliance on renewable forms of energy in Western Australian energy systems.
- Adoption of best practice energy management in the Western Australian community, including government.
- Greater awareness of the environmental, economic and social benefits of energy efficiency and renewable energy by all Western Australians.

### Actions underway

- A plant replacement program at Western Power aimed at replacing old, less efficient generators with high efficiency, combined cycle gas turbines, achieving energy production with a lower environmental footprint.
- Development of renewable energy projects, such as the Albany wind farm, the Denham hybrid wind/ diesel system, the Narrogin integrated wood processing plant and a new wind farm at Esperance.
- The establishment of the Sustainable Energy Development Office is assisting in creating opportunities for innovation in the ways we view and use energy.
- The Sustainable Energy Development Office is enabling government to lead by example with the Energy Smart Government program.

## In short cont'd...

### Actions

4.73 Develop a State renewable energy strategy and a bio-industry policy.

4.74 Further promote the use of existing house energy rating schemes as a means to meet and exceed the Building Code of Australia's mandatory energy efficiency requirements for new homes, additions and renovations.

4.75 Investigate the introduction of mandatory disclosure of house energy ratings, using existing house energy rating schemes, at the time of sale.

4.76 Ensure urban land developments maximise the potential of all lots, to allow for passive solar dwelling design and construction.

4.77 Encourage building design and management for energy efficiency in all government-owned and tenanted buildings.

4.78 Promote energy efficient office buildings through improved design, maintenance and management, within the commercial property industry.

4.79 Investigate use of eco-loans as part of the existing KeyStart program, initially for solar hot water systems to save energy through the design and construction of the home.

4.80 Demonstrate government leadership in sustainable energy through sustainability action plans.

4.81 Continue trialling innovations in transport fuels including gas, hydrogen fuel cells and biodiesel demonstrations and publish and promote the results.

4.82 Encourage the use of sustainable energy products, services and market-based strategies for demand management purposes.

4.83 Facilitate renewable energy generation, demand management and distributed generation in the electricity market by removing impediments and ensuring the new electricity market provides opportunities for effective participation.

4.84 In meeting the Mandatory Renewable Energy Target investigate the scope for mechanisms to ensure that Renewable Energy Certificates are sourced locally.

4.85 Continue to support the use of renewable energy in Remote Area Power Supply systems.

4.86 Seek to maximise energy efficiency in Western Australia by:

- providing information on energy efficiency options to households, businesses and government
- including energy efficiency in school curricula
- supporting mandatory national standards for energy efficiency in appliances and vehicles
- promoting the purchase of high energy star-rated appliances through consumer awareness campaigns and training of appliance retailers
- promoting the use of the Australian Building Greenhouse Rating scheme for benchmarking and improving the energy efficiency of office buildings

# In short cont'd...

- utilising accredited Australian Building Greenhouse Rating in the assessment of new government office tenancies
- ensuring government procurement is based on lifecycle costing to properly account for the cost of energy
- using sustainability assessment to include lifecycle analyses on all such decisions.

4.87 Use the Sustainability Scorecard to demonstrate sustainable energy options in building before phasing it in to all development control.

## Global opportunities in sustainable energy

The world has entered a phase of very rapid development of sustainable energy solutions.

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Sustainable Energy Development Office
http://www.sedo.energy.wa.gov.au

Western Power
http://www.westernpower.com.au


*Solar water pump at Serpentine.*

Source: Sustainable Energy Development Office





## > CONSERVING CULTURAL HERITAGE AND LANDSCAPES AND CREATING 'SENSE OF PLACE'

**Western Australians have long been considered a group of people with a strong sense of local identity, who feel proud of their State and who prefer to live here rather than any other part of Australia. It is a State with a beautiful coastline, clean and orderly cities and towns. The Western Australian Government recognises that 'sense of place' is important in the psyche of Western Australians. Maintaining and building on this sense of place will contribute to sustainability by fostering a spirit of pride and optimism that will encourage innovation and creative problem solving.**

> *Cultural landscapes are ... considered to be about people gaining and maintaining a 'sense of place' in their community, and people in a place feeling confident in that place. Our recognition of a site as being pleasant or important is a first step in planning how it can be preserved and managed for the enjoyment of people.*
>
> Coral Pepper, Discussion Paper - Sustainability of Cultural Heritage and Landscapes. Background Paper for the State Sustainability Strategy.

