4 Contributing to global sustainability

Vision for Western Australia

Western Australia contributes to the solution of global sustainability issues particularly population pressures and poverty, climate change, threats to biodiversity and oil vulnerability and in so doing creates significant local opportunities for new jobs in the rapidly growing sustainability economy.

Goal

Play our part in solving the global challenges of sustainability.

Priority areas for action

Ecologists understand that all economic activity, indeed all life, depends upon the Earth's ecosystems. Economics knows how to translate goals into policy. Economists and ecologists working together can design and build an eco-economy, one that can sustain progress'

Lester Brown[9]

Sustainability gained wide acceptance globally in the 1980s. It was a political response to the tension that existed between the ecological perspective, which highlighted the impacts that development was having on the Earth, and the social justice perspective which argued that the 1 billion people whose basic needs were not met needed development to provide housing, health care and jobs.

In 1987 the Brundtland Commission attempted to resolve this tension by saying that it was possible to redefine development so that it enabled the poor to benefit and did not increase the burden on the world's ecological systems. Sustainable development required that social and ecological considerations be incorporated fully into economic development - not 'bolted on afterwards' and required economic decisions to occur within an ecological and social context.

In this section, the draft State Sustainability Strategy considers the global sustainability agenda and suggests how Western Australia can contribute to global sustainability. Economic opportunities are also emerging for nations and states that take the sustainability agenda seriously and these are highlighted.

The draft Strategy identifies four key areas that provide opportunities for Western Australia to contribute to global sustainability:

- Population, development aid and environmental technology
- Maintaining our biodiversity
- Responding to greenhouse and climate change
- Oil vulnerability, the gas transition and the hydrogen economy.

> POPULATION, DEVELOPMENT AID AND ENVIRONMENTAL TECHNOLOGY

The government will participate in the global sustainability agenda to reduce global population growth, contribute to development aid, reduce consumption and improve technology.

The World Bank has reported that there are now 25 million environmental refugees. The world population today is divided between the high consumer, high living standard nations with near stable populations and the desperately poor in the third world countries whose populations are growing rapidly. The world's richest nations with 20% of the world's population account for 86% of the world's consumption while the poorest 20% of the world's people account for only 1.3%.

Sustainable Population Australia (WA)

The global population needs to stabilise, as a continuously growing population undermines sustainability. The world's population increased to 6.2 billion in 2001, more than double the population in 1950[10], though recent estimates suggest that if birth rates continue to decline then the population may stabilise at 8 to 9 billion[11].

Population issues and the capacity of Western Australia to absorb growth are considered under *Sustainability and settlements*, particularly the sections on *Water supply and Managing urban and regional growth*. This section largely concentrates on the global aspects of population and what Western Australia can do about it.

[9] L Brown, *Eco-Economy*, Norton, 2001, p. 4.

[10] D Nierenberg, *'Population Growing Steadily', Vital Signs 2002-2003*, Earthscan Publications Ltd, London, 2002.

[11] United Nations Population Division, *World Population Prospects: The 2000 Revision, Volume III: Analytical Report*, United Nation, NY, 2002.

Extensive evidence suggests that high birth rates in developing countries (and parts of Australia with similar problems) begin to drop quickly when:

- women are educated
- people have enough food so that their children don't have to work
- there is political security
- children attend school
- basic health care is provided
- some form of social security is available.

Social and economic development is therefore critical to stabilising global population growth and it is important to consider what Western Australia can do to play its part addressing this fundamental sustainability issue.

Some Western Australian firms and individuals are already involved (see Box 15) as are non-government organizations, such as Oxfam Community Aid Abroad, and government agencies (see Box 16).

BOX 15 HARRY NESBITT: THE RICE GOD OF CAMBODIA

Harry Nesbitt, a Western Australian scientist, went to Cambodia on an Australian aid project to help reconstruct agriculture after the 'killing fields' virtually destroyed rice-growing capability. Over thirteen years Harry developed a team who identified the best rice to use for local conditions and trained people in new production techniques. Cambodia is now an exporter of rice and Harry's contribution has been recognised by many international and Cambodian awards.

Western Australia can play its part in supporting development by encouraging research on sustainability technologies with a global sustainability focus and ensuring government agencies are sharing their expertise with developing countries. Many agencies are already involved in aid projects providing their expertise through World Bank and AusAID projects. New opportunities can also be pursued through the trade agenda. The government can encourage reduced resource consumption through a variety of initiatives and undertake research to better understand the relationship between population and consumption issues in Western Australia.

BOX 16 GOVERNMENT AGENCY INVOLVEMENT IN OVERSEAS PROJECTS

Western Australian Government agencies have been involved in overseas aid projects for many years.

AgWest International is the international project unit of the Department of Agriculture. This unit is undertaking work in:

- East Timor - developing maps on agriculture and training locals to create maps through GIS.
- India - training people in apple production techniques.
- Vietnam - potato production training.
- China - training in livestock, post harvest and crop production techniques.
- Middle East - training in horticulture and livestock in Egypt and Jordan.

The Department of Land Administration, through DOLA International, is working in Bangladesh, Sri Lanka and East Timor on developing land titling and administration systems that are critical to enable financing for any development.

Environment agencies are involved in pollution control projects in Indonesia, Vietnam and Thailand, after long term involvement in several Middle East countries. The Water and Rivers Commission conducted a detailed water plan for the Sultanate of Oman.

The Department of Training, through TAFE International WA, has recently won a $50 m oil and gas training project in Qatar. Training projects have been undertaken in China, East Malaysia, Hong Kong, Mauritius and the United Arab Emirates. Training International students who come to study in Western Australia is an important contribution to international development, contributing some $600m annually to Western Australia.

