



BACKGROUND PAPER 11: Resource consumption

What was said during Time to Talk Canberra 2030

During Time to Talk the community expressed considerable concern about the issue of resource consumption. Energy and water were the key concerns and the outcomes report described concern on these issues as ‘universally shared’.

Definition of issue

Resource consumption is an umbrella term for the many different ways and rates that humans consume the products of the natural world. Some resources are finite, meaning that once they are used there are none left, such as fossil fuels and land. Other resources are renewable, such as wind and solar energy.

This resource consumption has been formalised into a metric called the ecological footprint. ‘The ecological footprint is a measure of how much biologically productive land and water an individual, population or activity requires to produce all the resources it consumes and all the wastes it generates (using prevailing technology and resource management practices). The measure indirectly reveals the magnitude of consumption of food and manufactured products.’¹

Role of strategic land use planning

Strategic planning needs to assist people to live responsibly by consuming fewer natural resources. This applies to many resources, but particularly land, water and energy.

Energy and water supply are the responsibility of the ACT Government. Land use and planning can influence the amount used through the urban form and structure of the city.

What does the ACT Planning Strategy need to consider?

The Sustainable future program researched multiple aspects of resource efficiency that concluded our current resource consumption rates are unsustainable. To use a banking metaphor, we are living on credit. This conclusion is also supported by the Office of the Commissioner for Sustainability and Environment 2009 report on Canberra’s ecological footprint.² This report’s key findings were:

- the average ACT resident’s ecological footprint in 2008-09 was 9.2 global hectares. It’s increased by 8% in five years and nearly 25% in ten years
- our ecological footprint was 13% above the Australian average and nearly 3.5 times the global average
- Canberrans used 14 times the land area of the ACT to support our lifestyles
- if everyone in the world lived in the same way as the average Canberran, we would need five Earths to give us enough land (and surface water) to provide our resources and absorb our wastes.

To give a wider context, Table 1 below compares the demands on resources from different nations with populations of high, middle and low incomes.

Table 1: Ecological footprint and biocapacity

	Total footprint	Biological capacity	Ecological deficit or capacity
World	2.2ha/person	1.8ha/person	-0.5
High income	6.4	3.3	-3.1
Mid income	1.9	2.1	+0.2
Low income	0.8	0.7	-0.1

Source: Global Footprint Network, <http://footprintnetwork.org>

This table shows the current level of global consumption already exceeds what the planet can naturally replenish. Furthermore, these rates of consumption show no sign of abating. ‘In 1961 the world used only 49% of its biological capacity, and therefore showed ecological reserves, but in 2001 it used 121% of capacity, an ecological deficit of 21%. In 2003 the deficit was over 22%.’³

Table 2 shows the highest consuming components of the ACT’s footprint. Generally, higher consumption is correlated to greater housing wealth.⁴ As Canberrans have a high standard of living, they consume more.





Table 2: Items that contribute the most to Canberra's ecological footprint

Item	Footprint (gha/person)	% of total
Electricity supply	1.07	12
Retail trade	0.51	6
Residential building construction	0.56	6
Hotels clubs restaurants	0.44	5
Air space and transport	0.35	4
Petrol	0.32	3
Wooden furniture	0.25	3
Ownership of dwellings	0.24	3
Other food products	0.29	3
Clothing	0.21	2
Electronic equipment	0.20	2
Finished cars	0.16	2
Education	0.15	2
Non building construction	0.14	2
Non residential building const	0.14	2
Gas supply	0.14	2
Wheat	0.12	2
Beef cattle	0.17	2

Source: Ryan S (2011) *Buying Choices for a More Sustainable Canberra*. Report for the ACT Commissioner for Sustainability and the Environment. ACT Government, Canberra.

A planning strategy cannot influence personal buying preferences, but driving to the shops to make purchases is often a high part of the footprint.⁵

The most recent estimate from the Bureau of Transport and Regional Economics confirmed the increased trend of driving. 'Among five major capital cities, average quarterly growth rates of capital city VKT (vehicle kilometres travelled) [between 1965 and June 2010] was highest in Brisbane, followed by Perth, Melbourne, Sydney and Adelaide. In the three small capital cities, average quarterly growth rates were much higher in Darwin and Canberra compared to Hobart.'⁶

The promotion of mixed use and higher density development could lessen the length of trips. The link between transport and land use is covered more fully in the background papers on transport and urban form.