Over the years, however, there has been an erosion of the very 'place' values that create identity and belonging, as the impacts of western-style development have manifested. The feelings of loss within the community have been mixed with feelings of powerlessness, reducing the capacity of individuals and the community as a whole to participate in, and contribute to solutions. This is a factor of vital concern in any discussion of sustainability.

This sense of belonging, of attachment to and ownership of particular places, is our 'sense of place.' The loss of a 'sense of place' within sectors of the community is of vital concern in this discussion of sustainability of cultural heritage and landscapes (see Box 58). It is also very important to other social justice issues as identity is a necessary part of empowerment. Its link to most environmental issues is obvious – people want to look after a place that means a lot to them personally.

Our cultural heritage is what we pass on to future generations and it is expressed in how we build and how we shape our landscapes. Beautiful and culturally significant buildings, townscapes and landscapes are preserved because we feel they are important expressions of who we are. The protection and enhancement and of cultural heritage and landscapes is a fundamental means of creating and maintaining a 'sense of place'.

Heritage conservation does not stand in isolation, but is inseparably linked with economic development, tourism, urban 'liveability', reduction of waste, and the social cohesion of communities. It is a major asset in promoting goals in these related areas, and it helps provide the 'glue' that holds them together.

The benefits of heritage conservation are often discussed in social terms: heritage contributes to an understanding of ourselves and the development of our society; and heritage enhances the continuity, familiarity and beauty of our surroundings. However heritage conservation can also have important economic benefits that are sometimes overlooked, including the following:

- attracts people and investment, as a result of its positive effect on urban amenity or liveability
- stimulates and supports tourism
- creates proportionately more jobs than new construction, and provides better local expenditure-retention in regional areas
- aids economic diversification, and
- promotes cost-efficient and energy-efficient building practices (e.g. less demolition waste).

Many factors can contribute to a sense of place. For example, a good knowledge of the geography of the area or region in which people live and of the State as a whole. People should feel free to move around and interact with others in the streetscapes and landscapes with which they are familiar. They converse freely with others about travels, and have some picture in their mind's eye of the places being described.

A sense of place can be generated by a familiarity with and fondness for particular streetscapes and landscapes across a range of scales, from the local precinct to a region to the whole of the State. Invariably the streetscapes are not dominant and overpowering–the buildings are on a human scale. And the landscapes do not feel threatening; they are vegetated with familiar plants and contain familiar animals.

Good relationships with other members of the local community including neighbours and near-neighbours and even local shopkeepers engender a sense of being part of a community, with all the potential for support that this creates, especially for young people as they grow up.

Much can be done to facilitate the sense of place through a range of infrastructure improvements to minimise car use and maximise walking and cycling in a local area. However the social infrastructure of a community is also critical through various community services and the local expressions of culture and the arts, especially Indigenous arts (see *Sustainability through culture and the arts*). The local planning system can be a powerful mechanism for facilitating sense of place. Heritage regulation in the past has been seen as an impediment to the economy just as environmental regulation once was. However, there are now many examples to demonstrate that once heritage values have been preserved in buildings (like the Fremantle Arts Centre), townscapes (like Fremantle or Subiaco or many other inner city areas) and landscapes (like the Swan Valley or the Hills), the economy and the community has benefited.

**BOX 58 THE KOJONUP RECONCILIATION CENTRE: 'KODJA PLACE'**

An outstanding example of how a local community has strengthened the 'sense of place' within that community is the town of Kojonup's Reconciliation Centre. This centre is named 'Kodja Place' after the stone axes that local Aboriginal people used in the past. The Centre has been planned and constructed as a combined reconciliation and community-based project where a combination of facilities is provided for all members of the community to access.

Resources in the museum and multi-media laboratory demonstrate the development of the town and the landscapes through to the present day. The laboratory has facilities for interested members of the community to scan family photos and to blend them with scenes of the evolving townscape and landscapes to create videos that best represent their own life stories in and around Kojonup. Many Aboriginal elders have had their stories recorded. The process of describing these stories will undoubtedly strengthen and enliven the sense of place.

