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GOVERNMENT SUBMISSION TO THE STANDING COMMITTEE ON
CLIMATE CHANGE, ENVIRONMENT AND WATER

INQUIRY INTO THE ECOLOGICAL CARRYING CAPACITY OF THE
ACT AND REGION

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CONTENTS

Section	Page
1. Introduction	1
2. ACT Government community engagement processes – <i>Time to Talk</i>	4
3. Demography and the region	6
4. ACT Government policies and programs	9
4.1 Triple bottom line sustainability policy	9
4.2 Economic policy	11
4.3. Environmental policy	12
4.3.1 The ACT's ecological footprint	12
4.3.2 The ACT's natural environment	12
4.3.3 Greenhouse gas emissions in the ACT	19
4.3.4 Energy in the ACT	21
4.3.5 Water in the ACT	22
4.3.6 Environmental protection	23
4.3.7 Waste	24
4.3.8 The ACT Government's Environmental Programs	24
4.4 Spatial planning	29
4.5 Infrastructure planning	34
4.6 Sustainable transport	35
4.7 Social policy overview	36
4.8 Health sustainability strategy	38
4.9 Sustainability in education	39
4.10 Training for sustainability	40
4.11 Affordable Housing	41
5. Summary	44
Appendix A: Species and ecological communities listed as threatened under the <i>Nature Conservation Act 1980</i>	45

1. Introduction

The carrying capacity concept is used in agricultural and natural biological systems to determine the number of animals that can be supported in the long-term by a specific environment. The Inquiry Discussion Paper provides two definitions of carrying capacity, including the following:

Carrying capacity is a term used to describe the maximum population size of a given species that can be supported by a given area without depleting resources. Carrying capacity of a given region may be influenced by a number of factors and may change over time as a result of environmental changes, population growth and technological advances.

Carrying capacity can therefore depend on such factors as the availability of food, shelter and water. For any species and any area of habitat, the carrying capacity varies over time as the supply of the ‘necessities’ for a species changes; for example, due to annual weather variations. A species with a population above its carrying capacity will tend to decrease, due to ‘regulatory factors’, while the population of a species below its carrying capacity will tend to increase.

Carrying capacity theory suggests limits to the potential growth of the global human population or, more specifically, global annual consumption by humans. In 1972, the Club of Rome argued in *The Limits to Growth* that there were constraints to the human population that Earth can support, at current and increasing levels of *per capita* consumption. This is because Earth is essentially a closed system with finite resources, other than the annual intake, storage and re-radiation of energy from the sun.

Both renewable resources (such as the annual solar energy input to the earth available to plants to generate basic foods), and non-renewable resources (such as petroleum), are finite during any period of time, although non-renewable resources are in many cases substitutable. While the basic biological needs of humans are dependent on renewable resources, contemporary industrial society does rely on broader inputs, particularly minerals, which generally become less readily retrievable and reusable after industrial use.

The Global Footprint Network calculates that human society now annually uses over one and a half times the services produced by the environment in that year. These services range from fixing atmospheric carbon dioxide to producing the raw material for food. We are no longer living off nature’s ‘interest’, but instead are consuming or polluting nature’s ‘capital’.

The ACT State of the Environment reporting uses the ecological footprint indicator as a measure of the environmental impact of the ACT community. The footprint approach asks how many ‘planet Earths’ are necessary to support all of the people that live on the planet in a given year, under that year’s standard of living, biological production and technology. The ACT Commissioner for Sustainability and the Environment defines ecological footprint as

“...(the) measure of the area of land and water needed to support the resource demands (it includes the raw material for food, building, energy, etc) and absorb the wastes of a given population or specific activity, using prevailing technology and resource management practices.”

The last assessment of the ACT’s ecological footprint was in 2008, using 2003-04 data. It is understood that the ACT Commissioner for Sustainability and the Environment will release revised data on the ACT ecological footprint in late 2010.

The ecological footprint approach provides a means for crudely estimating a sustainable global human population, for any level of average *per capita* consumption. In contrast, carrying capacity refers to the maximum population of a species that a given land or marine area can support. Many species have consumption needs that are easily determined and do not change much over time, making carrying capacity relatively easy to define and calculate. For humans, however, carrying capacity estimates require assumptions about future per-person resource consumption, standards of living and ‘wants’ (as distinct from ‘needs’), productivity of the biosphere, and advances in technology. An area’s carrying capacity for humans is thus inherently speculative and difficult to define.

Specifically, human society is capable of changing the productivity of its environment. For example, we can increase productivity by adding fertilisers to our agricultural soils. Conversely, the projected effects of human-induced climate change from unabated greenhouse gas emissions reflect how Earth’s human carrying capacity might be reduced by pollution.

Contemporary human societies also no longer rely solely on the resources available in their immediate environments. Within the range of contemporary human land uses, agricultural production areas are net exporters of food to cities and other areas. This makes it very difficult to define the human carrying capacity for a limited area, such as the ACT or the ACT and its immediate region.

Canberra residents import products from all around the world, and similarly export products and services beyond the ACT’s borders. Since we can trade resources and products into and out of our region, there is no longer a direct relationship between the size of our ecological footprint and the sustainable use of the resources within our region.

The ACT Government therefore recommends the Committee separate out its consideration of the sustainable use of resources which are essentially geographically fixed within the ACT, such as soils and habitat for native species, from consideration of the elements of the ACT community’s broader use of global resources, as determined through our ‘ecological footprint’.

This ACT Government submission first provides an overview of the demographic factors that will be vital in shaping Canberra’s future, and how the ACT plans for a sustainable

future. The ACT's current population of 357,673 is currently projected to increase by 76,000, or 21.2 per cent, over the next twenty years to reach 434,000 by 2030. These increases will particularly be focused in Gungahlin and Molonglo. The ACT's population is also ageing; the proportion of the ACT population aged 65 years and over is projected to increase from the current 10.6 per cent to 17.3 per cent by 2029-30.

This submission then outlines the policies and programs it is pursuing to create a sustainable ACT. The Government is actively planning for a sustainable future. A critical part of that process is consultation with the community, particularly through the current *Time to Talk* process.

2. ACT Government community engagement processes – *Canberra 2030 -Time to Talk*

The ACT Government is committed to engaging the community in a meaningful, transparent, accountable, responsive and equitable way.

The ACT Government's participatory approach is designed to identify the potential implications and impacts of government decisions, and to respond to these impacts proactively as early in the decision-making process as possible.

This community engagement approach is based on the view that governments cannot help to solve complex problems without the concerted efforts of the general public. Arriving at solutions will invariably involve tradeoffs and outcomes that reflect and balance community interests as a whole. For this reason, governments must engage more broadly with the community and in ways that are different from what has been tried before.

Accessibility, timing and transparency are all significant elements in getting community engagement right. For complex and controversial issues, undertaking community engagement processes earlier rather than later in the policy development process can have significant benefits. This means that the community has the opportunity to learn about the trade-offs involved, and a diverse range of community views can be considered in the development of solution options.

The ACT Government is therefore undertaking a broad and comprehensive community engagement project to inform its strategic planning. *Time to Talk – Canberra 2030* is focusing on finding out the kind of city Canberrans want to live in twenty years from now. The initiative is involving Canberrans in discussions about how the ACT Government can address the key urban challenges to becoming a truly sustainable city.

The key areas for discussion include the impacts of a growing population on:

- housing affordability: attracting young people and providing for an ageing population;
- urban form and liveability: a more compact city; the feel and liveability of the city; maintaining and improving the quality of the public domain;
- transport: linking Canberra's transport future to its changing urban form;
- environmental sustainability: what does this mean for Canberra as we strive for a low carbon emission future; and
- population growth.

This community engagement will inform the development of government policy in key areas such as

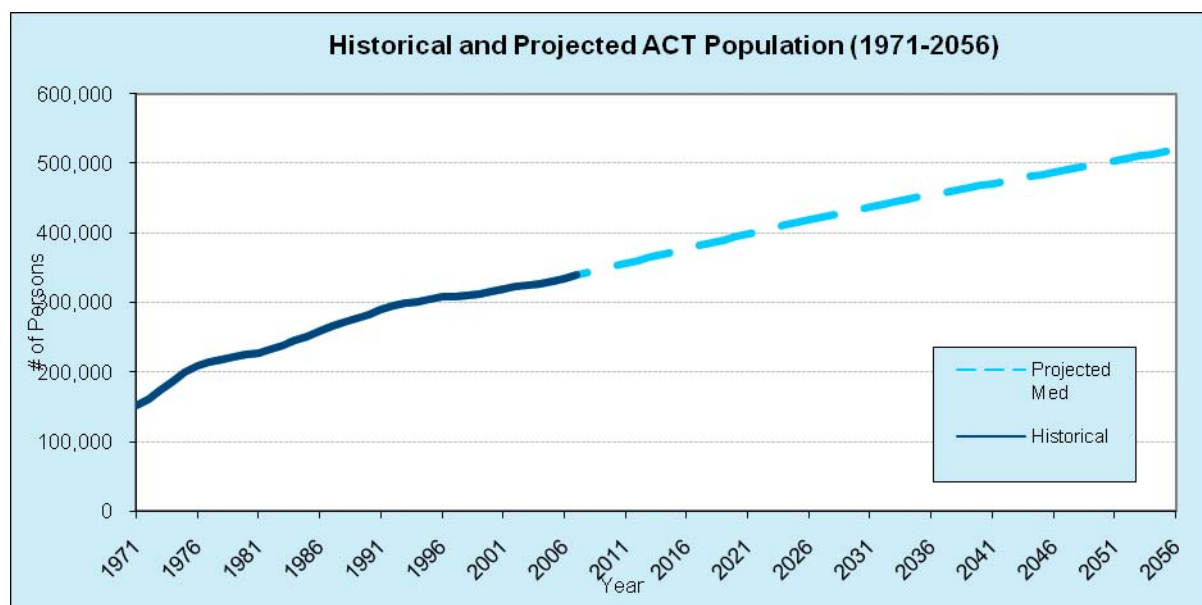
- the evaluation of the Spatial Plan;
- transport systems; and
- environmental policies, including the review of *Think Water*, *ACT Water* and the development of the second Action Plan for implementing *Weathering the Change*.

It is envisaged that each of these policy areas will undertake more specific community engagement that builds on the findings of the *Canberra 2030 -Time to Talk* program.

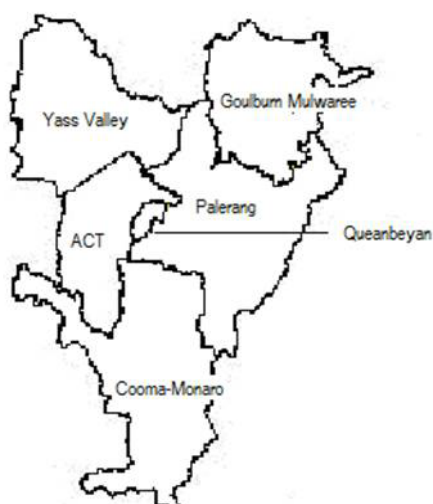
3. Demography and the region

A growing ACT population

The population of the ACT is approximately 357,673¹. This is projected to grow by around 38,000 over the next 10 years (11 per cent), and by 76,000 over the next 20 years (21.2 per cent)² to reach 434,000 by 2030³.



