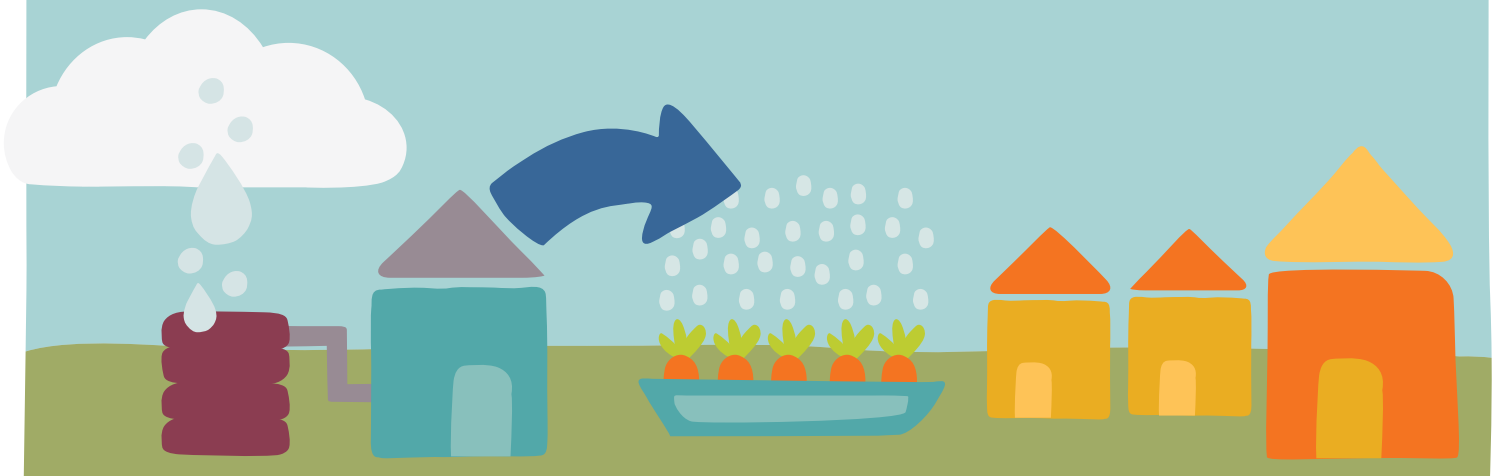
LIVING SMART

CREATING SUSTAINABLE COMMUNITIES

Living Smart
Participant Handbook

Nobody made a greater mistake than he who did nothing because he could only do a little - E. Burke



www.livingsmart.org.au

Acknowledgements

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The 2013 Participant Guide is based on the previous Action Guide written by Lucy Sheehy and Peter Dingle through the community partnership. (© 2006 version Lucy Sheehy and Dr Peter Dingle). The Be Living Smart Board would like to acknowledge Lucy and Peter and all those involved for the enormous amount of time and work spent developing the original guide.

Be Living Smart would like to acknowledge Catherine Doran, Helen Whitkin, Stephanie Jennings and Media on Mars for their work updating and making the Participant Guide a very easy, informative and readable resource.

Contents

Welcome to Living Smart

Welcome to Living Smart. During this course, and throughout this guide, you will learn about the big issues we face as a global community, and how local and individual actions can help to build resilient communities.

Living Smart helps us to think, act and live sustainably. To date Living Smart has run over 190 courses working with over 4000 participants, all over Metropolitan Perth, regional Western Australia, New South Wales, Tasmania and the Northern Territory.

The Meeting Place Community Centre, the City of Fremantle, Murdoch University and the Southern Metropolitan Regional Council developed Living Smart in 2003. All organisations recognised the need for a program that helps people to embrace more sustainable and rewarding lifestyles.

The course focuses on changes that you can make to improve the quality, enjoyment and sustainability of your life. Living Smart will introduce you to like-minded people and local experts who will share their stories and skills and hopefully assist you to achieve your sustainability goals.

Living Smart recognises, but does not focus on, the role of governments and other organisations and issues of global equity. However, it concentrates on supporting local people to find local solutions to local problems. We use an evidence-based approach to sustainability. Throughout this Guide you will find end notes referring you to particular publications, the details of which are in the **Want to find out more?** section at the end of each chapter.

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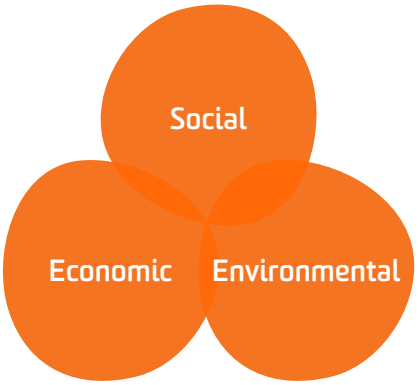
The information in this participants guide is provided in good faith. However, the accuracy or appropriateness of the information may change over time.

Living Smart

What is sustainability?

What is sustainability?



What is sustainability?