Since its opening in April 2002, the multi-media laboratory has been used extensively by a broad cross-section of the community. Members of the community are working together so that capacity building is occurring within the community. Further, it seems that younger members of the community who formerly felt dispossessed are now finding their place. See photos on page 67.

There has been in recent times, something of a reaction to heritage because of concerns about individual property rights. At the same time, it is clear that residents of most of the older, established suburbs prefer the existing style and ambience of those suburbs and are not keen for these areas to be redeveloped with different architectural styles. A useful approach to dealing with these apparently conflicting issues is for residents of local precincts to develop guidelines for planning and development for their precinct that identify, protect and enhance the essential character of the precinct and identify opportunities for redevelopment rather than being heavily regulation oriented. This has been the characteristic approach of successful heritage areas where development is facilitated by the guidelines, and the heritage qualities become part of the full triple bottom line advantages to living or working in such places.





The integration of the social component of sustainability into economic and environmental considerations is never more obvious and necessary than in the careful consideration and protection of cultural values in the built heritage. Transparency and engagement are essential to the proper development and acceptance of 'sense of place'.

Finally, it is important in discussing heritage and sense of place to emphasise the importance of city centres and other urban centres such as Fremantle, Bunbury and Geraldton, as an expression of who we are. They are the soul of the city as they represent in the style of their architecture, their public spaces and their level of human interest and creativity, what the underlying values and priorities of the community are. They are in simple terms the physical expression of our economic health, our environmental sensitivity and our cultural and community values. They are sustainability profiles or indicators.

The city centres of Perth and Fremantle, other sub-centres in Perth, and regional town centres need a vision of how they can become more sustainable, more interesting and attractive places to visit as well as to live and work in. They need to have cultural and architectural features that represent the community and its aspirations. They need community art and they need high culture as both are part of who we are.

Greater Perth has incorporated a discussion paper titled 'Can Perth Be More Creative'. This draws heavily on a working paper by British author and consultant Charles Landry.[39]

In a recent study of Australian cities[40], Perth was rated third in terms of creativity. Perth is a city with a lifestyle amongst the best in the world, a fact recognised by the *Economist* which ranked Perth as the third easiest city in the world in which to live.[41] International recruitment firms also rate Perth highly – 10th equal in environmental terms (no Australian city ranked above Perth) in 2002 and 18th equal overall out of 215 cities surveyed.[42]

As the world's urban hierarchy is reshaping the global economy, cities making the most of their creative potential are succeeding. This demands rethinking competitive resources such as language, time zone, image, lifestyle and cultural depth. Creativity is an important planning initiative that facilitates the expression of community values in the city and other centres. The key question is how can Greater Perth complement its existing attributes—Australia's western gateway, a minerals and resource service centre, tourism, cultural diversity and harmony, and quality infrastructure – by creatively planning an urban environment that offers the city as experience, tells a story and creates a sense of place that is unique. The key is to nurture, mobilise and measure Greater Perth's ideas, talents and creative organisations, provide solutions not obstacles and create a (as Charles Landry says) 'yes' attitude to ideas and opportunities. A Creative City Policy will be developed as part of Greater Perth to facilitate this environment.

*Jump Rock Lake Kununurra: an altered landscape now an important part of the East Kimberley 'sense of place'.*

Source: Brian Prince

[39] C Landry, Can Perth Be More Creative?, Future Perth Working Paper No.12.

[40] See Box 73 in *Sustainability through Culuture and the Arts.*

[41] *Economist*, 12 October 2002, pg. 102

[42] See William M Mercer survey at www.wmmercer.com

# In short...

## Vision

Western Australia's built heritage and special qualities of place are valued and enhanced in all development.

## Objective

Create a quality built environment in Western Australia through the conservation of cultural heritage, the development of quality urban design creating a 'sense of place' in new and revitalised areas, and the active development of quality public spaces.

## Actions underway

- Accelerated compilation of the State Heritage Register.
- Protection of heritage places by local governments through municipal inventories and town planning schemes
- Area-based conservation such as that achieved in the West End in Fremantle.
- Active involvement of State and local governments in public spaces and community art in city centres.
- Community-based programs such as the development of a multi-media laboratory by members of the Kojonup community.
- Preparation of a Creative City Policy as part of Greater Perth.