The Department of Industry and Technology, through its International Projects section, has projects in Leeds (UK) on its GEMS technology and with the Asian Development Bank on electronic procurement strategies.

The Department of Mineral and Petroleum Resources has delivered a number of overseas projects related to mining, oil and gas exploration and development, the administration of mining tenements, environmental assessment and legislation. Projects have been undertaken in Eritrea, Pakistan, Ethiopia, Mongolia, China, Vietnam, Hong Kong, Myanmar, Sri Lanka and India. The biggest project involved a series of training exercises through the Channar Fund in China.

Population, consumption and technology

It is obvious that many sustainability issues are related and overlap. Addressing sustainability will require recognising these relationships and seeking ways to resolve them. Population influences many different issues and this was reinforced by many submissions. In particular, submissions pointed to the links between population, consumption and technology (see Box 17).

The draft Strategy will address consumption and technology by highlighting the many ways of reducing unnecessary and wasteful resource use, and the technologies that offer hope in many areas.

BOX 17 POPULATION X CONSUMPTION X TECHNOLOGY

Professor Paul Ehrlich defined global environmental impact as a combination of three factors based on the simple formula:

I Input	=	P Population	x	R/P Consumption of resources per person	x	I/R Technological impact per unit of resource used

Ehrlich and many others emphasise population as the issue; others tend to suggest the real problem is consumption or lifestyle, and others emphasise technology. This draft Strategy will try to account for all three factors and to find the opportunities that this difficult formula presents.

Some general points will be made first about this global context though most of the detail on consumption and technology will be found in particular issues in the draft Strategy. One side of the sustainability debate asserts that for the poor of the world there is a case for them to have greater access to the fruits of the earth. The other side of the debate asserts that overall the world should learn to reduce its ecological footprint–to learn to live with less energy, less water, less materials and less land. Both should be possible.

There is a new market for firms that can demonstrate resource efficiency, while improving quality of life and a need for infrastructure and government processes to facilitate this. Such opportunities will become important parts of the new global economy. For example if people in Western Australia can show how they can adapt to living with a more constrained use of water, then this will have global ramifications. Many other examples of how reduced consumption can be achieved, while improving quality of life, will be outlined in the draft Strategy, including through procurement, full life cycle assessments, greater use of recycled materials in buildings, stronger local communities and so on.

There are many global processes attempting to guide technological development so that it is more sustainable. Increasingly it is found that small-scale renewable energy systems or clever waste management or more energy and water efficient buildings, are not just for villages in the developing world, but for everyone.

Environmental technology is the fastest growing area of technology today. The global market is conservatively estimated at $1 trillion by a recent Federal Government report[12] that said, ‘We are entering the era of sustainability, with the environment industry moving into the mainstream of business life.’

[12] Leaders Group, *Investing in Sustainability*, Department of Industry, Science and Resources & Environment Australia, Canberra, 2001.

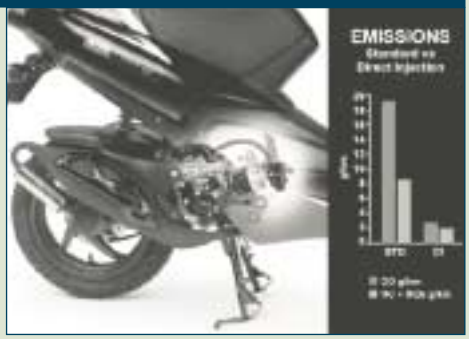
This report urges Australians to invest in sustainability, as there are endless opportunities for innovation and employment in this global market. Already in Western Australia there many firms and individuals developing globally significant environmental technology (see Box 18).

BOX 18 WESTERN AUSTRALIAN INNOVATIONS IN ENVIRONMENTAL TECHNOLOGY

Orbital Engine Corporation

Orbital Engine Corporation has developed a two-stroke motorbike engine that has much reduced emissions. The economic opportunities and the air quality improvements for smoggy Asian cities are significant.

The 4 stroke car engine has been demonstrated to provide significant air quality benefits as well.



Source: Orbital Engine Corporation

Ecomax and Biomax

Ecomax and Biomax are two of several Western Australian companies that have developed small-scale sewage treatment systems and are also involved in several aid projects. One such project provided sewage treatment to a squatter village in Indonesia and demonstrated that a small community can manage waste and improve health with the aid of these simple new technologies.

Source: Peter Newman

As part of the approach to global sustainability that recognises the role of environmental technology in solving the sustainability problems of the future, the government will support a number of initiatives including promoting Western Australian environmental technologies and facilitating research and development through a new Global Centre for Sustainability.

In short...

Vision

Global population is stable and consumption is reduced to achieve a smaller 'ecological footprint' through sustainable technology and management. Basic needs are met for all people and global ecosystem processes are restored and in balance with human needs. Western Australia contributes significantly to this transition.

Objectives

- Ensure that Western Australia is part of the global economy opportunity provided through environmental technology.
- Enable Western Australia government agencies, industries and non-government organisations to be linked into global aid programs that can assist in grass roots development and population control.
- Facilitate education at all levels about global sustainability issues, including population.
- Create new opportunities for research and development on global sustainability issues to ensure Western Australia is well placed to contribute to major global aid projects.

Actions underway include

- Research and development in environmental technology is facilitated through funding research bodies such as Curtin University's Centre for Cleaner Production and Murdoch University's Environmental Technology Centre.

In short cont'd...