The regional population shown in the map below (including the ACT) is expected to exceed 577,000 by 2031.



¹ Australian Demographic Statistics, March 2010, ABS Cat No 3101.0.

² ACT Population Projections, 2007 to 2056.

³ ACT Population projection, 2007 to 2056; and New South Wales Statistical Local Area Population Projections 2006-2036.

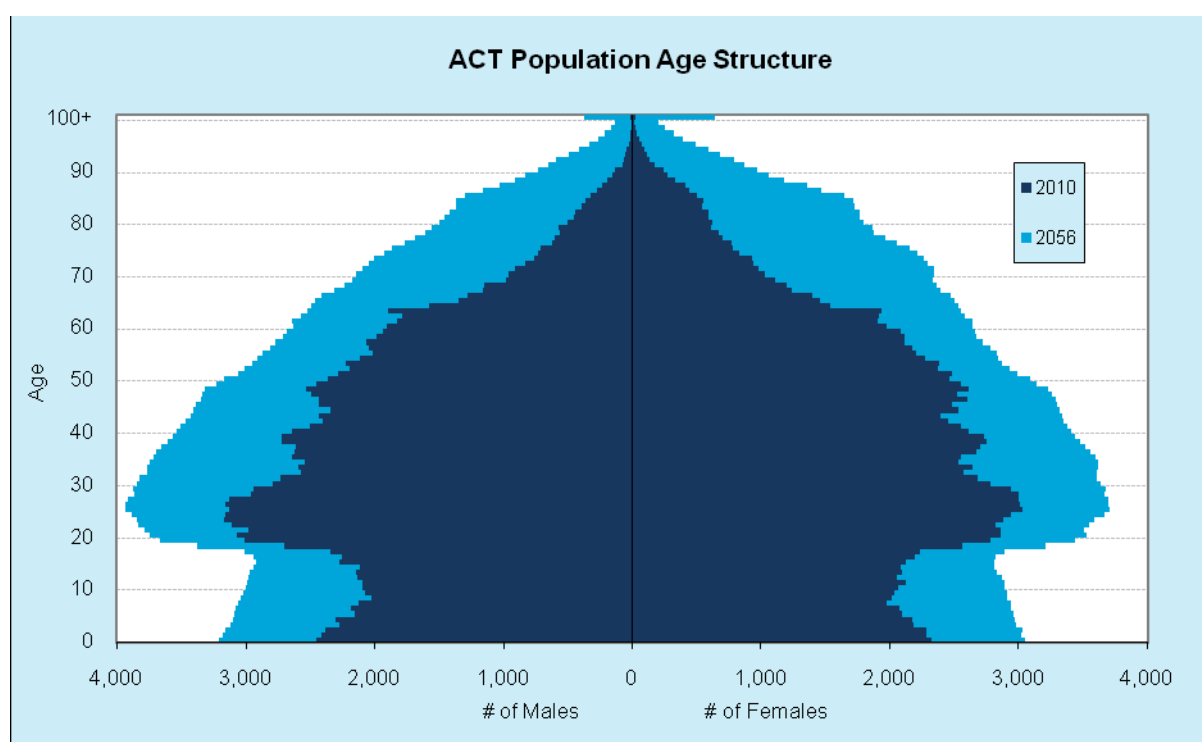
Over the next ten years, the Government projects that more than 60 per cent of the increase in population will occur in Gungahlin and Molonglo. A further 25 per cent of growth is projected to be in Belconnen and North Canberra⁴.

A larger population will allow the ACT to take advantage of economies of scale, particularly for large, fixed assets such as transport, water and power. As the population of the ACT and its region grows towards 500,000, the cost-efficiency of infrastructure investment, for example, improves and new infrastructure options become feasible.

An Ageing ACT population

As well as growing, the ACT population is ageing. At present, the proportion of the ACT population aged 65 years and over is approximately 10.6 per cent. This is projected to increase to 14.6 per cent by 2019-20, and to 17.3 per cent by 2029-30⁵.

The majority of the increase in population aged 65 years and over will occur in Tuggeranong and Belconnen. Together, these two areas will be home to nearly half of the aged population in the ACT, meaning demand for health and other community services in these areas will far outweigh that of other districts.



Regional growth

The ACT is the regional centre for employment, retail trade, and services. Almost 20,000 people living in the surrounding region travel to work in the ACT each day⁶. Every day the ACT provides health, education, community and justice services to a large number of NSW residents. For example, 25 per cent of ACT public in-patient hospital services are provided

⁴ ACT Population Projections for Suburbs and Districts, 2007 to 2019

⁵ ACT Population Projections, 2007 to 2056.

⁶ 2006 Census, as reported in: The ACT and its Region, A Report by Access Economics for ACT Chief Minister's Department, 2008

to NSW residents. The strong link between the ACT and our region makes regional demography a driver of future infrastructure demand in the ACT.

The south-eastern region of NSW, which houses the region surrounding the ACT, is projected to grow, and to age, at a faster rate than the ACT. The current population of the region is approximately 218,000. This is projected to grow by 28,000 over the next 10 years (12.8 per cent), and by 55,000 over the next 20 years (25.2 per cent). Much of this growth will occur in the areas closest to the ACT - the fast-growing areas of Queanbeyan, Palerang, and the Yass Valley.

Currently, the proportion of the south-eastern region's population aged 65 and over is approximately 16.7 per cent. This is projected to grow to 21.4 per cent by 2019-20, and to 25.7 per cent by 2029-30.⁷

⁷ New South Wales Statistical Local Area Population Projections 2006-2036

4. ACT Government policies and programs

4.1 Triple bottom line sustainability policy

The Government is committed to sustainability as a philosophy underpinning all of its work, and is taking a broad and comprehensive approach. This approach uses the 'Triple Bottom Line', taking into account economic, environmental and social aspects.

In December 2009, the Government released an updated version of *People Place Prosperity*, the Government's key sustainability document. It guides the implementation of the specific policy priorities set out in the Canberra Plan, and its subsidiary plans. The updated version sets out progress the ACT has made in this area and details the Government's sustainability work plan.

The Government has fulfilled its commitment to introduce Triple Bottom Line agency reporting. In December 2009, the Government released a pilot triple bottom line annual report for the Chief Minister's Department to guide this process. Building on the pilot, a new Triple Bottom Line section has now been added to the Annual Report Directions for the 2009-10 Annual Reports.

The Government has reviewed the *Measuring Our Progress* indicators and the broader reporting framework for monitoring our progress towards our long-term goals for the ACT. On 31 August 2010, the Government launched a new online report card on life in Canberra, *Measuring Our Progress* (at www.MeasuringOurProgress.act.gov.au). The Measuring Our Progress website will be updated regularly and used to inform community engagement and the development of government policy. It is part of a program of work being led by the Chief Minister's Department to improve performance and accountability across government. The *Measuring Our Progress* website reports 28 indicators of the ACT's progress as a society. These indicators are aligned with the themes of *The Canberra Plan: Towards Our Second Century*, the ACT Government's plan to build a better future for our growing city.

The Government is also building on previous work to develop a triple bottom line assessment tool, to guide agencies in assessing the full benefits and impacts of their initiatives.

An important part of ensuring economic and social sustainability is assessing the impacts of proposed new regulation for its broader impacts, by preparing Regulatory Statements.

A Regulatory Impact Statement is required for any new or amending legislation proposals that might impact on a stakeholder group.

A Regulatory Impact Statement is an analytical tool that guides policy development and decision-making, prepared by the department, agency or statutory authority responsible for a

regulatory proposal. The objective of the Regulatory Impact Statement is to assist decision-making by presenting the information in a clear, structured and logical framework that will, after the decision is made, provide evidence of a sound approach underlying the chosen regulatory model. A Regulatory Impact Statement describes the issue that has given rise to the need for regulation and compares various possible options for dealing with that issue. An assessment of the costs and benefits of each option is included, followed by a recommendation supporting the most effective and efficient option.

4.2 Economic policy

In 2008, the ACT Government released its revised key economic policy, *Capital Development*, to guide and co-ordinate economic policy development and implementation across the ACT Government, in co-operation with the community, region and other governments.

Reflecting the speed of changes in economic circumstances, *Capital Development* provides a flexible and adaptive approach to economic and regional development. This means setting policy priorities that help steer rather than drive the economy, and enabling the Government to adapt the policy framework in the future.

Capital Development is the ACT Government's plan to maintain and strengthen a strong and dynamic ACT economy. Such an economy is critical to meeting the social and environmental goals envisaged in *The Canberra Plan: Towards our Second Century*. The foundation of *Capital Development* is the Government's ongoing commitment to responsible financial management, appropriate regulation and sustainable development.

These policies help create the macroeconomic conditions to support business and consumer confidence in the ACT economy, and ensure that the economy can achieve sustained growth and development. *Capital Development* also reaffirms the Government's commitment to working with the region to increase economic opportunity and activity.

Capital Development sets out three strategic themes to guide the ACT Government's economic policies

- investing in people;
- encouraging business and innovation; and
- building infrastructure and planning for the future.

For an already strong economy like the ACT, with an unemployment rate of only 3 per cent, economic growth and development depends on increasing the economy's productive capacity. Investing in people to ensure they are well-trained and educated will increase both workforce participation and productivity. Encouraging an innovative business sector will lead to smarter ways of doing business, and more efficient and effective use of economic resources. Sound planning and investment in public infrastructure reduces bottlenecks and congestion, and leverages the investment of the private sector.

These three strategic themes are also increasing the dynamism and responsiveness of the ACT economy so that it can best meet the challenges and opportunities of a changing economic landscape. A skilled workforce and innovative business sector are more flexible and mobile and can respond quickly to changes in economic conditions. Forward-looking planning and infrastructure investment will ensure that the ACT economy is efficiently integrated and co-ordinated and has the resources to meet new challenges such as climate change and an ageing population.

In essence, the Government's economic strategy as embedded in *Capital Development* aims to make Canberra an even more attractive place to live, work, invest, study and visit. A skilled workforce, increasing business investment, and being a vibrant centre of learning,

innovation and cultural exchange, will help strengthen the ACT's economy and secure our prosperity into the future.

4.3 Environmental policy

4.3.1 The ACT's ecological footprint

The ecological footprint methodology generates a measure of a person or community's ecological impact. It measures this impact in 'global hectares', where one global hectare represents the average biological production per hectare across the globe. The ACT's ecological footprint *per capita* is high by global standards. Between 1998-99 and 2003-04, the ACT's ecological footprint increased by 15 per cent from 7.4 to 8.5 global hectares *per capita*, which is 17 per cent higher than the Australian average⁸. To place this in context, in 2006, the average biologically productive area per person worldwide was about 1.8 global hectares per capita, while the global average footprint was 2.6 hectares.

When this per capita impact is multiplied by the ACT's current population of 357,673, this gives an ecological footprint of for the ACT of over 3 million global hectares, or almost thirteen times the area of the ACT. This result emphasises that the impacts of the ACT's consumption extend beyond its borders and that the ACT relies on significant productive areas in other parts of Australia and the world.

The majority of the ACT's footprint is due to energy needs (58 per cent), and the electricity component of this represents 13 per cent of the total footprint. Forestry products also form a significant aggregate in the overall footprint, at 18 per cent. At a more detailed level, the highest ranking components of the footprint are electricity use, residential building construction, retail trade, hospitality, petrol use and aviation.