## Actions

4.88 Prepare a heritage tourism strategy for Western Australia, including more use of Aboriginal names to create 'sense of place' and tourism interest.

4.89 Improve knowledge of the condition of the State's heritage by periodic survey work coordinated by the Heritage Council and local governments and promote a wider appreciation of the value of cultural heritage, including knowledge of the economic benefits of heritage conservation.

4.90 Investigate non-regulatory mechanisms for promoting conservation outcomes through greater planning flexibility, financial incentives, and possibly a voluntary offsets program for the built environment.

4.91 Improve legislative protection of the State's built heritage through reviewing the Heritage Act.

4.92 Improve the standards of local government heritage protection and quality urban design with reference to best practice, including best practice in guidance of infill and redevelopment in heritage areas.

4.93 Support opportunities for Indigenous people to promote cultural awareness within their own communities.

4.94 Develop a Built Environment Policy during the Year of the Built Environment that focuses attention on Western Australia's architectural features and promotes quality architecture that enhances our 'sense of place'.





# In short cont'd...

4.95 Ensure that heritage conservation and quality urban design for new areas are important considerations in major planning policies or reviews.

4.96 Complete the Creative City Policy as part of the Greater Perth project to promote Perth's creative potential and facilitate expression of community values in the region.

## Global opportunities

Although needed most at local level, the principles and practices of cultural heritage can be applied everywhere.

## Further information

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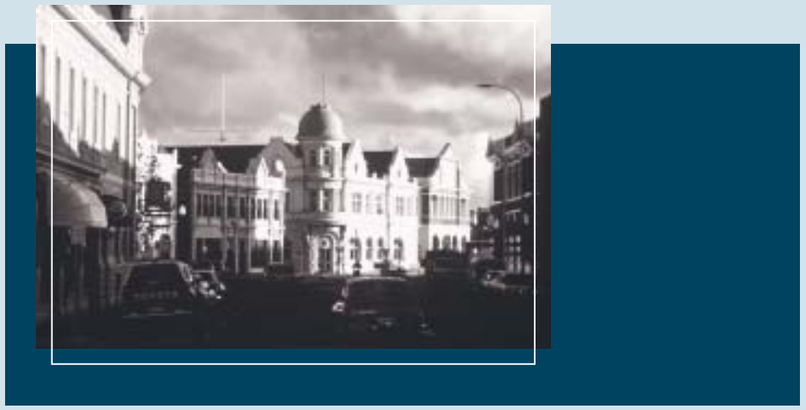

*Fremantle's heritage and sense of place have become vital to its economy.*

Source: Peter Newman

## > BUILDING SUSTAINABLY

**Building sustainably would result in buildings that are simultaneously less resource-intensive and provide a better environment in which to live and work. The Western Australian Government has a number of initiatives that share this goal including the Greenhouse Strategy, Housing Strategy WA and the Building WA Strategy**

*The pursuit of sustainable development brings the built environment and the construction industry into sharp relief. This sector of society is of such vital innate importance that most other industrial activities in the world simply fade in comparison.*

Confederation of International Contractors' Associations[43]

*In every country, the construction industry is both a major contributor to socio-economic development and a major user of energy and natural resources; therefore its involvement is essential to achieve sustainable development in our society.*

United Nations Environment Programme[44]

The benefits of designing sustainable homes and buildings are well understood. However, sustainable building also requires a sympathetic planning system and an enthusiastic market. Dispelling any myths or scepticism that industry or the public may have would require the efforts of government in partnership with key stakeholders to achieve a smooth and comprehensive transition.

Planning for building development, especially residential planning, requires rethinking the existing approvals process to explicitly support sustainable building guidelines in terms of placement, access, shape, orientation, and the renovation and re-use of existing building stock. This would give building designers a huge boost in delivering a passive solar, energy efficient, accessible and more liveable environment (see Boxes 59 and 60). Arguably appropriate improvements in the approvals process that support passive solar design could deliver a built product with no or minimal capital cost increases.

Building materials should be manufactured, supplied and recycled within the framework of sustainability. This will require increasing effort to develop guidelines for manufacturers and for the building and construction industry. A key issue for government in creating a comprehensive sustainable building materials catalogue would be in enlisting and supporting private industries to develop their own environmental management systems. This could be achieved in partnership with industry peak bodies such as the Royal Australian Institute of Architects, the Institution of Engineers Australia, Housing Industry Association and the Master Builders Association.