- Department of Fisheries provides advice to Indonesia and the Pacific Islands in relation to fisheries management practices and associated issues.
- Perth Zoo fosters a strong in-situ conservation ethic by participating in internationally renowned conservation breeding programs, for example Sumatran Tigers and Sumatran Orang-utans.
- The government provides some industry facilitation in support of global environmental technology markets.
- Some local industries and universities are involved in global sustainability markets.

Proposed actions

2.1 Help create the Global Centre for Sustainability to bring Western Australian expertise into global development projects through a partnership between the five universities, TAFE, the CSIRO, industry research and development and government agency research and development in sustainability.

2.2 Assist government agencies where appropriate to be positioned to win or participate in projects in developing countries.

2.3 Promote Western Australian environmental technologies in global trade through the Environmental Industries Unit within the Department of Industry and Technology.

2.4 Facilitate research and development in environmental technology through the support of new and continuing Centres of Excellence and Cooperative Research Centres.

2.5 Conduct a study on the relationship between Population and Consumption in Western Australia (as recommended by the 1998 Western Australian State of the Environment Report[13]).

Indicators and targets

- Number of global aid projects involving Western Australian government agencies.
- Major overseas sustainability projects in developing countries conducted by Western Australian organisations and agencies.

Global opportunities

There are considerable and growing economic opportunities for Western Australians to be involved in the global sustainability issues of population, development aid and environmental technology. Government agencies can become significant participants in this global economy, particularly in aid projects, which often require substantial government involvement for credibility and capacity building. Partnerships with business and researchers will be made through the Global Centre for Sustainability to attract large aid projects to Western Australia. The key step is for Western Australians to recognise that their innovations in sustainability have global significance.

Further reading

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United Nations Environment Program, International Environmental Technology Centre http://www.unep.or.jp/

Australian Government Overseas Aid Program http://www.ausaid.gov.au/

[13] Government of Western Australia, *Environment Western Australian 1998: State of the Environment Report*, 1998.

> MAINTAINING OUR BIODIVERSITY

Conservation of Western Australia's biodiversity, and the landscapes and seascapes that support it, is a key plank of sustainability. Further, we have an obligation to the global community to conserve these values. Giving meaning to sustainability involves reversing the decline of the biodiversity of Western Australia.

> *Because there are a number of ways to achieve economic and social outcomes, but few alternatives for maintaining biological diversity, we believe that the requirements for maintaining the unique biological wealth of the south west should set the framework within which other aspirations are met. That is, the requirements for ecological sustainability should limit the actions that are taken to meet economic and social goals.*
>
> Greening Australia (WA)

Western Australia contains an enormous variety of environments that support a large proportion of the world's biodiversity, both terrestrial and marine. The South West of the state is considered to be an important node of biodiversity on a world scale, because of the high number of species, high degree of endemism and the threats to those biodiversity values. The Fitzgerald River National Park has as many species of plants, animals and other organisms as the whole of the Murray Darling Basin (around 100 times the area of the Park).

This global focus on the state's biodiversity reflects the following facts:

- Western Australia's flora is not completely known, but includes around 10,000 species, of which a high proportion are found nowhere else. Of these, 16 plant species are presumed to have become extinct since European settlement, and a further 348 are formally gazetted as rare and threatened.
- The terrestrial vertebrate fauna is better known, and also includes 13 taxa that are presumed extinct, 86 species that are rare and threatened, and 11 species that are in need to special attention.
- The list of rare and threatened fauna also includes snails, spiders and crustaceans (38 species); however, the invertebrates of the State are poorly documented and may well include a much larger number of rare and threatened taxa.
- The state's marine ecosystems are also rich in species although poorly documented. In particular, the coral reefs of the west coast are of global significance.

This substantial decline in terrestrial and aquatic biodiversity is largely a result of habitat loss through clearing and subsequent salinisation (in the wheatbelt), through overgrazing (throughout the rangelands), and because of the presence of foxes and feral cats.

Biodiversity conservation is intimately linked to issues of population growth and consumption, planning and development, greenhouse and the management of natural resources. As well, there are emerging issues that have the potential to impact on biodiversity. For example, there are risks that genetically engineered organisms and other genetically manipulated material could escape into the wild and affect the reproduction of naturally occurring plants and animals.

Western Australia's South West region has recently been identified by a group of international scientists as one of only 25 Global 'Biodiversity Hotspots'[14]; no other part of Australia has achieved this recognition. The west coast of Western Australia (between North West Cape and Perth) is also recognised as one of the 18 world tropical marine biodiversity hotspots, ranked second in terms of endemism.[15]

The state's global biodiversity conservation responsibilities are now well documented and there are increasing global processes to monitor our performance in management of these special areas.

Apart from the moral obligation to see that Western Australia's special biodiversity status is recognised and acted upon, the state has obligations under international treaties on biodiversity such as:

[14] Myers et al. 'Biodiversity hotspots for conservation priorities.' *Nature* Vol 403. 24 February 2000. pp. 853-858.

[15] Roberts et al, 'Marine Biodiversity Hotspots and Conservation Priorities for Tropical Reefs', *American Association for the Advancement of Science*, vol. 295, 2002, pp.1280-4.

- Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention)
- Asia-Pacific Migratory Waterbird Conservation Strategy: 2001-2005
- Convention on Conservation of Nature in the South Pacific (Apia Convention)
- Montreal Process
- Convention on Biological Diversity (Biodiversity Convention)
- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- Convention for the Protection of the World Cultural and Natural Heritage (World Heritage Convention).