The ACT can significantly reduce its ecological footprint by increasing electricity use efficiency and by sourcing electricity from renewable sources, and choosing goods and services with low embodied ecological footprints.

4.3.2 The ACT's Natural Environment

The establishment of the Australian Capital Territory brought Commonwealth control of all land in the ACT. Protection of Canberra's water supply placed clearing controls on the upper half of the ACT, and other constraints were placed on rural land use elsewhere. One consequence is that the ACT was not subject to the intensity of clearing, pasture improvement and cropping that occurred in surrounding districts, over the last hundred years. Today, all montane and sub-montane vegetation and most of the land above 750 metres is protected and managed within the conservation reserve system.

The ACT also conserves relatively large and well-connected lowland and riparian vegetation remnants in comparison to that elsewhere in South-eastern Australia, and

⁸ University of Sydney, 2008. The 2003-04 Ecological Footprint of the population of Canberra

consequently is a stronghold of several lowland plants, animals and vegetation communities considered to be nationally threatened.

Canberra's development was initially focused on flat, low land that originally supported native grassland (see Figure 1). About 60 per cent of the native vegetation has been cleared across northern ACT, originally for grazing stock and pine plantation, but more recently, to allow urban expansion.

These lands are still a focus of urban development, with more recent town centres such as Weston Creek, Tuggeranong Belconnen and Gungahlin requiring the clearing of lowland woodland. Further greenfield development is proposed over 12, 616 hectares of the ACT. Roughly half of this land, identified as a Future Urban Area planning zone, supports native vegetation, including 877 hectares of dry forest, 1,327 hectares of lowland woodland, 2,973 hectares of secondary or derived grassland and 816 hectares of native grassland. The ACT government recognises maintenance of the extent, quality and connectivity of native vegetation cover as an important policy objective.

The ACT's *Nature Conservation Act 1980* is the primary nature conservation legislation. The provisions and powers of the Nature Conservation Act are currently under review. A draft Discussion Paper for the Review of the *Nature Conservation Act 1980* is expected to be released for public comment in late 2010.

Threatened ecological communities and species

A species or ecological community is threatened if it is likely to become extinct in the foreseeable future. A process is threatening if it has the potential to threaten the survival of a species or community in the ACT region.

The historical record shows several plant and animal species are now locally extinct in the ACT, and the ACT Government is committed to identifying those species and communities which are at the highest risk of extinction and to giving them statutory protection under legislation. The primary function of the Flora and Fauna Committee under the Nature Conservation Act is to provide independent scientific advice to the ACT Government on species and community declarations.

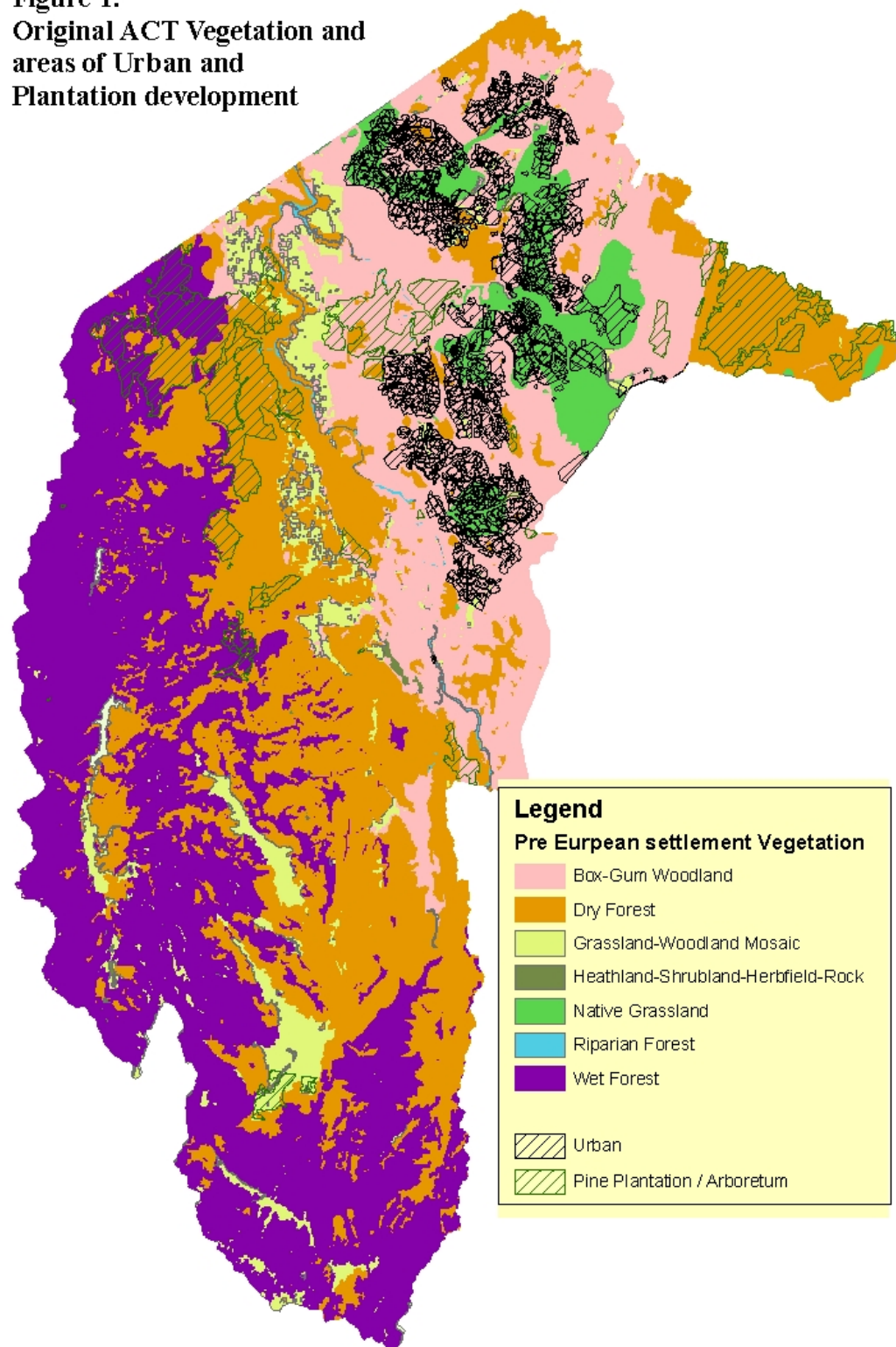
The ACT has declared 32 threatened species and two threatened ecological communities under the *Nature Conservation Act 1980*. These species comprise three reptiles, four fish, one crustacean (a crayfish), two insects, ten birds, three mammals, eight plants and one frog. A list of species is at [Attachment A](#).

The threatened communities are the endangered *Yellow Box – Red Gum Grassy Woodlands* (critically endangered under national legislation) and the endangered *Natural Temperate Grasslands* (nationally endangered).

While the ACT's threatened species and communities are largely concentrated in the lowland areas of the ACT, some, such as the corroboree frog, spotted tailed quoll, smoky

mouse, mountain gentian and the Brindabella midge orchid occur in the montane and subalpine areas of Namadgi National Park.

Figure 1.
Original ACT Vegetation and
areas of Urban and
Plantation development



Threatening Processes

Threatening processes impacting on species and ecological communities are generally a combination of habitat loss and fragmentation, landscape modification (such as for agriculture), grazing pressures, changed fire regimes, invasion by pest plants and animals, impacts of domestic animals and urban edge effects. More recently, drought has exacerbated the pressures exerted by threatening processes and signifies how the effects of climate change may play out in the future.

Action Plans for threatened species and communities

Under section 40 of the *Nature Conservation Act 1980*, the Conservator of Flora and Fauna is required to prepare for public information an action plan for any community declared endangered or any species declared endangered or vulnerable under this Act. An Action Plan must include proposals to ensure, as far as is practicable, the identification, protection and survival of the species, or the ecological community.

Action planning for the threatened entities that occur outside the reserved highlands is largely addressed in three documents:

- Action Plan 27: *Woodlands for Wildlife – ACT Lowland Woodland Conservation Strategy*;
- Action Plan 28: *A Vision Splendid of the Grassy Plains Extended. ACT Lowland Native Grassland Conservation Strategy*; and
- Action Plan 29: *Ribbons of Life – ACT Aquatic Species and Riparian Zone Conservation Strategy*.

Key objectives and actions within the above documents have been arranged into six main groups. The Action Plans also detail specific actions for certain threatened or uncommon species. Key topics within the Action Plans include

1. *Information* – the type, location and condition of lowland and riparian communities is described, kept current and linked to national and community databases;
2. *Protection* – a comprehensive, adequate and representative reserve system is in place. Conservation is the overriding land use of all Category 1 and 2 grasslands and riverine and riparian habitats. The ecological impact of development proposals affecting lowland vegetation and aquatic systems are assessed and minimised.
3. *Threats* – are identified, prioritised and management and planning steps taken to eliminate or reduce the threat.
4. *Planning* – significant lowland biodiversity is recognised and planned for early in planning processes. Planning should strive to prevent or minimise further vegetation fragmentation, maximise connectivity and encourage activities aimed at improving viability.
5. *Management* – best practice adaptive management with particular focus on habitats of threatened, uncommon and declining species will be conducted. Identification and prioritisation of sites for regeneration and restoration occurs.

6. Community/landholder involvement – Encourage, educate and facilitate involvement of landholders, community groups and others in biodiversity protection and management. Investigate opportunities for voluntary agreements and incentives for private land managers to undertake ‘best practice’.