Construction of sustainable homes and buildings requires an understanding of the impacts of construction methods and resource use by the builder and contractor. Specific training and short courses for builders on site and construction impacts, environmental management (including waste minimisation and recycling) could be provided through TAFE colleges and industry-based training programs.

Universal design, a cornerstone in any discussion on sustainable housing and building, requires that structures are designed and built to be accessible to all members of the community, which ultimately reduces costs for refitting and modifications as our population ages.

[43]Confederation of International Contractors' Associations, *Industry as a Partner for Sustainable Development: Construction*, Confederation of International Contractors' Associations and United Nations Environment Programme, United Kingdom, 2002, p. 7.

[44]United Nations Environment Program, *Energy and Cities: Sustainable Building and Construction*, International Environmental Technology Centre, Japan, 2000, viewed 15 August 2002,http://www.unep.or.jp/ietc/Focus/Sustainable_bldg1.asp





Education for the public on all aspects of sustainability is essential to successful implementation. For example, the home is an excellent vehicle to demonstrate the benefits of sustainable living and change attitudes and behaviour. The development of a comprehensive 'sustainable home living package' that addresses the key elements of sustainability that homeowners can adopt would be beneficial. This sustainable home living package should build on and support the Cool Communities initiative.

### BOX 59 PLANNING FOR INCLUSIVE COMMUNITIES.

People with disabilities consistently report that, because of inappropriate planning, they are unable to enter public buildings and facilities to use the services available within these buildings.

Currently 19.5% of the population, or approximately one in five people in Western Australia, have a disability. While people may have a disability at any age, the likelihood of having a disability increases significantly as people get older. As our community ages it is predicted that the number of people with disabilities will significantly increase.

These changing demographics and increased community awareness have led to the introduction of legislation by both the Commonwealth and State governments that recognises that people with disabilities have the same rights as other citizens, including access to premises.

It is being increasingly recognised that good access also benefits business and the overall economy as well as people with disabilities, their families, friends and carers. It is an important factor in the achievement of sustainable communities. Indeed inclusion of people with disabilities has become a 'touchstone' indicator of whether the 'human' component of sustainability has been included in development.

In response to a need for technical information identified by the design and construction industries, the Disability Services Commission formed a reference group that produced the resource manual 'Buildings-A Guide to Access Requirements.'

An accompanying pamphlet was also produced for local governments to distribute when a planning or building permit is requested. The manual, which is freely available from the Commission's website <www.dsc.wa.gov.au> was purchased by the Building Designers' Association for each of its members.

### BOX 60 ATWELL SOUTH SCHOOL - A SUSTAINABLE DESIGN FOR A SUSTAINABLE SUBURB

The Department of Education has commissioned a 'sustainable' school to be built at South Atwell, 35 km south of Perth in the City of Cockburn. South Atwell is a new subdivision that is being developed along the sustainable construction principles of 'Liveable Neighbourhoods' with solar orientation and 'GreenSmart' buildings. It will be adjacent to the new southern railway.

The South Atwell Primary School will be the first government school in Western Australia that aims to develop and apply some of the key principles of sustainable building and construction. This project will push the benchmark for future developments and will provide a valuable test case study for environmental technologies and the involvement of sustainability in the curriculum through the school building and school grounds.

The key sustainability components that this school aims to incorporate include:

- Energy efficiency and some use of renewable energy.
- Transport efficiency; development of clean transport options.
- Water efficiency and reduced offsite wastewater treatment.
- Landscaping with native species to moderate the micro-climate and for low water use.
- Materials sourced from local, recycled, and low-impact sources.
- Construction waste management and low site impact.
- Waste management and composting.
- Low-allergen, low-emission materials and ventilation systems.

The South Atwell Primary School provides a great opportunity to develop sustainable institutional facilities and public spaces. Being such a highly visible site its success will do much to promote and enhance what the future of building and construction could be. It is due for completion in early 2004.

### BOX 61 YEAR OF THE BUILT ENVIRONMENT

The State Government has proclaimed 2004 to be the Year of the Built Environment. The Commonwealth Government has supported the concept and has allocated funding for its involvement in 2004.