The responses to Western Australia's international biodiversity obligations have been occurring for some time. They include:

- Continuous improvement in the management of the Shark Bay World Heritage Property. Two of the six pastoral leases have been purchased for conversion to National Parks.
- Eleven wetlands have been nominated as Wetlands of International Importance (Ramsar Wetlands), and are being monitored to ensure that their values are not compromised.
- The Western Shield program for the control of foxes has led to the recovery of three native mammal species to the extent that they have been removed from the list of rare and threatened fauna.
- The Zoo's international research links that enable it to contribute to the preservation of global biodiversity as well as contributing to the preservation of Western Australian species.
- The Botanic Gardens and Parks Authority is continuing to make an important contribution to global conservation through its research and horticulture programs on rare plant species in the state.

The Western Australian Museum has also extended its survey program through the Indonesian Archipelago as a contribution to understanding global biogeographic patterns. And the fox and feral cat predator control programs are nationally and internationally acclaimed. Some of these programs are now accessible to the members of the public, as volunteers (Box 19) or as participants of the Department of Conservation and Land Management's Landscope Expeditions.

BOX 19 VOLUNTEERS AT THE DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT

Volunteers in nature and biodiversity conservation express the Western Australian spirit that so fundamental to sustainability.

Throughout Western Australia, the Department of Conservation and Land Management has 5,000 volunteers who help manage the state's National Parks and Reserves and assist with maintenance of plant collections at the Western Australian Herbarium.

Volunteers range from young students who volunteer on weekends and during their holidays, to retirees people who may spend several days a week on the job. Volunteers are given significant responsibility and have training commensurate with this.

As Kieran McNamara, A/Executive Director of the Department of Conservation and Land Management says, 'Our volunteer program is a key part of working with the Western Australian community'.

A significant step in achieving biodiversity conservation has been the ending of old growth forest logging and the establishment of thirty new National Parks.

One of the visionary processes that is emerging in rural Western Australia are the plans to establish corridors of bush across the state. There are many small reserves and patches of remnant bush on farmland that need to be linked up to the state's existing reserves. Corridors are being planned from east of Esperance through to the west coast (see Box 22 Gondwana Links in *Sustainable agriculture*), and extending 1500 km North-South to join up malleefowl habitat in the east of the state (see Box 20). These and other corridor initiatives are coming from non-government organizations and farmers.

The global market for nature-based tourism is large and growing rapidly. It is critical that future developments based on this industry are consistent with sustainability principles so that this global curiosity about our unique environment ultimately provides real gains for the biodiversity values on which the developments depend.

There are obvious social dimensions to biodiversity conservation activities. The importance of activities like nature-based tourism and community-based nature conservation is not just economic, but it is part of what defines our identity–as Western Australians and as local communities. Western Australians are proud of our wildflowers and interesting fauna, and this is an important part in defining who we are as a community. In each region a particular 'sense of place' is fundamental to defining local community, to creating a sense of belonging. Box 20 outlines how the Western Australian Mallee Fowl Association has helped generate a sense of community in the Gnowangerup area.

BOX 20 IT'S 'GNOW' OR NEVER ...

The Malleefowl Preservation Group formed ten years ago around the goal of saving the ,Gnow bird, Nyoongah for malleefowl. By the 1980s, the bird on the Gnowangerup Shire emblem appeared to be endangered. The local community began to rally around the cause of saving habitat and protecting the malleefowl from foxes and cats.

A sophisticated network tracks the birds to their nesting mounds and informs local action to protect them. Fences are constructed and people even camp nearby for critical phases of the nesting. Intensive baiting of feral animals is also undertaken.

Susan Dennings, the President of the Malleefowl Association, says that the local community has been strengthened by their actions to save the malleefowl; 'Not only do we share a common interest but it has helped us all to get to know and love our local environment so much more. As a result the broader issues of managing the land more sustainably are able to be addressed.'

The vision of the group is to construct wildlife corridors through private farms linking known malleefowl sites to reserves. These corridors are being planned to stretch 1500 km North-South and are attracting enormous support from farmers and community groups keen to link their actions to a major visionary conservation exercise. They are part of the Gondwana links project (see *Sustainable Use of Natural Resources: Sustainable agriculture*).

A heritage centre called Yongegnow is being planned in nearby Ongerup, which will be a major tourist attraction focussing on the malleefowl and its habitat. The story of Ongerup and similar towns is a reflection of the status of this 'icon' bird and hence its revival and rehabilitation is an important part of the revival of the region. The Yongegnow centres will act as a scientific base where eggs will be incubated and taken to new areas along designated malleefowl corridors.

The Malleefowl Association plays a critical role in defining the character of the communities of the south-eastern wheatbelt and helps to create a clearer sense of their future.

Indigenous involvement in biodiversity conservation and land management is an integral part of Aboriginal history and culture (read about Mike Hill who is featured in the *Sustainability WA* exhibit on the CD-ROM). The Western Australian Government is now moving to recognise how this can be directed into creative public and private enterprises. Indigenous involvement in managing National Parks and creating nature-based tourism ventures has significant growth potential and can be a very important contribution to sustainability in Western Australia as will be indigenous involvement in processes for bioprospecting.

In short...

Vision

Western Australia is playing its part to ensure the world has a comprehensive, adequate and representative reserve system with complementary private biodiversity conservation reserves linked through corridors across the state. The intervening matrix of farmland is managed so as to minimise threatening processes. The loss of native species of flora, fauna and other organisms and habitats has been halted, and programs are in place to recover any remaining threatened species and ecological communities. There is widespread knowledge and understanding of, and appreciation within all parts of the community for all elements of the biodiversity of the state, and this supports improved planning and management of the environments of the state. Biodiversity is the source for many new products, especially in health, and this production contributes significantly to Western Australia's economy. Nature-based recreation and tourism (with Indigenous cultures central to its management) is the main recreational pursuit worldwide, and Western Australia plays a significant part in this transition.