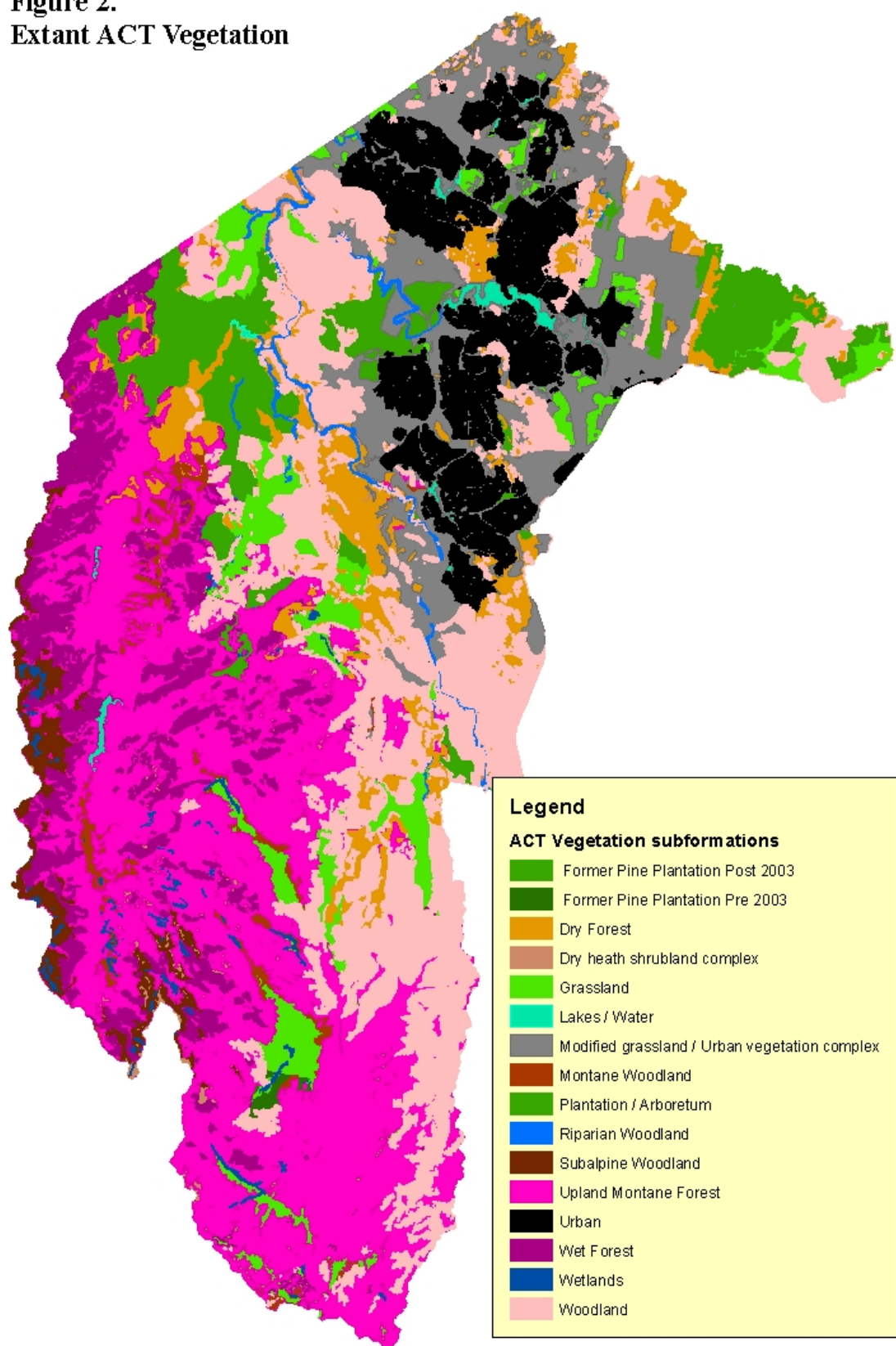
Woodlands and Grasslands in the Lowland Areas of the ACT⁹

About 10,850 hectares of Yellow Box – Red Gum Grassy woodland remain in the ACT. This represents 34 per cent of the original extent. About another 5,950 hectares (18.5 per cent of the original area) remain as low diversity native pasture with scattered paddock trees. There are about 13,100 hectares of other lowland woodland vegetation and a further 7,075 hectares of lowland woodland occurs in a highly degraded state. Only approximately 1,000 hectares (about 5 per cent of the estimated pre-European extent) of natural temperate grassland remain in the ACT. If native pasture and mixes of exotic pasture/native pasture are included, there is in total about 2,170 ha of native grassland remaining, or about 10 per cent of the original extent. Figure 2 indicates ACT’s extant vegetation.

About 12,600 hectares of land has been identified as being suitable Future Residential Areas in the Canberra Spatial Plan. This includes land at Kowen, the Molonglo Valley, North Gungahlin (Moncrieff, Taylor, Jacka and Bonner), East Gungahlin (Throsby, Kenny and Forde), West Belconnen, Jerrabomberra, Lawson, Kinlyside and West Hume. About half of this land supports native vegetation, including around 900 hectares of dry forest, 1,300 hectares of lowland woodland, 3,000 hectares of secondary or derived grassland (a mixture of native pasture and higher quality understorey) and 800 hectares of native grassland/native pasture. About 19 per cent of the Future Residential Areas contains good quality endangered vegetation. This is comprised of around 2,150 hectares of high quality box–gum woodland (mostly in East Molonglo, North Gungahlin – Kinlyside) and about 250 hectares of priority native grassland (mostly at Cookanella and Harman-Bonshaw). Although identified as generally suitable for urban development it is unlikely that all of the Future Residential Areas supporting endangered vegetation would be cleared. For example, the Government has already withdrawn urban development from Central Molonglo. Nevertheless, urban expansion will result in a further loss of lowland vegetation and habitat of some threatened species.

⁹ It is difficult to quantify exactly how much of the original vegetation communities has been lost, while vegetation mapping is reliant on a combination of modelling, aerial photographic interpretation and on ground survey. The figures provided in this paper should therefore be considered as estimates.

Figure 2.
Extant ACT Vegetation



Clearing of native vegetation

Clearing of native vegetation on rural lands is controlled through land management agreements. These agreements may also include conditions and constraints in relation to such things as feral animal control, weed control and grazing intensity. In the 2009 report on the inquiry into native grasslands, the Commissioner for Sustainability and the Environment questioned the effectiveness of land management agreements in delivering a sustainable outcome. The scope, content and condition of land management agreements are currently under review. With active regulatory monitoring, land management agreements would be an effective way of ensuring conservation values are appropriately balanced with agricultural land use.

Urban Edge Effects

Canberra is fortunate in having nature reserves established around and throughout the city and the benefits derived from the bush for the community and for the environment are significant. However, at the urban-bush interface there are several pressures operating that potentially impact negatively on the environment, especially on biodiversity. Typical pressures and impacts include weed invasion, physical disturbance of vegetation and soil, rubbish (dumped and incidental), dumped plant material, domestic cat predation of native animals, domestic dog droppings and disturbance of wildlife, bushrock collection, tree dieback and higher nutrient levels from urban runoff leading to increased weed invasion.

Fuel reduction for bushfire risk mitigation

The Strategic Bushfire Management Plan gives clear direction on how to reduce bushfire risk such as outer asset protection zones of 100 metres for predominantly grassy areas to 300 metres for forested areas and inner asset protection area of at least 30 metres. Slashing and other fuel reduction measures remove the diversity in habitat structure and composition required by many species. It is possible for new greenfield development to be designed to contain sufficient bushfire asset protection zones within the development area, so that adjoining areas of biodiversity value do not need to be significantly degraded by fuel reduction and fire risk mitigation activities.

Pest Plants and Animals

The garden and aquarium trades have been major sources for the spread of weeds and pest animals into the ACT's natural ecosystems. The *Pest Plants and Animals Act 2005* enables the prohibition of the supply, keeping or importing of plants or animals that may pose a threat to ACT's biodiversity. A list of such plants and animals is provided and updated by regulation.

Feral cats and the European red fox both do well in an urban bushland environment and are considered to be a major cause of decline in small ground-dwelling mammals. Monitoring of small mammals by the Department of Territory and Municipal Services over the past five

years indicates that most small ground dwelling mammals have disappeared from the Canberra Nature Reserves. The establishment of the predator proof fence around Mulligans Flat Nature Reserve, to exclude cats, dogs and foxes, has led to an increase in the common dunnart, providing further evidence that foxes and cats are a key threatening process for fauna.

Run-off and an increase in nutrients and general disturbance of soils at the urban edge also favours the spread of pest plants.

Cat containment

The *Domestic Animals Act 2000* enables the Government to declare suburbs as cat containment areas, in which owners of domestic cats must confine their cats to their property boundary. The ACT Government is currently developing a cat containment policy. Domestic cats kill around 100,000 native animals in the Canberra area each year, including about 20-to-27 per cent of the standing crop of native birds and at least 56 different native species. A South Australian study showed that 62 per cent of domestic cats caught birds, 59 per cent caught mammals and 34 per cent caught reptiles, while some caught frogs, insects and spiders. A sample survey found that 75 per cent of Canberra's cats caught native animals. The most commonly cat-injured animals brought to Canberra's RSPCA shelter are the Crested Pigeon, Red Wattlebird, Crimson Rosella, Magpie-Lark and Blue Tongue Lizard.

The effect of cats moving beyond suburban edges into remnant habitat is akin to the effects wrought by a predator newly-introduced to an island environment. While the cat is mobile, many of the native fauna species in remnant habitats are relatively immobile and exist in patchily distributed and isolated fragments. Populations have been isolated and reduced largely because of habitat clearance, but domestic cat predation can be the final straw that leads to local extinction. A number of species subject to cat predation, such as small mammals, woodland birds and reptiles, have suffered local extinctions within ACT bushland remnants.

Park Care and other community encouragement programs

The ACT Government facilitates and/or supports many groups and provides information for members of the community to become actively involved in enhancing the biodiversity of their local area. It does this through the *Park Care*, *Bush on the Boundary* and *Give a tree a drink* programs, and by providing advice on how to attract birds to a garden, the use of local plants within gardens, responsible pet ownership and what to do with injured wildlife.

4.3.3 The ACT's Greenhouse Gas Emissions

Climate change has significant implications for sustainable development. The scientific consensus is that human-induced increases in greenhouse gas emissions to the atmosphere from the combustion of fossil fuels are the major cause of current climate changes. Climate research indicates the ACT will become drier and hotter and experience more extreme conditions.

The ACT Greenhouse Gas Inventory estimated that in 2007-08:

- the ACT's net greenhouse gas emissions totalled 4.15 million tonnes of carbon dioxide equivalent, including emissions and removals from land use, land use change and forestry;
- the ACT's net greenhouse gas emissions totalled 4.18 million tonnes of carbon dioxide equivalent excluding emissions and removals from land use, land use change and forestry and
- greenhouse gas emissions were 29 per cent above 1990 levels.

Electricity, transport and natural gas were the main emissions sources in the ACT, contributing 62 per cent, 23 per cent and 9 per cent respectively.

The ACT's total emissions increased from 3.244 million tonnes CO₂ equivalent in 1990 to 4.182 million tonnes CO₂ equivalent in 2008, corresponding with a 20 per cent increase in the ACT's population. Per capita emissions in the ACT were 12.1 tonnes CO₂ equivalent in 2007-08, compared with a national figure in 2008 for per capita emissions of 25.7 tonnes CO₂ equivalent. The ACT's low *per capita* emissions compared to the national figure is due to a lack of significant manufacturing, mining and agriculture sectors.

The Legislative Assembly has passed the ACT's Climate Change and Greenhouse Gas Reduction Act 2010. The Bill sets out the following greenhouse gas reduction targets for the ACT:

- a principal target to achieve zero net emissions by 2060;
- interim targets to reduce greenhouse gas emissions:
 - by 40 per cent of 1990 levels by 30 June 2020;
 - by 80 per cent of 1990 levels by 30 June 2050 and
- the average annual *per capita* greenhouse gas emissions in the ACT to peak by 30 June 2013.

The ACT Government is already engaged heavily in improving energy efficiency and exploring options for increasing uptake of low emission and renewable technologies. The ACT's Electricity Feed-in Tariff Scheme was introduced in March 2009 and continues to be the most generous initiative of its type in Australia.

In addition, several of the recipients of the ACT Government's \$1 million Community Energy Grants have used this funding to help purchase significant solar panel installations.

In the 2009-10 Budget, the Government announced funding of more than \$19 million in programs and rebates to help consumers reduce their energy and water consumption and to reduce waste generation. The Government is also providing \$2.4 million on a matched basis to retrofit commercial office premises to achieve greater energy efficiency and has allocated \$3.2 million to increase the ACT Government's purchase of GreenPower from 23 per cent to 30 per cent.