Urban development and land

Research by the Grattan Institute shows that population density in Australian cities is very low by world standards. For example, Melbourne and Sao Paolo are roughly the same size but Sao Paolo has sixteen million more people.⁷ This is often called land take per person, and is a measure of all urban land uses, including space for roads divided by the resident population.

The ACT Government research paper Urban Form Analysis compared the resource consumption of parts of four Canberra

suburbs to three international best practice examples.⁸ The best performing of the four Canberra suburbs on land take per person was 89m² above Hannover Kronsberg in Germany and 171m² above Dockside Green in Canada.

Further research examined the energy and water consumption of four case study areas — a town centre, group centre, local centre and outer suburb⁹ — to explore implications of climate change. Using urban design and form alternatives existing high levels of consumption can be reduced by targeted infill in centres and suburban areas.

Through planning, the population density can be increased in key locations such as town centres. This can enable more efficient localised energy generation. In low density suburban areas, improving the energy efficiency of each dwelling is more efficient in reducing resource consumption than rebuilding a new house.¹⁰ There are also nationally mandated efficiency six star rating requirements for new buildings.

Greenhouse gases and energy

The ACT Government has adopted a Territory-wide target of zero net greenhouse gas emissions by 2060. To achieve the legislated targets, all Canberrans need to reduce our greenhouse gas emissions. The ACT Government's Sustainable Energy Policy 2010-2020 identified measures such as:

- establishing a target for the per capita usage of non-renewable electricity
- supporting the roll-out of electric vehicle support infrastructure
- assess the feasibility of including distributed generation technology in upcoming major developments
- the establishment of renewable energy targets
- supporting national approaches to skills development that reduce cost and delays in the transition to a clean economy.

In addition, the overarching sustainability policy, Weathering the Change, is being updated with Action Plan 2 to be released soon.

In 2006, ACT net greenhouse gas emissions totalled 4.02 Mt CO₂-e. This equates to an increase of 25.2% on 1990 levels and is 10.4% above 2000 levels. Until recently, ACT emissions were increasing at a rate more than double the national average. The largest emission source for greenhouse gases in the ACT is electricity, which contributed 64.5% of ACT emissions in 2006. The increase in electricity use has largely been in the commercial sector, which has seen a 16.3% since 2002.

Canberra does have the lowest per capita greenhouse gas emissions because we lack large, heavy industry. Despite this, our per capita rate of emissions has been increasing by 0.7% per annum since 2000, in contrast to the 0.6% decline in national per capita emissions over the same period.¹¹



The ACT Greenhouse Gas Inventory tracks greenhouse gas emissions by emissions sectors (e.g. stationary energy, transport, waste). To ensure the Territory takes full responsibility for the greenhouse gas emissions it causes, the Government includes emissions from electricity used by Canberrans but generated outside the ACT, largely from coal fired power stations in Victoria. Canberra's renewable energy targets mean 15% of energy will be sourced from renewable sources by 2012 and 25% by 2020. Globally, investment in renewable energy is on the rise, with an increase of 32% reported by the United Nations.¹²

The ACT Government has undertaken a wide range of actions to improve local energy security and sustainability. A range of incentive and education programs includes conducting domestic energy assessments and offering rebates on actions identified in the audits. The government also established a very generous feed in tariff policy, which led to a substantial uptake in solar power on individual houses.

The national roll out of a carbon price will also affect energy use. From 1 July 2012, a fixed carbon price will start at \$23 a tonne, and increase by a fixed amount for three years, after which the market will set the price. Due to exclusions such as farming, the carbon price will not capture the full spectrum of carbon emissions. Introducing carbon pricing may result in small scale localised energy generation.

Water

The Canberra Spatial Plan placed greatest emphasis on water supply for human needs, and on water bodies in the landscape for aesthetic values. While both are important, this was not holistic. A healthy hydrological cycle is essential to the health of the city and its inhabitants.