Objectives

- Fully engage in implementing within Western Australia the international treaties concerned with environmental protection and biodiversity to which Australia is a signatory.
- Protect all biodiversity values through appropriate legal means, supported by strategies and plans, including plans for the development and on-going management of a world class, comprehensive, adequate and representative system of national parks, nature reserves, marine parks and other conservation reserves, and plans for off-reserve conservation across the intervening matrix.
- Enable industries to grow that can protect and enhance Western Australia's biodiversity such as nature-based tourism and bioprospecting, while ensuring that the links between biodiversity conservation and Indigenous knowledge are properly acknowledged.
- Create awareness and pride in all the biodiversity features of Western Australia, including these features that are regarded as special, and facilitate the involvement of the public in the management of these features.
- Establish and maintain a whole-of-government environmental database that incorporates the results of the on-going biological survey and monitoring program, and the research and development programs dealing with management of the biodiversity values in-situ, and ensure that communities wishing to be involved in management, research and monitoring have access to this database.

Actions underway include

- Government continues to expand the conservation estate to achieve a comprehensive, adequate and representative conservation reserve system, including 30 new National Parks in the old growth forest areas.
- Work is being undertaken with pastoralists (see Box 28, *Sustainable Rangeland Management*) to transform management of pastoral leases towards sustainability, including setting aside areas to protect biodiversity values.
- Private biodiversity conservation reserves are being created through projects like Land for Wildlife and Bush Brokers and through support for the Australian Nature Conservancy.
- The community and volunteers are involved in biodiversity management (see Box 19).
- Botanic Gardens and Parks Authority are leaders in the field of rare plant conservation.

In short cont'd...

- Threatened species research and management has brought back 3 animal species from the edge of extinction.
- A system of marine parks and fish habitat protection areas has been established to protect marine environments.

Proposed actions

2.6 Reaffirm Western Australia's commitment to global treaties on biodiversity and the National Strategy for the Conservation of Biological Diversity and establish a long-term monitoring and reporting program to demonstrate that the State is fulfilling its global biodiversity conservation obligations.

2.7 Introduce a new Biodiversity Conservation Act for Western Australia supported by a Biodiversity Conservation Strategy that outlines reserve requirements and links between them.

2.8 Nominate the Cape Range-Ningaloo area for inscription on the World Heritage List in recognition of its universal natural and cultural heritage values and intactness.

2.9 Facilitate nature-based recreation and tourism and Western Australia's 'sense of place' including through the marketing of the state's special biodiversity status.

2.10 Establish a plan for a Biodiversity Research Consortium bringing together the research and databasing capacity of the Department of Conservation and Land Management that includes the Western Australian Herbarium, the Western Australian Museum, and the Botanic Gardens and Parks Authority and to improve opportunities for synergies. Biodiversity conservation research programs within the consortium partner organisations should continue to receive strong support.

2.11 Plan a major science-education facility that can assist in the education of the community on Western Australia's biodiversity and its foundation in geodiversity (Biosphere West Project).

2.12 Create a State Bioprospecting Policy for ensuring native plant based industries are developed sustainably and with benefits accruing to the State.

2.13 Complete the Biological Survey of Western Australia by 2015.

2.14 Continue to support the national program to manage marine pest incursions into Western Australia and limit the spread of existing pests.

Indicators and targets

- The extent to which there is a comprehensive, adequate and representative conservation reserve system in place.
- Management of the forest and woodland estate vested in the Conservation Commission continues to meet standards required for international accreditation for ecologically sustainable forest management.
- Hectares of private conservation estate set aside.
- The extent to which the proposed environmental database is accessed by managers, planners and decision-makers at all levels of government and within the community, including within the local natural resource management regional and local organisations.
- Number of internationally accredited nature-based tourism projects and places.
- Number of threatened species and ecological communities brought back from the edge of extinction.

In short cont'd...

Global opportunities

The biodiversity conservation efforts in Western Australia are already contributing to global conservation efforts. This can be expanded substantially through improved marketing and through aid programs, and should include extension of the biodiversity conservation survey and monitoring and research and development programs to countries throughout the Asia-Pacific region.

Further information

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Department of Conservation and Land Management, <http://www.calm.wa.gov.au>

The Wilderness Society Wild Country Program and GondwanaLink, <http://www.wilderness.org.au/projects/WildCountry/gondwana.html>

> RESPONDING TO GREENHOUSE AND CLIMATE CHANGE

A comprehensive Greenhouse Strategy is being developed to address the issues of greenhouse emissions, adaptation, sequestration and new industries.

It would be naïve to ask governments to put their economic interests aside. I hope, however, that a better appreciation of the costs of inaction and the economic benefits of innovation in technologies and lifestyles will generate a more balanced economic vision.

Michael Zammit Cutajar, Retiring Executive Secretary of the UNFCCC, January 30, 2002

The evidence is overwhelming; human activity has interrupted the global carbon cycle and is beginning to have a profound impact on the Earth's climate.

Over the past 25 years, the South West of Western Australia has experienced a 50% reduction in rainfall run off. This is at least partly due to global climate change. We must now adapt to climate change and work to achieve a global reduction in greenhouse gas emissions.

In 1992, the World agreed to stabilize the concentration of greenhouse gases in the atmosphere through the United Nations Framework Convention on Climate Change (UNFCCC). Achieving this goal will require a 60-70% reduction in global greenhouse gas emissions.