It should be noted that as greenhouse gas emissions have increased since 1990, actual emissions will need to reduce by 54 per cent from 2008 levels to achieve a greenhouse gas emissions reduction target of 40 per cent from 1990 levels by 2020.

Major climate change initiatives under the *Weathering the Change* Action Plan 1 2007-2025 have included:

- the Renewable Energy Showcase at Canberra Stadium;
- establishing the ACT Greenhouse Inventory to track progress towards the ACT's goal of zero net greenhouse gas emissions by 2060;
- collection of ACT Fuel Sales Data for the ACT Greenhouse Inventory;
- establishing the Resource Management Fund and Resource Management Plan to assist other ACT Government agencies to achieve sustainability gains; and
- partnering with key institutions (eg the Australian National University) to encourage climate change research.

The Government has started reviewing the Government's Climate Change Strategy *Weathering the Change* 2007-2025 and is developing Action Plan 2.

Action Plan 2 will focus on establishing the platforms necessary to support the ACT in its transition towards a low growth emission economy by:

- reducing energy use;
- promoting energy efficiency;
- increasing uptake of renewal energy;
- creating opportunities for offsetting emissions; and
- building the ACT's capacity to respond to climate change.

The Government allocated \$2.6 million over four years in the 2010-11 Budget towards:

- achieving carbon neutrality in the ACT Government by 2020;
- independent measuring and reporting of overall ACT greenhouse gas emissions; and
- enhancing the Department's capability to design cost-effective reduction in the ACT's greenhouse gas emissions.

4.3.4 Energy in the ACT

The ACT Government participates nationally in the Ministerial Council on Energy. The Council is charged with implementing the National Strategy on Energy Efficiency, which recognises that state and territory government should provide leadership in improving the energy efficiency of the buildings it owns or leases.

The Government has released a draft *Sustainable Energy Policy 2010-20*, to be finalised in late 2010, which canvasses opportunities to reduce the ACT's energy use and to increase efficiency. Measures in the policy include:

- increasing the efficiency of appliances, insulation, lighting, space heating and cooling, water heating;
- increasing the use of renewable energy, including incentives for installation of photo-voltaics through the ACT Feed-in Tariff Scheme; and
- the potential for a large scale solar power generating facility.

The draft policy also considers a trial of electric vehicles in the ACT Government Fleet.

The ACT Electricity Feed-in Tariff Scheme increases the ACT's capacity to produce renewable energy from solar and wind locally and allows individuals to be personally involved in reducing the carbon emissions of the Territory.

The Scheme, which commenced on 1 March 2009, is aimed at residential and small commercial installations of up to 30 kilowatts in capacity.

Community response to the Scheme has been encouraging. As at 1 October 2010, 3,048 solar facilities were connected to the grid. This represents a generating capacity of approximately 5 megawatts.

The Government has also agreed to an expanded feed-in tariff scheme for medium and large scale renewable energy generation with the following elements:

- an overall scheme cap of 240 megawatts of generating capacity;
- a large scale generation category for generators larger than 200 kilowatts (category cap of up to 210 megawatts, subject to review after the initial release of 40 megawatts);
- medium scale generation category for generators between 30 kilowatts and 200 kilowatts (category cap of 15 megawatts);
- existing household rooftop micro generation category up to 30 kilowatts (category cap of 15 megawatts).

The expansion of the scheme will occur in two steps, with medium-scale generation suitable for larger areas such as shopping centres, warehouses and large office buildings, to occur first through amendments to the existing *Electricity Feed-In (Renewable Energy Premium) Act 2008*.

The second step will involve the introduction of separate legislation for large scale generation with provision of premium payments to be allocated through an auction process.

4.3.5 Water in the ACT

Since 2004, the ACT has had in place a comprehensive water resources strategy, *Think Water, Act Water*, which adopts a sustainable approach to ensuring efficient and effective planning and management of the ACT's water resources into the future.

The *Think Water, Act Water* strategy includes objectives and targets. Two key targets are to reduce the ACT's potable water consumption by 12 per cent by 2013 and 25 per cent by 2023, and to increase the use of reclaimed water from 5 per cent to 20 per cent by 2013. The ACT is on track to meet its potable water reduction target, despite the increases in the ACT population.

Think Water, Act Water contains various programs and action items aimed at efficient water use. One key action is the implementation of Permanent Water Conservation Measures which apply when the ACT is not in temporary water restrictions. Permanent Water

Conservation Measures will assist the ACT in meeting its water demand efficiently now and in the future.

The *Think Water, Act Water* strategy has been evaluated and a revised strategy is now being developed. An aim of the new strategy will be to improve water use efficiency through a series of initiatives and programs relating to long term supply.

ACTEW is undertaking a number of infrastructure projects, such as the Enlarged Cotter Dam, due to be completed in late 2011, which incorporate the offsetting of greenhouse gases in their construction and operation.

The ACT participates in national and regional water policy strategies aimed at efficient water use, including the National Water Initiative.

The ACT, as a Murray Darling Basin State, will be subject to the impact of the Murray-Darling Basin Plan, which aims to reduce the total water intake from the catchment, known as the Sustainable Diversion Limit, setting the ceiling of water use available for all uses in the Territory. However, the ACT under its water planning regime already appropriately provides water for the aquatic environment of our watercourses before the actual take is set. Any reduction in the Sustainable Diversion Limit for the ACT may affect the viability and future population growth of the ACT. The ACT might then need to adopt water trading as an option to meet its water supply requirements.

4.3.6 Environment Protection

The ACT's Environment Protection Authority is responsible for regulating activities which have the potential to affect human health and the environment. The principal role of the Environment Protection Authority is to administer the *Environment Protection Act 1997*. The regulation of activities to minimise pollution protects or enhances the condition of natural assets, and can entail, for example, contaminated land remediation and storm water interception. By such means, land is not used inappropriately and opportunities for multiple use in the future are protected.

The Water Regulation Unit in DECCEW administers the *Water Resources Act 2007*, the means by which the Territory sets aside water for the environment as well as for consumptive use. The ACT Government uses an adaptive, science-based, management regime for the use of environmental water to ensure the protection of the ecological values of riverine environments and to safeguard environmental and human health. The long term average water resource of the Territory amounts to about 490 ggalitres *per annum*. A typical allocation for the environment is about 270 ggalitres, leaving 220 ggalitres available for consumptive use.

DECCEW actively supports the Waterwatch program in the ACT and the surrounding NSW region. Waterwatch's main impact has been to foster cross-border partnerships for land

restoration work to foster better water quality in the Upper Murrumbidgee Catchment which benefits the ACT.

4.3.7 Waste

The National Waste Policy, released in March 2010, identified the ACT as the state or territory with the highest rate of waste recycling, at more than 70 per cent of the waste stream. The ACT also participated in the National Litter Index. The 2008-09 National Litter Index provided further evidence that Canberra is a national leader in reducing waste levels, with the second lowest rates of litter in Australia.

The Government will release the draft Sustainable Waste Strategy in the near future. The draft Strategy will outline measures to significantly increase resource recovery from waste locally and to reduce greenhouse gas emissions related to waste management.

The Government has introduced the Plastic Shopping Bags Ban Bill 2010 which will ban the supply of lightweight, single use, plastic bags of 35 microns thickness or less. The ban will take effect from 1 July 2011 with a four month transitional period, after which supply of lightweight plastic bags will be illegal from 1 November 2011. This change will switch use patterns away from using plastic bags derived from non-renewable fossil fuels to alternatives such as biodegradable paper and fibre bags which are made from renewable resources.

4.3.8 The ACT Government's Environmental Programs

The ACT Government has established a broad suite of programs to support the community in improving the ACT's environmental sustainability. These programs aim to achieve reductions in consumption of potable water and energy, and reductions in waste to landfill.

Energy

Home Energy Advice Team Program

The ACT Government provides a range of home energy programs. These include energy audits and advice from the Home Energy Advice Team, and use of a Home Energy Action Kit, which are available for loan from ACT libraries.

The Home Energy Advice Team provides ACT residents free, expert advice on saving money and reducing greenhouse gas emissions, by reducing home energy consumption. The Home Energy Advice Team also provides useful information sheets with tips for keeping cool or warm, insulating the home, and reducing energy consumption on the Home Energy Advice Team website.

The Home Energy Advice Team Energy Audit is a comprehensive home energy audit delivered to home occupiers by the Home Energy Advice Team. The audit takes up to two

hours and residents are provided with a detailed written report. This report includes a list of practical actions that can be taken to make the home more comfortable and energy efficient. The ACT Government also provides a rebate when the priority recommendations in a HEAT Energy Audit report are addressed to the value of \$2,000 or more.

The Home Energy Advice Team Energy Audit is available for houses and semi-detached houses in the ACT that were built before 1996. Homes built after 1996 were constructed to a 4-star home energy rating and are not eligible for the ACT Energy Wise audit and rebate. The dwelling may be owner-occupied or rented, however the rebate is only available to the home owner.

The Home Energy Action Kit enables residents to perform an energy audit of their home and develop their own Home Energy Action Plan. The kits can be borrowed from the ACT Public Library. They contain equipment, instructions and worksheets that will assist residents to find practical ways to save energy around the home and to reduce their energy bills and greenhouse gas emissions.

Outreach Program

The ACT Government's Outreach program identifies high need households and provides them with new energy and water efficient appliances that replace existing inefficient or inoperable appliances.

The Outreach program is being implemented initially as a trial through five non-government community welfare organisations. The program targets low income clients who are tenants of non-government housing.

Energy efficient appliances may be provided to clients, in accordance with their assessed needs. These appliances include refrigerators or washing machines with a 4-star energy rating or above, freezers, heaters (not heat pumps), fans, and dishwashers or air conditioners for clients or carers with a demonstrated medical need.

CitySwitch

With over 70 per cent of Canberra's greenhouse gas emissions generated by stationary sources, including office buildings, the ACT's emissions profile is distinctly different from the national emissions figure of around 50 per cent for this category. This is because the Canberra economy lacks a large industrial sector.

CitySwitch Green Office is a partnership between businesses and government agencies acting as environmental leaders. The program works with office tenants committed to improving their energy efficiency. Any office building tenant can become a signatory to CitySwitch. Under CitySwitch, organisations can reduce their impact on the environment at the same time as making significant savings on energy costs.

Water

ToiletSmart and ToiletSmart Plus Programs

The ToiletSmart Program assists ACT homeowners to replace their single flush toilets with a 4-star water-efficient toilet suite. Participants are also eligible to take advantage of new

ToiletSmart Plus options, including a free home water audit and some additional low-cost water saving fixtures and repairs, provided these are taken up at the time of the toilet installation.

GardenSmart

To help residents make a long-term commitment to sustainable water use habits, the ACT Government offers a free GardenSmart service, valued at \$150. A horticulturist visits residents' homes to assess their gardens and to demonstrate practical ways to use less water.

Rainwater Tank Rebate

The ACT Government offers rebates for the installation of eligible rainwater tanks with a connection to plumbing inside the home (for example to the toilet or washing machine) on residential properties connected to the ACTEW Corporation's water supply network. Where there is an existing rainwater tank, the ACT Government offers a rebate on the cost of connecting it to plumbing inside the home.