The role of water in the city and the ACT is complex and must include consideration of mental and physical health outcomes, ecosystem services, recreation and tourism opportunities, climate change, biodiversity functions, and aspects of Canberra's heritage and social values such as contributing to sense of place.

Water regulation and planning have gone through significant legislative and policy reform through the Council of Australian Governments (COAG). The National Water Initiative was signed by all states and territories between 2004 and 2006, committing all jurisdictions to sweeping reforms. The key areas of reform are in water entitlements, water planning, environmental water, addressing over-allocation, risk, water accounting, and encouraging innovation.

To comply with the COAG water reform directions, new ACT legislation was introduced in 2007 which embedded the principle of adaptive management. Adaptive management is the systematic process for improving management policies and practices by learning from the outcomes of operational programs. A major tool for achieving this is the environmental flow guidelines, which Canberra introduced prior to COAG in 1999. These statutory guidelines were revised in 2006, with the next review due in 2011.

The quantity of water is important, but equally crucial is its quality. The ACT Government maintains a bi-annual monitoring program

for water quality, streamflow and biological monitoring. It uses biological data to ascertain ecosystem diversity, and water quality data to determine trends that may be present, and compares these results with the designated environmental and use values and standards set in the Territory Plan, Environment Protection Act 1997, Environment Protection Regulation 2005 and Water Resources Act 2007. The most recent report found the higher than average rainfall had been beneficial for streamflow, given the impacts of the preceding long prolonged drought. The caveat was periods of increased turbidity.

The health of Canberra's urban lakes showed signs of stress, with elevated levels of chlorophyll and phytoplankton necessitating closure at times.¹³ There has also been significant investment in urban waterways, particularly the restoration of wetlands to former concrete drains in the inner north suburbs. These projects, while also increasing local amenity, also improve water quality. The ACT has a number of catchment management groups operating across urban and rural catchments which work collaboratively with government to improve environmental quality. A key focus in recent years has been the rehabilitation of the Cotter catchment following the 2003 bushfires.

The ACT Government's water policy document Think Water Act Water – Strategy for sustainable water resource management in the ACT, set targets in 2004 for:

- reducing potable water usage by 25% by 2023
- increasing effluent reuse by 20% by 2012
- nutrients and sediments entering waterways to be no greater than from a well managed rural landscape
- reducing flows from urban developments to no larger than they were prior to development.

The approach in this strategy reduces demand, improves water efficiency, diversifies supply, adopts appropriately targeted regulation and pursues a range of educational strategies.

In supporting this policy the statutory Territory Plan includes the Water Sensitive Urban Design Code, which all developments must conform to.

The ACT Infrastructure Plan notes significant current investment in water infrastructure, including the works to augment the Cotter Dam and services to Gungahlin with additional reservoirs, trunk mains and pumping stations.

The recent drought had a significant impact on Canberra, particularly on street trees, gardens and playing fields. Recent research suggests the costs of maintaining such public assets may be outweighed by the social and health benefits provided, especially in a warming climate.¹⁴



Waste

One of the key successes in the ACT over the last decade has been the vastly increased rate of recycling, from 42% to 73%. Despite this very positive change in behaviour from ACT residents, the Zero Waste goal was found to be unachievable. However, the value of setting a 'stretch goal' is demonstrated because of the substantial change in behaviour that resulted.

'The ACT is estimated to have produced over 850,000 tonnes of waste in 2008–09, equivalent to over 2.5 tonnes for each ACT resident and the second highest per capita rate in the country after Western Australia.'¹⁵ The amount of waste generated is affected by population growth, income and consumption levels, consumer preferences such as packaging and single use containers, and life cycle of goods such as televisions, computers and other electronic goods. In 2008-09 the total amount of waste generated was 798,000 tonnes with 214,000 tonnes interred to landfill.

A major review was undertaken and a draft strategy was released for public comment late in 2010. The draft strategy aims for the ACT to lead innovation in the management of waste to achieve full resource recovery and a carbon neutral waste sector. The draft strategy recognises waste as a valuable resource which, when recovered (reused, recycled or processed), reduces the need for raw materials and can help to address climate change.¹⁶

Things to think about

Modern consumption is using global resources faster than they can be replaced.

Individual purchasing decisions can help to reduce consumption rates, by avoiding the generation of waste in the first place.