The Kyoto Protocol, which was agreed in 1997, is the first step toward implementing the UNFCCC. The Kyoto Protocol establishes limits on Greenhouse gas emissions that challenge Western Australia's energy intensive society and economy. We must anticipate future greenhouse gas emission limits before they are applied globally in coming decades. The economy is moving inevitably towards reduced carbon intensity.

The changes that are required to address climate change can offer an opportunity for innovation and economic development. If we are able to use reductions in greenhouse emissions as a driver for economic modernization, efficiency and innovation then we can create a strong economic future for Western Australia while making a fair contribution to reducing global greenhouse gas concentrations.

Greenhouse has become perhaps the pre-eminent global sustainability issue. If the climate is changing due to human activity then how can we be looking after the future from an economic, social or environmental perspective? All of the sustainability principles are undermined by climate change.

The world is rapidly moving towards a consensus of action on greenhouse matters and a new economy is emerging where 'early movers' in greenhouse can begin to find opportunities for new technology and new services. The Kyoto Protocol is likely to be approved by a global majority and come into practice. Even those countries not signing are committed to shifting their economy towards less carbon intensive production, e.g. Australia.

The increasing requirement to sequester carbon may provide Western Australia with significant opportunities. Western Australia has all the requirements:

- substantial land that was cleared in 1990 and can be revegetated before 2010-12
- satellite photography and scientific analyses that enable verifiable calculations to be made of the potential carbon dioxide that would be sequestered
- carbon rights legislation that enables a clear, legal process to be established.

However a Federal Government system consistent with global standards will be required to truly encourage this process.

The Western Australian Government is committed to meet the challenges of climate change. A Greenhouse Strategy is being prepared by the Western

Australian Greenhouse Taskforce to position Western Australia so that it can contribute to the successful reduction in greenhouse emissions while securing the future of our communities and economy. The key ideas below are consistent with that strategy and with other parts of the State Sustainability Strategy that are greenhouse-oriented, though that is not their focus. These will be expanded and updated in the final State Sustainability Strategy when the Greenhouse Strategy has been completed.

The policies are developed to enable proper accounting of greenhouse gases and carbon sequestration in the economy, to facilitate moves towards a less carbon intensive economy, to enable the global process of carbon trading and sequestration to occur in Western Australia, to create adaptation strategies for the climate change, and to create educational processes that enable the community to be informed and act on the issue.

Throughout the draft Strategy a range of other proposed initiatives related to industry, energy, buildings, transport, water, planning and agriculture will lead to reduced greenhouse emissions.

In short...

Vision

Climate change stabilises through concerted global action including reduced emissions, new technology, new ways of living, substantial revegetation and stabilised population growth. Western Australia contributes significantly to this process.

Objectives

- To participate in the new global opportunities arising from greenhouse related initiatives.

Actions underway include

- A State Greenhouse Strategy is being developed building upon previous work by government such as the Western Australian Greenhouse Council.
- Government has established a Sustainable Energy Development Office.
- Carbon rights legislation is underway.
- Government has also required government agencies to reduce greenhouse emissions by reducing their energy consumption by 12% between 2001-02 and 2006-07 through the Energy Smart Government Program.
- Western Power has begun to achieve significant reductions in carbon intensity due to more efficient power stations and greater use of gas. Decisions made will reduce carbon intensity from 0.95 to 0.80 tonnes CO_2 per MWh between 1999-2000 and 2006-07, ie a 16% reduction.
- Through the Strategic Environmental Assessment of the Power Procurement Process, the government has ensured that greenhouse is a significant factor in future power plant decisions.

Proposed actions

2.15 Establish a voluntary program of Greenhouse Offsets to assist large development projects to reduce greenhouse gas emissions by investing in energy efficiency, renewable energy, carbon sequestration or other accredited projects in Western Australia.

2.16 Continue to require companies involved in major projects assessed by the Environmental Protection Authority, to minimise and report on greenhouse emissions.

2.17 Facilitate a carbon sequestration facility through the Forest Products Commission to exploit the new market of carbon credits from the new carbon rights legislation.

In short cont'd...

2.18 Investigate the potential for reducing greenhouse gas emissions for the government vehicle fleet and the electric train system.

2.19 Maintain the commitment to ensuring that greenhouse is a significant factor in power decisions.

2.20 Provide mechanisms in the electricity market structure for encouraging renewable energy and distributed generation, which could include providing incentives to reduce line losses and providing priority dispatch for renewable energy in any trading market.

2.21 Establish an Adaptation Strategy for Climate Change with the Department of Conservation and Land Management, CSIRO Healthy Country and other relevant agencies.

2.22 Establish a carbon accounting system in accord with national and international systems to enable better understanding of greenhouse across government and the potential for various policy options.

2.23 Create greenhouse accreditation for carbon accounting for carbon rights.

Indicators and targets

Indicators and targets for greenhouse will be established as part of the Greenhouse Strategy. Preliminary indicators include:

- Reduced greenhouse intensity of the economy.
- Growing jobs in greenhouse related industries.
- Regional adaptation strategies adopted for climate change.

Global opportunities

There are many global opportunities arising from the greenhouse effect. There is a rapidly growing market for Western Australian gas (as evidenced by the recent contract with China for Liquid Natural Gas) as the world seeks to find less carbon intensive energy futures. There are many opportunities in Western Australia's rural areas for revegetation and reforestation through the global processes of carbon trading. There are also opportunities for Western Australian innovations in greenhouse related technologies, for example, small-scale biomass power as is being developed through the Oil Mallee project at Narrogin or wind power systems like Albany; and greenhouse related services, for example, construction of new rail systems, or climate adaptation strategies.