Waste

ACTSmart Business and ACTSmart Office

ACTSmart Business assists ACT businesses to put more efficient recycling and waste management into action. The program provides a step-by-step best practice guide to waste management as well as advice and assistance to establish their waste management system, conduct waste audits and staff education. Annual ACTSmart Business accreditation provides customer recognition of a business's waste management achievements.

Reducing the amount of waste sent to landfill can have direct benefits for businesses through:

- reducing costs – sending waste to a recycling centre is 50 per cent cheaper than tipping at the landfill;
- reducing impacts on the environment;
- helping meet corporate environmental commitments;
- providing customer recognition of achievements through annual accreditation; and
- advertising of the ACTSmart Business or Office brands to the wider community.

The ACT Government's ACTSmart Office Program assists offices to put more efficient recycling and waste management into action. The program is available for Government and non-Government office buildings, including multi-tenanted buildings, in the ACT. Building managers, facilities managers, building owners or tenants can participate in the program.

Natural Resource Management

Community Partnership Funding

In the 2009-10 ACT Budget, the Government announced community partnerships for sustainability and the environment, providing funding of \$1.34 million over four years to support the operation of the Canberra Conservation Council Inc (\$544,000); Canberra Sustainability and Environment Resource Centre Inc (\$410,000) and SEE-Change ACT (\$390,000).

During 2010-11, the ACT Government is focusing on developing enhanced relationships with these organisations to establish collaborative opportunities that assist the delivery of Government priorities for the environment and sustainability.

ACT Natural Resource Management Council

DECCEW supports the operation of the ACT Natural Resource Management Council. The Council recommends and manages strategic investments in projects that maintain, protect and enhance natural resources in the ACT as part of a sustainable future.

Because its charter crosses land, water and biodiversity issues in an integrated fashion, the Council also provides leadership and guidance on natural resource management in the ACT. It promotes and brokers the development of partnerships across all sectors to deliver natural resource management projects that bring together the strengths of individual organisations to achieve integrated outcomes at larger scales.

ACT Natural Resource Management Plan

The Council released its ACT NRM Plan, *Bush Capital Legacy*, following extensive community consultation in October 2009. The plan brings together community and government aspirations around targets to improve and sustain the condition of our water, biodiversity and land. Actions are also detailed for developing the capacity of the community to contribute to achieving these targets.

While the Plan is not a statutory document, it has helped shape the development of natural resource management policy and the choice of indicators for the next ACT State of the Environment Report.

Caring for our Country Investment

The ACT Government manages, with the Natural Resource Management Council, the delivery of the Australian Government's Caring for our Country initiative in the ACT. This program is complemented by ACT Government funding. Between 2009-10 and 2012-13, the ACT will receive \$1.359 million a year in funding to support regional natural resource management projects.

A further \$1.9 million over four years has been provided by the ACT Government to complement the Australian Government investment. This funding supports the operation of the ACT NRM Council and a range of activities in the Department of Environment, Climate Change, Energy and Water, the Department of Territory and Municipal Services. It also supports community partners to enhance the natural assets of the ACT and the capacity of the community to care for these assets.

ACT Environment Grants

The 2010-11 ACT Environment Grants, announced on 31 August 2010, provided funding assistance to a number of community groups undertaking projects directly focusing on reducing the ACT's ecological footprint:

- ACT Electric Vehicle Council - ACT Electric Vehicle Open Day (\$16,000);

- Chorus of Women - Canberra Conversations – community engagement events on topics relating to climate change and sustainability (\$12,000);
- SEE-Change - 2020 Vision: How Will We Change? – education project to encourage young people to develop their vision for the ACT in 2020, to include road shows to be taken to schools (\$10,000); and
- Greening Australia Capital Region What Farmers Want forum - forum for landholders, bringing together farmers, policy officers, researchers and extension workers focusing on what farmers need to be more sustainable in their use of the land (\$8,000).

4.4 Spatial planning

The path of Canberra's development has not been accidental. It has been guided by a series of plans over the last century that have determined the form of the city through various land use patterns.

Canberra's urban planning commenced with the design competition that saw Walter Burley Griffin and Marion Mahoney's design selected and Canberra's first land use plan established in the early 1900s. Since then, there have been a number of revisions to the original concept as political, economic and social circumstances have changed. Key points in Canberra's planning history include:

- 1960s – *The Future Canberra*: this plan identified discrete new towns (or districts, such as Belconnen and Woden) that would be separated from each other by hills, ridges and rivers. Canberra's retail hierarchy of town, group and local centres was established in this plan, as was the concept of decentralising employment.
- 1970s – *Tomorrow's Canberra* (The 'Y' Plan): this plan reinforced the new towns structure, but linked the separate towns with two linear corridors, creating a Y-shape, that would strengthen their metropolitan connections.
- 1980s – *The Metropolitan Policy Plan: Development Plan* which confirmed the land use patterns established in the earlier plans and looked forward to the next twenty years of development.
- 2000s - the *Canberra Spatial Plan 2004* recognised the need for limiting suburban expansion, the protection of the natural environment and promotion of higher density housing and employment in and around centres and along transport corridors in order to become more sustainable. This strategy is typical of the 'compact city' concept.

The term 'land use pattern' refers to the spatial configuration of land uses - such as residential, commercial, industrial and rural uses - across an area. Put simply, land use pattern is how the spatial functions of the city are placed and how they relate to each other.

In the main, land use patterns within the ACT are framed by government policy (both Commonwealth and ACT) and the market responses to those policies. Government policy affects the relationships between these different land uses.

Land use patterns have a direct effect on:

- equitable access to services such as health, education, recreation and retail;
- infrastructure provision;
- access to public transport and the need for private transport;
- economic diversity;
- access to parks and outdoor spaces;
- noise and other pollution;
- the environment;
- appropriate density and diversity of housing; and
- our sense of place and social interaction.

Ultimately, land use patterns will affect a city's ability to meet its environmental, social and economic sustainability goals. Increasing the intensity and mix of activities in targeted areas such as town and group centres, large island sites and transport corridors is vital to creating a more sustainable city that can respond to a range of issues such as climate change, housing affordability, and the efficient provision of infrastructure and services.

A feature of Canberra's planning has been the integration of transport and land use. In the mid - 1960s the growth strategy adopted for the city was based on the development of new towns each with a major town centre. The strategy identified a centres hierarchy with Civic to serve as the prime centre for commercial, entertainment and facilities and services requiring a metropolitan catchment. The development of town centres would provide employment, retailing, community and entertainment services and facilities to the residents of the new towns. Peripheral roads would carry large volume inter-town traffic, a public transport right-of way linking the town centres and industrial estates located on the edge of urban areas.

The aim of the strategy was to 'to reduce the length and cost of the journey to work; to minimise traffic congestion; to reduce public investment, and to provide opportunities for people to live and work in the same town'.

Employment dispersal, particularly to town centres in each of the new towns, was a fundamental objective. The rationale for employment dispersal to centres was that it provided major transport benefits, including shorter journeys to work, higher use of public transport, reduced traffic congestion, opportunities for multi-purpose trips, lower fuel, parking and transport infrastructure requirements. Employment at the centres reinforces the trading position of businesses in the centres, while those employed at the centres have the opportunity to undertake trips to shops, financial services, libraries and gymnasiums on foot. Employment dispersal was also associated with the growth of the industrial areas of Fyshwick, Hume and Mitchell and the mixed use areas in Deakin and Bruce.

Given the nature of Canberra's employment structure, the location of office employment was particularly important in the establishment of significant employment in the town centres in Woden, Belconnen and Tuggeranong.

At the neighbourhood level, local centres, generally associated with nearby government primary schools, were provided to meet the day to day convenience needs of the community. Group centres, serving a 'group' of neighbourhoods were developed to primarily meet the weekly grocery shopping and business needs of the community and were often associated with a government high school.

The legacy of past planning is that Canberra has an urban structure being advocated by researchers such as Gray, Gleeson and Dodson as a structure readily able to respond to the issues now facing the development of Australian cities.

Since the 1960s, dwelling occupancy rates have fallen from 4 persons per dwellings to 2.54 persons per dwelling in 2006, in response to factors such as lower fertility, economic prosperity and increased separation and divorce. Dwelling occupancy is expected to continue to fall to as

low as 2.25 person per dwelling by 2056, although recent trends in fertility, the economic downturn and high housing costs may reduce the rate of the decline.

Residential consolidation policies were introduced in the Territory Plan in 1993 to place additional population close to employment to reduce the amount of travel and car use, to make better use of existing infrastructure and to widen housing choice.

By 2006, 75 per cent of Canberra's population lived in detached dwellings. However, over the past 15 years, some 45 per cent of dwelling commencements have been 'other dwellings' (such as apartments/flats) and 40 per cent of dwelling commencements have been in established areas. The changing demand has also enabled the release of an increased number of sites at town centres for residential development.

The provision of additional housing close to existing employment centres has reduced the level of travel required and has contributed to the reversal of the decline in population in the older areas of Canberra. The benefits of urban consolidation are illustrated in Turner, a suburb that has experienced substantial redevelopment. The number of dwellings in Turner doubled between 2001 and 2006. Its location adjacent to Civic, where employment grew by over 9000 during that period, contributed to an increase in the proportion of residents walking, bicycling or using public transport from 9 per cent to 37 per cent. The increase in walking to work was most pronounced, rising from under 3 per cent to 24 per cent. In comparison, the average Canberra share of trips to work using public transport, cycling or walking was under 12 per cent.

Canberra's urban structure exhibits the characteristics of a city that will need significant adjustment to withstand the uncertainties of climate change and declining oil supplies. Canberra's development until the mid-1990s was based on meeting the population's preference for low density living facilitated by the mobility provided by the car. Developing a more compact city requires working with decentralisation trends, the gradual increase in demand for medium and higher density housing forms and the population's lifestyle choices. These lifestyle choices shape daily activity patterns and are influenced by household characteristics including income, size, structure, tenure and age and the households' attitudes and behaviour in regard to energy use. While changes in urban form and structure can provide the opportunity for households to reduce energy consumption, the objective can only be achieved if households change their behaviour.

The Canberra Spatial Plan, released in 2004, began to work towards some of the necessary changes required to make Canberra a more compact and sustainable city. However, in the six years since the Spatial Plan was delivered, the planning context has continued to change. Increasingly, the problems we are facing as a society are 'wicked' problems. Wicked problems are problems that are multi-faceted and multi-causal, socially complex, not easily solved, involve changing behaviours, involve multiple stakeholders, and are not the sole responsibility of one person, group or agency. They tend to be collective problems that have many interdependencies, potential unforeseen and unintended consequences and no clear solution¹⁰. **Error! Hyperlink reference not valid.** Some of these wicked problems

¹⁰ Australian Government, Tackling wicked Problems: A Public Policy Perspective, pp3-5.

include environmental degradation, waste, housing affordability, climate change, increasing energy costs and population growth.

The Sustainable Future Program, an initiative sponsored by the ACT Government for 2008/9 to 2010/11, is making a substantial contribution to this commitment through the development of land use planning strategies and policies that will:

- make the urban structure and form more resilient to change;
- minimise redundancy and maximise adaptability;
- promote actions that will abate climate change; and
- reinforce Canberra's amenity and the community's open space and democratic values.