The aim of the Year of the Built Environment is to encourage Australians to celebrate and understand how the built environment makes a difference to their quality of life and foster a sense of community and purpose by setting directions for a positive and sustainable future.

### BOX 62 GOVERNMENT OFFICE ACCOMMODATION

The Australian Building Greenhouse Rating (ABGR) is a world-first initiative for rating the greenhouse and energy performance of commercial office buildings. The ABGR aims to encourage building owners and tenants to reduce energy use and costs, and greenhouse gas emissions.

The Department of Housing and Works, which has responsibility for the State Government's office accommodation requirements, is supporting this initiative by introducing ABGR requirements for all government-leased and owned accommodation.

## In short...

**Vision**

Innovations in sustainable building and construction rapidly become mainstream.

**Objective**

- Encourage the widespread adoption of sustainable building and construction.

**Actions underway**

- The Housing Industry Association provides the Greensmart Accreditation Program.
- The Housing Industry Association of Australia's GreenSmart Program for sustainable building and construction is being used in projects such as Atwell South, Wellard, Brighton, Ellenbrook.
- The Department of Education and Training's new primary school at Atwell South will be a model eco-school built to sustainability principles.
- Landcorp has established a Sustainability Officer position to coordinate input to development projects.
- The Liveable Neighbourhoods code.
- An amendment of the Building Code of Australia requiring the implementation of energy efficiency into the design of new homes and major renovations was introduced in Western Australia on 1 July 2003.
- Industry groups are developing rating tools and guides to promote sustainability in the commercial property sector.
- The Disability Services Commission is working in partnership with a number of State government departments, Commonwealth Government departments and other State agencies developing 'Welcome: Design Ideas for Accessible Homes', which identifies a range of strategies to build accessible housing according to universal design principles.
- The Disability Services Commission is working in partnership with the City of Subiaco in the development of their sustainable house to be ready at the end of 2003.





## In short cont'd...

- The Disability Services Commission is involved in a seminar with architects later in 2003 to discuss heritage issues and access for people with disabilities.

**Actions**

4.97 Demonstrate the use of sustainability benchmarks, including the Sustainability Scorecard for government building projects to show leadership to the building industry and facilitate the introduction of sustainability to development control.

4.98 Promote the application of mandatory minimum building standards that support sustainability in the Building Code of Australia.

4.99 Appoint a government architect to encourage good design and construction, particularly in government buildings, and assist in the implementation of sustainability initiatives in the building industry.

4.100 Identify, develop and promote best practice sustainability standards and incorporate these standards into all government housing and buildings through sustainability benchmarks as they relate to sustainable buildings.

4.101 Support best practice standards through government procurement policies.

4.102 Compile a sustainable land development and built form toolkit, which includes guidelines and checklists, in close consultation and cooperation with relevant government agencies and authorities. Ensure best practice standards are incorporated into the guide.

4.103 Progressively incorporate the principles of sustainable planning, building and construction into:

- relevant State government documents such as a Statement of Planning Policy, Residential Design Codes and local town planning schemes through the Sustainability Scorecard, and
- relevant documents such as the Building Codes of Australia and other statutory documents.

4.104 Develop regulatory frameworks and associated incentives for sustainable building and construction including conservation, adaptive re-use and renovation.

4.105 Progressively introduce environmental rating of buildings, and promote the disclosure of this rating at the time of sale or lease of the building.

4.106 Develop a close partnership between government and industry for the support of research and development to facilitate sustainable homes and buildings.

4.107 Develop policies and guidelines for the minimisation of construction and demolition waste, including conservation, adaptive re-use and renovation.

4.108 Demonstrate the business benefits of sustainable housing through research and pilot programs to help transform the house construction market to one receptive to sustainable development.

4.109 Develop a sustainable home living package as a way to educate homeowners on the benefits of sustainability in their homes.

# In short cont'd...

## Global opportunities

The building industry globally is looking for innovation in sustainability. The United Nations Environment Program through the Environmental Technology Centre at Murdoch University has established a Co-operation Centre that is primarily aimed at bringing sustainability innovations in building and construction to the Asia-Pacific Region. This is typical of the opportunities for Western Australian firms to be involved in this rapidly growing market.

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