Further reading

Menage, X 2002, *Working Towards Sustainability: Local Government Greenhouse Action through the Cities for Climate Protection Campaign*, sustainability case study, Department of the Premier and Cabinet, Perth, viewed 15 August 2002, <http://www.sustainability.dpc.wa.gov.au/CaseStudies/Greenhouse%20Action/greenhouseaction.htm>

Australian Greenhouse Office <http://www.greenhouse.gov.au/>

Indian Ocean Climate Initiative <http://www.ioci.commerce.wa.gov.au/>

Commonwealth Scientific and Industrial Research Organisation <http://www.csiro.au/>

> OIL VULNERABILITY, THE GAS TRANSITION AND THE HYDROGEN ECONOMY

One of the most difficult issues facing the world is the transition away from fossil fuels that have been the basis of industrial economies for several hundred years. In particular oil has been the basis of most economic growth in the past 50 to 80 years as the world has become very mobile.

> *Transport's current dependence on cheap oil supplies is not a sustainable activity. Estimates of the life of cheap oil supplies range from 3 to 50 years however the sooner we start the transition to a sustainable system the easier it will be.*
>
> Royal Automobile Club of Western Australia

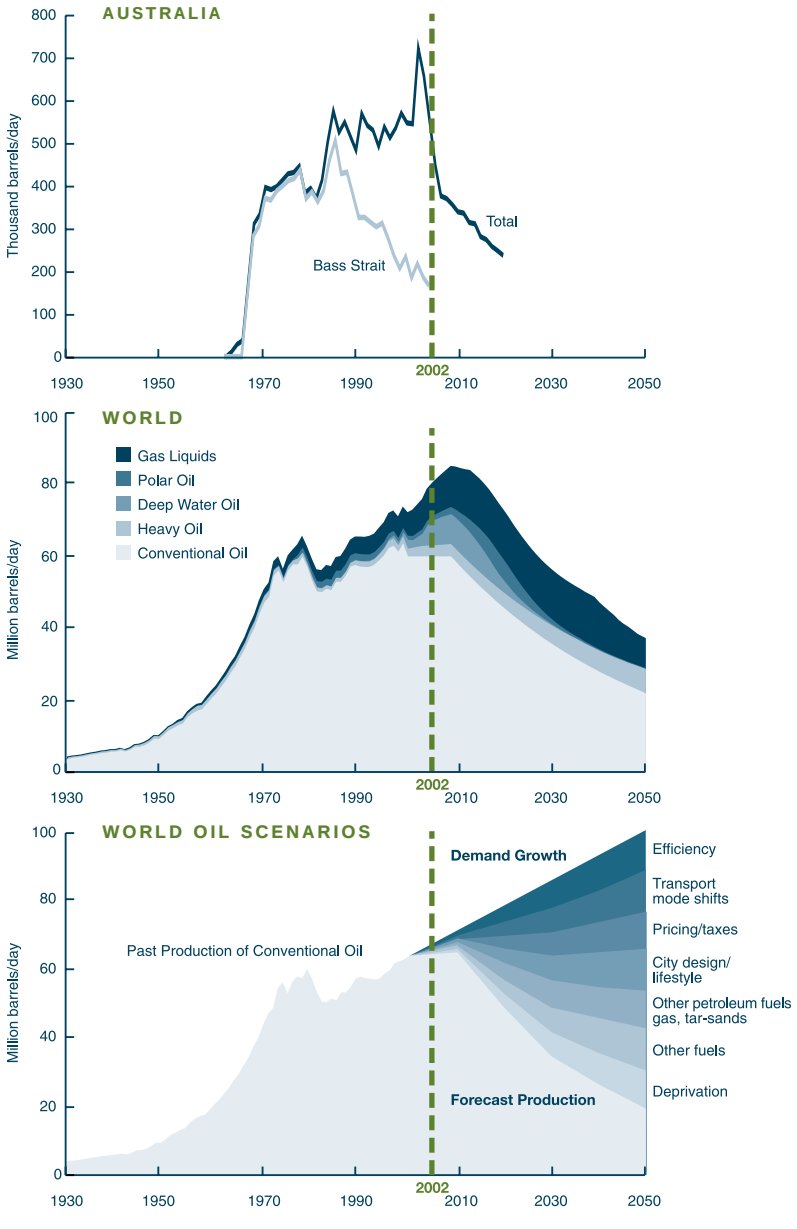
> *Since 1995 Australia has been consuming oil and condensate at three times the rate of discovery. Australia should urgently shift to natural gas based fuels to replace oil based petroleum products, and develop other alternatives like hydrogen and ceramic fuel cells, especially for transport.*
>
> Brian Fleay

Since the first oil crisis in 1972 there has been increasing awareness that oil vulnerability is an issue of concern. The concentration of oil reserves in the Middle East means that there is a distinct possibility of political control of oil prices and oil availability. Apart from this the world is using oil at a much faster rate than it is being found–four barrels are used for every one found (some estimates suggest this could be as high as nine). Added to this are the problems of greenhouse emissions from oil use and the car dependence in cities.

Widespread awareness of this problem has grown since September 11 and it was the basis of several key industry submissions to the draft Strategy. There is just one week's supply of petrol in Western Australia for emergency purposes and in the medium term the oil and gas industry is also suggesting a major global oil crisis could occur (see Box 21).

Figure 4 outlines the problem and this is explored in some detail by Bruce Robinson's background paper. Adam Hawke's background paper looks at medium term technological options (see Box 21) and Lisa Garrity's background paper examines how we can prepare ourselves for the long term future Hydrogen Economy.

Figure 4 Oil Vulnerability (existing and projected production)



Source: See B.Robinson Background Paper, *'Global Oil Vulnerability and the Australian Situation'*.