A number of outcomes are being achieved, including increased community awareness of the sustainability issues from an urban development and land use perspective; changes to current practices through planning legislation, and improvements to strategic planning documents.

The program commenced with a series of topic workshops with community and experts. This exchange was documented in a report that was then released for public comment, with additional capturing of community views through a survey and web based 'comment box'. These contributions were analysed and have influenced future work.

Following the completion by consultants of targeted investigations, a review of the residential codes in the Territory Plan is resulting in draft Territory Plan Variations. These are currently under consideration by Government and the community.

Another project is the evaluation of the Canberra Spatial Plan, which was released in 2004. This project will support the refinement of strategic planning actions to achieve the ACT Government's policy agenda on affordability, liveability and sustainability.

The Spatial Plan evaluation project has a number of components:

- a 'report card' on what has been implemented since 2004 of the actions nominated to achieve the strategic directions;
- investigation of the changed policy and governance structures since 2004 that might affect implementation of the actions and the strategic directions;
- research into the 'wicked problems' that can be addressed through spatial planning, particularly the likely impacts of climate change for the ACT and the possible adaptive or mitigation measures; and
- consultation with government and key stakeholders.

The outcomes from the above will be used to shape a set of draft directions for future spatial planning that will then be tested with the wider community before informing an amendment to the Planning Strategy for the ACT.

The evaluation of Canberra's current Planning Strategy, including any proposed amendments to the plan in the future, is underpinned by the Local Government and Planning

Ministers' Council National Planning System Principles and the Council of Australian Governments' criteria for capital city strategic planning.

The National Planning System Principles were released in December 2009. They were prepared by the Queensland Government on behalf of the Local Government and Planning Ministers' Council. In endorsing these principles, the Council of Australian Governments has established a "comprehensive and consistent set of principles that the Australian, state, territory and local governments collectively and collaboratively agree to follow"¹¹.

The National Planning System Principles are grouped into three categories: purpose principles (why we plan), system principles (how we should plan) and issues principles (what issues or problems should be addressed through planning).

Of particular relevance are the purpose principles, which state that in considering sustainability in our strategic planning systems, we should have regard to intergenerational equity, prudent use of non-renewable resources, the sustainable use of renewable resources and the precautionary principles.

Furthermore, Canberra's strategic planning system is shaped by the establishment of national criteria for capital city strategic planning systems, which were agreed to by the Council of Australian Governments in December 2009. The objective of these criteria, which form a part of the Council of Australian Governments broader microeconomic reform agenda, are to "ensure Australian cities are globally competitive, productive, sustainable, liveable and socially inclusive and are well placed to meet future challenges and growth".¹²

In agreeing to this reform area, all jurisdictions must have in place strategic plans for their capital cities that meet these criteria by January 2012. In the future, the Commonwealth will link future infrastructure funding decisions to meeting these criteria.

¹¹ National Planning Principles, p6.

¹² COAG communiqué 7/12/09.

4.5 Infrastructure planning

On 1 June 2010, the ACT Government released the first in an annual rolling program of medium-term infrastructure plans. The *ACT Government Infrastructure Plan 2010* provides an important link between the capital works and infrastructure priorities the Government's long-term objectives. The *ACT Government Infrastructure Plan 2010* is a 10-year plan which builds on the preliminary *An Infrastructure Plan for the ACT*, released in 2008.

The Plan addresses infrastructure priorities over the next ten years, focusing on: Health; Education and Training; Transport; Housing and Community Services; Municipal Services; Justice and Community Safety; Land Development and Planning; Water; Energy; and Culture and the Arts.

The Plan also outlines the ACT's infrastructure planning and prioritisation framework, which consists of:

- Direction Setting - what do we want Canberra to look like in 10 or 20 years time (as outlined in the Canberra Plan) and how do we get there (the Government's strategic policies).
- Strategic Planning – integrated service and infrastructure planning.
- Analysis and Approvals – business cases, feasibility studies and the annual budget process.
- Delivery and Management – procurement and asset management.

It has been informed by the views of the community and industry, through the Government's budget consultation strategy, and also through high-level community and industry roundtables. In development of the 2011 Plan, the Government will hold further community and industry infrastructure roundtables in November 2010 and in February/March 2011, and will also draw on the current *Canberra 2030 -Time to Talk* consultation.

4.6 Sustainable Transport

The Sustainable Transport Plan (2004) established a number of long-term goals for the ACT, including development of a more accessible transport system, improving efficiency through better pricing and resource allocation, and changing community attitudes towards non-car sustainable transport. The Government's target established by the Sustainable Transport Plan is to increase the use of walking, cycling and public transport for trips to work from 13 per cent in 2001 to 20 per cent by 2011 and to 30 per cent by 2026. Achieving the 2026 mode share targets would reduce the resource use in relation to transport, ecological footprint and transport emissions by 14 per cent (relative to 2026 business as usual estimates).¹³

In addition, the emission reductions resulting from the Sustainable Transport Plan will make a significant contribution to meeting the Government's legislated emissions reduction targets. The overall contribution of the transport sector to emissions reductions will also be reviewed during 2010-11 as the Government develops new Transport for Canberra policies - including public transport, parking, cycling and walking and infrastructure strategies. The *Transport for Canberra* policies will be released following the Government's *Canberra 2030 - Time to Talk* community conversation in conjunction with urban planning, land use and climate change policy responses.

¹³ Calculation is based on the reduction of vehicle travel. Assumed an average emission of 0.28 kilograms of carbon dioxide equivalent per vehicle-kilometre travel

4.7. Social policy overview

The 2004 Canberra Social Plan

The *2004 Canberra Social Plan* sits under the Canberra Plan and is the part of the ACT Government's strategic planning framework that articulates the vision for the people of Canberra. The *Canberra Social Plan* is underpinned by a set of sub-plans and strategies that detail the ways in which various sectors of the community can participate in, contribute to and benefit from living in the Canberra community.

The *Canberra Social Plan* is the ACT Government's blueprint for creating a place *where all people reach their potential, make a contribution and share the benefits of our community*.

To achieve this vision the *Canberra Social Plan* identifies seven priorities supported by goals and specific actions. Since 2004 the ACT Government has implemented the *Canberra Social Plan* commitments. The ACT Government has reported against the 2004 Plan priority actions and targets every two years. These biennial reports are available at: <http://www.cmd.act.gov.au/policystrategic/socialplan> The ACT Government investment in social infrastructure and quality services, grounded by a strong evidence base and understanding current and future demand, has resulted in significant achievements.

2011 Canberra Social Plan

Chief Minister's Department has been developing an update to the 2004 *Canberra Social Plan*. The update, scheduled for release in early 2011 will retain its ongoing focus on health, education and municipal services and commitment to well-being, safety and equity in the community. Importantly, the update will respond to a number of current and emerging pressures and issues, to map a way forward for the future.

The ACT Government's forward social policy agenda will need to take into account a number of contextual issues - a growing population, an ageing demographic and the possible longer term impact of the *Global Financial Crisis*, particularly on unemployment and household debt. In addition, the social impacts of emerging issues, notably climate change and water security, also need consideration. Research commissioned by the Chief Minister's Department in 2008 shows that climate change will have disproportionate consequences for vulnerable and low income households.

Canberra's role as a regional centre for health, aged care, education, employment and business is shaping a longer-term regional approach to the planning of service infrastructure and delivery. The ACT provides many important services and opportunities for residents in south-east New South Wales, in particular, transport, education, health, retailing, tertiary industry and cultural facilities. The strong growth of the surrounding region will increase economic and business opportunities in the ACT, but is also likely to present a range of planning, service delivery, infrastructure provision, and budgetary challenges.

Looking to the future, the ACT Government will meet these challenges and strike the balance to support sustainable growth for the community and continuing to invest in an inclusive community. This is about understanding future demands and the implications for our service footprint into the future; investing in social infrastructure; and strengthening ways of working that have a robust evidence base.

Focus of the 2011 *Canberra Social Plan*

Key community engagement activities have included meetings with key stakeholder groups, across government consultation, online forums and community forums and a number of face to face meetings in 2009 and early 2010.

Feedback from community engagement activities emphasised that social priorities for the future build on the strengths of our strong and vibrant community; focus on addressing disadvantage for the most vulnerable in our community; and maintain a vision where everyone has the opportunity to belong, participate and contribute.

The foundation of the *Canberra Social Plan* is an inclusive community. In the ACT, community inclusion is understood as having two dimensions: building cohesion (the experiences of connection with people and the place we live) and addressing disadvantage (an ongoing commitment to addressing the causes and consequences of entrenched disadvantage).

The 2011 *Canberra Social Plan* will have a focus on building an inclusive community and will incorporate a community inclusion initiatives; draw on the views and leadership within the community; continue to build the evidence base; and report to a Community Inclusion Committee of Cabinet on progress. This work builds on advice, community engagement and research by the Community Inclusion Board between 2004 and 2009.

The ACT Government's community inclusion policy agenda includes initiatives to target across agency effort to address entrenched disadvantage. This targeting is also an opportunity to continue to refine the community inclusion principles – as recommended to government by the Community Inclusion Board – of leadership, engagement and collaboration.

The three initial areas for targeted effort are long term unemployment, homelessness and the needs of vulnerable families. Additional areas will be added to this action plan in time, for example, integrated across agency responses to throughcare and aftercare for prisoners and their families.

4.8 Health Sustainability Strategy

ACT Health has developed a Sustainability Strategy to provide a roadmap for collaborative action between ACT Health and all stakeholders, clients and staff to deliver a sustainable health system into the future.

The Strategy supports ACT Health in meeting the following requirements:

- delivering a sustainable Health service;
- achieving targets under the ACT Climate Change Strategy 2007-2025;
- attracting and retaining staff; and
- complying with the Building Code of Australia.

The Sustainability Strategy aims to:

- realise the benefits of sustainability;
- optimise lifecycle costs;
- deliver a platform for stakeholders engagement;
- develop replicable capacity within the department for tracking future strategic challenges;
- be incorporated into the ACT Health corporate plan and align with ACT Government plans;
- leverage off the existing seven organisational focus areas for ongoing development of actions; and
- provide direction to achieve the ACT Health sustainability vision.

The Sustainability Strategy is being embedded in seven focus areas:

- models of care;
- buildings and infrastructure;
- the digital health environment;
- transport;
- regulatory environment;
- workforce; and
- partnerships & external service delivery including adaptation.

The Strategy Action Plan will embed sustainability as a key objective in the Corporate Plan and address ACT Health's responsibilities under the "Weathering the change" Action Plan 2.

4.9 Sustainability in education

The Government is conscious of the need to improve the environmental sustainability of educational infrastructure in the ACT. The Government has been proactive in ensuring it has appropriate policies and practices for incorporating environmentally sustainable design features into the planning and design of new schools and in the retrofitting of existing buildings.

The Department is aiming to have carbon-neutral schools by 2017 as part of the ACT government '*Weathering the Change*' strategy. The Department has allocated \$1 million for environmental sustainability projects from the annual school capital upgrades budget. All new ACT public school buildings are being designed to meet the Green Building Council of Australia 5 green star rating. As a result, new schools including Gungahlin College, the P-10 school at Kambah and Harrison High School will incorporate energy and water-efficient design features. A new environmental centre at Gold Creek will achieve six green stars, the first 6-star-rated facility at an Australian school.