Equally significant gains can be made at community scale. Strategic land use planning presents the opportunity to rethink the way we build and run the city. Individual buildings can be made to run more efficiently, while improving the location of new developments can help to reduce the amount of travel that people must undertake on a daily basis.

Further reading

For information on national policy on climate change and energy go to <http://climatechange.gov.au/>

For information on national water policy and reform go to <http://www.nwc.gov.au/www/html/7-home-page.asp>

For information on catchment issues go to <http://www.mdba.gov.au/>
<http://www.molonglocatchment.com.au/>

For more information on ACT energy and climate policy go to <http://www.environment.act.gov.au/>

For more information on ACT water policy go to <http://www.thinkwater.act.gov.au>

For more information on sustainability in Australian cities http://www.grattan.edu.au/publications/038_the_cities_we_need.pdf

For more information on research supporting adaption to climate change go to <http://www.nccarf.edu.au/>

Endnotes

- 1 David J. Cuff "Ecological Footprint" *The Oxford Companion to Global Change*. Ed. David Cuff and Andrew Goudie. Oxford University Press, 2009. Oxford Reference Online. Oxford University Press. Australian National University. 24 May 2011 <http://www.oxfordreference.com.virtual.anu.edu.au/views/ENTRY.html?subview=Main&entry=t265.e65>
- 2 http://www.environmentcommissioner.act.gov.au/publications/fact_sheets
- 3 David J. Cuff "Ecological Footprint" *The Oxford Companion to Global Change*. Ed. David Cuff and Andrew Goudie. Oxford University Press, 2009. Oxford Reference Online. Oxford University Press. Australian National University. 24 May 2011 <http://www.oxfordreference.com.virtual.anu.edu.au/views/ENTRY.html?subview=Main&entry=t265.e65>
- 4 Australian Housing and Urban Research Institute, Does Higher Housing Wealth Increase Consumer Spending, Research and Policy Bulletin No 117, June 2009.
- 5 Ryan S (2011) *Buying Choices for a More Sustainable Canberra*. Report for the ACT Commissioner for Sustainability and the Environment. ACT Government, Canberra. See chapter on coffee and tomatoes.
- 6 Bureau of Infrastructure, Transport and Regional Economics (BITRE), 2011, *Road vehicle kilometres travelled: estimation from state and territory fuel sales*, Canberra ACT. pxxviii
- 7 The Grattan Report, the Cities We Need, p9
- 8 http://www.actpla.act.gov.au/topics/significant_projects/planning_studies/sustainable_future/sustainable_future_research#Urban%20form%20analysis
- 9 Spatial Plan Evaluation – Urban Form Scenarios – Adaptation and Mitigation Interventions, prepared by SGS Economics and Planning for the ACT Planning and Land Authority, accessible from http://www.actpla.act.gov.au/_data/assets/pdf_file/0013/21046/ACTPLA_Urban_Form_Scenarios_Final_Report_WEB.pdf
- 10 Spatial Plan Evaluation – Urban Form Scenarios – Adaptation and Mitigation Interventions, prepared by SGS Economics and Planning for the ACT Planning and Land Authority, accessible from http://www.actpla.act.gov.au/_data/assets/pdf_file/0013/21046/ACTPLA_Urban_Form_Scenarios_Final_Report_WEB.pdf
- 11 Time to Talk Background paper on environmental sustainability, <http://timetotalk.act.gov.au/about/2030-outcomes-report/>
- 12 <http://fs-unep-centre.org/publications/global-trends-renewable-energy-investment-2011>
- 13 DECCEW Annual Water Report 2009-10, http://www.environment.act.gov.au/_data/assets/pdf_file/0008/227978/DECCEW_Water_Report_WEB.pdf
- 14 Dena Fam, Edward Mosley, Abby Lopes, Lorraine Mathieson, Julian Morison and Geoff Connellan, *Irrigation of urban green spaces: a review of the environmental, social and economic benefits*, CRC for Irrigation Futures, April 2008.
- 15 ACT Sustainable Waste Strategy, 2010-2025, p4.
- 16 A copy of the draft Waste Strategy and all the submissions relating to it can be found at <http://www.environment.act.gov.au/waste>