BOX 21 THE TRANSITION TO SUSTAINABLE TRANSPORT FUELS AND TECHNOLOGY[16]

As oil supply becomes less certain and its use less environmentally acceptable, governments worldwide are implementing strategies that introduce tough emissions standards, encourage responsibility for pollution and greenhouse gases, and foster sustainable transport industry upstream and downstream.

Australia's oil vulnerability in particular is highlighted by the fact that it faces a $7.6 billion deficit on trade in liquid hydrocarbons by 2010 from a surplus of $1.2 billion in 2000. Given Western Australia's major natural gas resources and strong public support for protecting the environment, the state is well placed to play a major role in meeting this challenge. There is a global transition to the use of gas for greenhouse reasons as well as economic and air quality reasons.

The global pool of transport technology is rapidly progressing and there are no obvious benefits to any one technology, as such it is not possible to second-guess which technology combination will eventually provide the solution. Government must therefore facilitate the transition to lower emissions fuels and vehicle technology without picking winners. It needs to be part of trials and remove barriers to the rapid integration of new technology. Demonstration projects with LPG and CNG, biodiesel and hydrogen fuel cells, are all underway and need to be carefully monitored.

Western Australia is well placed to create economic opportunities from the global oil situation though we also have some constraints of concern. The opportunities come from:

- the globally significant gas resources in our North West
- the political and economic security for developing these resources into value added products like liquid fuels
- the opportunity to create biodiesel from waste animal fat and from canola
- oil refineries being able to process gas condensates and produce high quality fuel suitable for the future in engine technology
- the electric train system which enables local fuels to be used including renewable electricity, for transport
- the Hydrogen Fuel Cell Bus trial in which Perth is the only non-European participant, supported by the EEC.

The constraints are:

- Western Australia is a highly transport fuel intensive state due to its large distances
- the nature of Perth's development which has been highly car dependent
- the oil-intensive nature of Western Australian agriculture.

The state can show global leadership in all these areas and will establish a Taskforce to pursue the issues. The Taskforce will assess the global oil situation, examine Western Australia's liquid fuel situation in short and long term supply, assess how best to use Western Australia's gas in transport, how this can lead to a hydrogen economy and the implications for sustainable transport policy.

In short...

Vision

Oil based transport moves quickly to a combination of gas-based systems and more public transport, cycling and walking to head off oil vulnerability. Then hydrogen becomes the basis of our economy using fuel cells and hydrogen gas produced from renewable energy.

Objectives

- Assess the global oil vulnerability situation and position the state's options if oil restriction occurs.
- Consider how to optimise the state's gas reserves in order to ensure that the global gas transition is addressed sustainably and to the state's long term advantage.

[16] A Hawkes, *Evolution towards a Sustainable Transport Energy Source*, Background Paper for the State Sustainability Strategy, CD-ROM, 2002.

In short cont'd...

- Facilitate Western Australia's involvement in the emerging Hydrogen Economy.
- Provide 'whole of government' perspectives on transport energy sustainability issues that can enable innovation and leadership to occur.

Actions underway include

- An emergency fuel storage plan has been prepared.
- The Ministerial Council on Energy has a Strategic Energy Supply and Security Working Group.
- 25% of vehicle fleet is being converted to LPG.
- A hydrogen fuel cell bus trial is being conducted in Perth (the only non-European city participating in the EEC based trial).
- Local firms, such as Orbital Engine Corporation, are making global contributions to fuel efficiency (see Box 18 in Population, Development and Environmental Technology).
- A Sustainable Transport Energy for Perth program is being established in the Department of Planning and Infrastructure.

Proposed actions

2.24 Establish a Taskforce to examine issues to do with oil vulnerability, the gas transition and the Hydrogen economy.

Indicators and targets

- Proportion of middle Eastern oil used in Western Australia.
- Amount of gas and biodiesel used in the transport system.

Global opportunities

The oil problem is Western Australia's golden opportunity to establish global leadership in how to move towards the better use of gas in transport and to help lead the world towards a hydrogen economy. Economic opportunities in this area of sustainability abound.

Further information

Robinson, B 2002, *Global Oil Vulnerability: the Australian Situation*, sustainability background paper, Draft State Sustainability Strategy CD-ROM, Department of the Premier and Cabinet, Perth.

Hawkes, A 2002, *Evolution towards a Sustainable Transport Energy Source*, sustainability background paper, Draft State Sustainability Strategy CD-ROM, Department of the Premier and Cabinet, Perth.

Garrity, L 2002, *The Hydrogen Economy*, sustainability background paper, Draft State Sustainability Strategy CD-ROM, Department of the Premier and Cabinet, Perth.

Combes, D 2002, *Gas as a Transition Fuel: Western Australia's Natural Alternative, sustainability case study*, Department of the Premier and Cabinet, Perth, viewed 15 August 2002, <http://www.sustainability.dpc.wa.gov.au/CaseStudies/gasastranstion/gasastransition.htm>

Garrity, L 2002, *Hydrogen Fuel Cell Buses: The Future for Sustainable Transportation in Western Australia and Around the World*, sustainability case study, Department of the Premier and Cabinet, Perth, viewed 15 August 2002, <http://www.sustainability.dpc.wa.gov.au/CaseStudies/Hydrogen%20Fuel%20Buses/Hydrogen%20Fuel%20Cell%20Buses.htm>

Passey, R 2002, *Biodiesel: A Fuel for the Future*, sustainability case study, Department of the Premier and Cabinet, Perth, viewed 15 August 2002, <http://www.sustainability.dpc.wa.gov.au/CaseStudies/biodiesel/biodiesel.htm>