The Department has taken up opportunities for Australian and ACT government funded programs for installation of solar panels and water tanks including both the National and ACT *Solar Schools* programs and the ACT Public Schools Water Tanks program.

Innovative designs at new schools include the sharing of facilities with the broader community (such as libraries, performing arts centres and ovals) to ensure efficient use of buildings and recreational space. Site design and orientation are carefully considered to optimise use of energy and water and to ensure buildings are attractive. School buildings in the ACT have long considered flexible design to enable infrastructure and land to be adapted to remain useful when educational and community uses change over time.

The Government is fulfilling an election commitment to instal artificial turf surfaces for sports fields to ensure safe surfaces to encourage fitness without needs for irrigation. The Government has recently installed the largest artificial turf sports field in the ACT at Gold Creek school.

Local area planning is being instituted by the Government to ensure optimal provision of educational services across the ACT, including consideration of sustainable transport development.

4.10 Training for sustainability

Having a workforce that is appropriately trained and skilled will be essential to the ACT pursuing its sustainability goals. Skills in design and construction, for example, will be needed to address to reduce energy requirements and adapt to changing climate.

Canberra Institute of Technology is addressing this need. If its four hundred qualifications, 60 per cent include sustainability subjects or competencies.

Canberra Institute of Technology offers five specific programs with an environmental focus: Certificate IV in Renewable Energy; Course in Renewable Energy – Statement of Attainment; Diploma of Ecology and Environmental Management; Diploma in Sustainability and Sustainable Building Practices – Statement of Attainment.

Canberra Institute of Technology's Bruce Campus features a Sustainable House, funded by the ACT Government, providing training in retrofitting existing housing stock for sustainability, as well as a Sustainable Skills Training Hub, funded jointly by the ACT and Australian Governments. The Sustainable Skills Training Hub is a pioneering purpose-built facility for hands-on training in emerging sustainable technologies for both residential and commercial sectors.

4.11 Affordable Housing

The provision of affordable housing is one of the Government's highest priorities and an important element of social sustainability. In response to affordability concerns in the ACT the Government launched the Affordable Housing Action Plan 2007 on 12 April 2007. Phase 2 of the Affordable Housing Action Plan was launched in August 2009 and focussed on affordable housing for the aged as well as homelessness initiatives.

The ACT Government has also recently convened a Housing Affordability Roundtable with the community and private sectors to engage in fresh thinking on the provision of affordable housing to:

- those struggling in the private rental market;
- key workers who gain short term employment in Canberra; and
- Short-term and visiting students.

Phase I of the Affordable Housing Action Plan has 63 objectives, while Phase 2 added an additional 21 objectives. As at September 2010, 49 objectives have been fully implemented with many being monitored and refined on an ongoing basis and 13 have been partially implemented.

The Affordable Housing Action Plan is working. The latest Real Estate Institute of Australia measure of Housing Affordability shows that in June 2010, Canberra remained the most affordable jurisdiction in Australia in June 2010:

- For Home Purchasers, the proportion of income needed to meet mortgage payments is 18.0 per cent compared to a national average of 34.6 per cent and a NSW figure of 38.0 per cent.
- For renters, the ACT has the lowest proportion of family income needed to meet rent payments of all states and territories (16.5 per cent compared to a national average of 25.1 per cent).

The Housing Industry Association has released their latest measure of affordability which showed an improvement, up 6.6 per cent in the June 2010 quarter (following the 0.5 per cent rise in the March 2010 quarter).

Of the thirteen jurisdictions in which affordability is measured, the ACT was only one of three regions to record an improvement, and the only region to record two consecutive improvements.

The Affordable Housing Action Plan is also incorporating significant environmental sustainability elements. Universal design guidelines form part of the Affordable Housing Action Plan. The guidelines will be introduced to ensure dwellings are of construction type and design that facilitate the changing needs of people as they age, allowing, for example appropriate doorways, ramps, handles, stairs. This ageing-in-place approach is considered to have major economic and social benefits.

In addition:

- The estates of Wright and Coombs at Molonglo feature a range of sustainability initiatives, identified by a sustainability strategy commissioned by the LDA, for both individual blocks and within each suburb.
- The estates of Wright and Coombs incorporate water sensitive urban design principles through the use of swales, bioretention basins, water quality control ponds, tree pits and rain gardens for street trees.
- Non-potable water will be used to irrigate public open space.
- New homes will be required to save water through the use of rainwater tanks or grey water recycling, consistent with the Territory Plan.
- The LDA has maximised the solar passivity of all blocks, within the constraints of topography and major roads.
- A riparian strategy is being prepared as a collaborative project between LDA, ACTPLA and TAMS.
- Higher density developments will occur close to major transport routes, which include dedicated public transport and cycle lanes.
- The management of construction waste to maximise processing and reuse on site as well as minimising the amount of waste going to land fill.
- Preliminary planning for Coombs includes a community garden.

Housing ACT

The ACT Government's public housing through Housing ACT is an important element of providing affordable housing within the ACT. Housing ACT has implemented initiatives which aim to improve the energy efficiency of the public housing portfolio.

Housing and Community Services is responsible for managing some 11,500 properties used for public housing. In addition to public housing tenants, support is provided to people with disabilities or community organisations that provide support to public housing tenants.

The average age of the portfolio is thirty years old, with almost a quarter of the portfolio over forty years old. Properties of this age, design, materials, methods of construction and poor orientation are generally not energy-efficient and have a poor overall energy rating. In 2007, as part of the *Weathering the Change Action Plan*, the ACT Government committed \$20 million over ten years for energy efficiency measures in public housing.

A ten year Action Plan focuses on building fabric improvements (through wall and ceiling insulation and draught seals) and high efficiency hot water systems and heating appliances for new and existing dwellings. A photovoltaic electricity generation system has been installed at two apartment complexes. New hot water systems are 5 star gas, electric heat pump or electric boosted solar hot water systems. Hot water systems are being replaced

either on failure or on vacancy. Many of the properties in apartment complexes are not suited to the installation of gas or solar hot water systems.

The properties constructed under the Nation Building and Jobs Plan initiative have an energy rating in excess of six stars, are fitted with efficient energy appliances (eg solar hot water heaters) and have water efficiency improvements (eg separate grey water plumbing provisions and rain water tanks).

The Government also allocated \$500,000 over two years for water efficiency improvements to public housing, including dual flush toilets, water saving shower heads and flow retardation devices.

Improving the energy and water efficiency outcomes of public housing dwellings achieves a number of objectives:

- It leads to a reduction in energy use and energy costs by public housing tenants (who are among the least well-off in the community), while maintaining acceptably comfortable living conditions;
- Reducing greenhouse gas emissions associated with household energy consumption;
- An increase in thermal comfort for the least well off households with little or no increase in greenhouse gas emissions or electricity or gas costs; and
- Alleviation of chronic health conditions caused or exacerbated by living in houses that are not adequately heated in winter, for those tenants that may be in fuel poverty.

Housing and Community Services issues a newsletter to public housing tenants every three months. This serves as a means of providing useful information to tenants about energy saving measures that they can implement.

The Department of Disability, Housing and Community Services also administers a range of concessions which aim to improve the affordability of essential services. Holders of the following cards are eligible for a rebate on the cost of electricity and gas: Centrelink Pensioner Concession Card, Centrelink Low Income Health Care Card and Veteran's Affairs Pensioner Concession Card.

5. Summary

In summary, there is a wealth of current and planned initiatives in the ACT designed to reduce the environmental impact of human activity and contribute to achieving the Government's green house gas emission targets.

Drawing from these, and listening to the community through consultation and engagement activities such as the *Canberra 2030 – Time to Talk*, a number of principles emerge which should guide our further actions. These principles are:

- ❖ wherever possible, use existing investment in infrastructure to maximise utilisation rates in preference to building new facilities.
- ❖ Encourage food production in proximity to population centres (market and community gardens, farmers markets).
- ❖ Pursue urban form that is sustainable across all three dimensions of sustainability (compact city, low carbon emissions balanced with biodiversity and green space).
- ❖ Continuation of waste, energy, transport and other related policy initiatives that will contribute to the ACT reaching its carbon emissions targets.
- ❖ Continue to work with surrounding New South Wales Councils in achieving a more sustainable outcome, acknowledging that the growing New South Wales region surrounding the ACT will have significant impact on our services, infrastructure, demand for goods and overall environmental footprint.
- ❖ Engage with the Federal Government as the largest employer and economic sector, on its contributions to a more sustainable Canberra.
- ❖ Continue to monitor and report on key environmental indicators.
- ❖ Educate the community on ways of reducing our 'footprint' – in particular the level of purchased but unconsumed resources.

Attachment A

Species and ecological communities listed as threatened under the Nature Conservation Act 1980

Vulnerable species

Scientific name	Common name
<i>Delma impar</i>	Striped Legless Lizard
<i>Gadopsis bispinosus</i>	Two-spined Blackfish
<i>Euastacus armatus</i>	Murray River Crayfish
<i>Perunga ochracea</i>	Perunga Grasshopper
<i>Melanodryas cucullata</i>	Hooded Robin
<i>Lathamus discolor</i>	Swift Parrot
<i>Polytelis swainsonii</i>	Superb Parrot
<i>Climacteris picumnus</i>	Brown Treecreeper
<i>Grantiella picta</i>	Painted Honeyeater
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll
<i>Daphoenositta chrysoptera</i>	Varied Sitella
<i>Lalage sueurii</i>	White-winged Triller
<i>Hieraaetus morphnoides</i>	Little Eagle
<i>Aprasia parapulchella</i>	Pink-Tailed Worm Lizard
<i>Calyptorhynchus lathami</i>	Glossy Black Cockatoo

Endangered species

Scientific name	Common name
<i>Gentiana baeuerlenii</i>	a subalpine herb
<i>Prasophyllum petilum</i>	a leek orchid
<i>Rutidosia leptorhynchoidea</i>	Button Wrinklewort
<i>Swainsona recta</i>	Small Purple Pea
<i>Synemon plana</i>	Golden Sun Moth
<i>Tympanocryptis pinguicollis</i>	Grassland Earless Dragon
<i>Macquaria australasica</i>	Macquarie Perch
<i>Maccullochella macquariensis</i>	Trout Cod
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby
<i>Xanthomyza phrygia</i>	Regent Honeyeater
<i>Pseudomys fumeus</i>	Smoky Mouse
<i>Muehlenbeckia tuggeranong</i>	Tuggeranong Lignum
<i>Lepidium ginninderrense</i>	Ginninderra Peppercreese
<i>Bidyanus bidyanus</i>	Silver Perch
<i>Pseudophryne pengilleyi</i>	Northern Corroboree Frog
<i>Arachnorchis actensis</i>	Canberra Spider Orchid
<i>Corunastylis ectopa</i>	Brindabella Midge Orchid

Schedule 3 Endangered communities

Name of community	Description
Natural Temperate Grassland	A naturally occurring grassland of the temperate zone, dominated by native perennial tussock grasses, with associated native herbs and native fauna.
Yellow Box/Red Gum Grassy Woodland	A naturally occurring woodland of the temperate zone, in which Yellow Box co-occurs with Blakely's Red Gum. It includes the species rich understorey of native tussock grasses, herbs and scattered shrubs, together with a large number of native animal species.