In brief, sustainability means:

- The equal valuing and balancing of the Social, Economic and Environmental
- Fair and equal access to resources for all generations, current and future
- Recognition that human activities are dependent on and affect the environment
- The requirement that every level of society to play its role in solving global issues and living sustainably.

History

After World War 2 the pathway to human development was seen as being based on economic growth, the benefits of which would trickle down through society. This was synonymous with capitalism, industrialisation and urbanisation.

By the 1980s world leaders were beginning to recognise the social and environmental problems that had occurred due to this focus. As a result, the United Nations established the Brundtland Commission that redefined the notion of development as

'meets(ing) the needs of the present without compromising the ability of future generations to meet their own needs'

Importantly, it recognised that human development and human activities were dependent on and affected the environment (interdependence), that all generations, current and future, should have equal and fair access to resources (known as intergenerational equity). The notion of sustainable development was born.

At the Earth Summit, 1992, in Rio de Janeiro, 178 countries voted to adopt Agenda 21, an action plan for international, national and local efforts. A major focus of Agenda 21 was how local action could solve global challenges; how individuals, community groups, not for profits and local governments could play a key role in getting informed, making decisions and taking action.

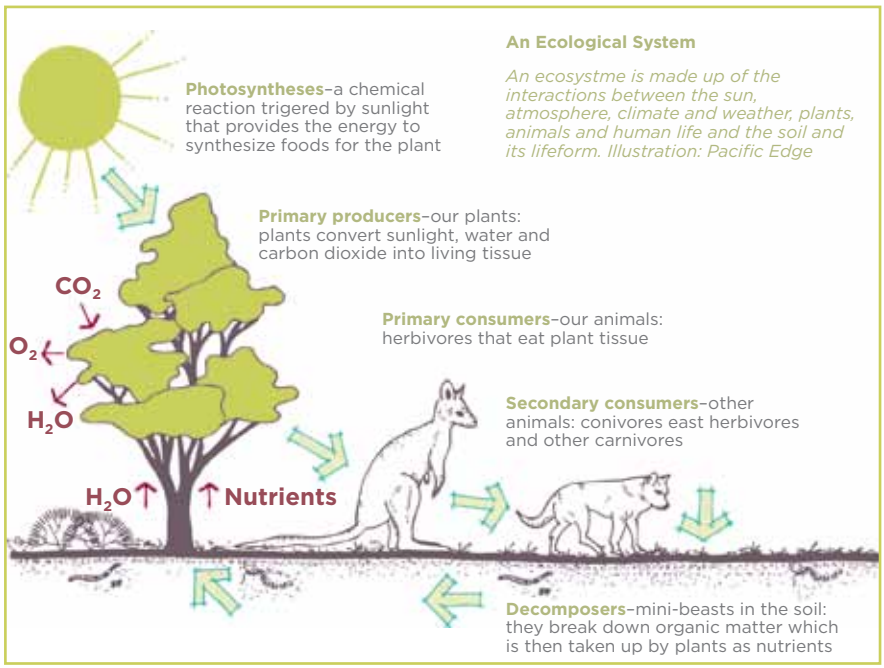
Many local governments in Australia adopted Local Agenda 21 and began to work on improving how their organisations used resources and supported their local community to live more sustainably.

Living Smart takes a broad and holistic view of sustainability including health, well-being and community participation, as well as the more traditional subjects of resource conservation, food security and bio diversity.

The big picture

The earth provides us with everything we need to live - food, water, fuel, disease management, climate regulation even aesthetic enjoyment. These services are called eco system services.

Our actions have a huge impact on the earth's ecosystems, over the last 50 years human activities have changed these ecosystems more rapidly and extensively than in any other period in our history. These changes have led to a mixed bag for humans - economic gains, some



improvements and some diminishment in wellbeing and, for some, an exacerbation of poverty[1,2]. There has also been a large and mostly irreversible loss in the diversity of life. There are many and complex drivers for this situation but our economic system - the way in which labour, capital and land resources are used to produce and trade goods, and levels of consumption - is a major player. See the chapters on Climate Change and The Big Issues for more details.

Sustainability is a journey

Sustainability is a personal journey; each of us may have different goals, different approaches and maybe even a different vision of what a sustainable future looks like. And we are all at different stages of our journey. Let's take a moment to capture a snapshot of where you or your household is at right now.

[1] Millennium Ecosystem Assessment

[2] Living Planet Report: Biodiversity, biocapacity and better choices

[3] Department of Planning and Infrastructure The truth about travel in Perth

My Living Smart journey

Where is my household now?

Electricity ..... units per day

Gas ..... units per day

Water ..... L per day

Compare yourself to the rest of Perth.

High Usage Per day			Medium Usage per day		Low usage per day	
Household size	Electricity/ Gas Combined	Water*	Electricity/ Gas Combined	Water*	Electricity/ Gas Combined	Water*
1-2 Persons	30 Kwh	900L	20 Kwh	600L	10 Kwh	250L
3-4 Persons	45 Kwh	1,200L	15 Kwh	800L	15 Kwh	500L
5+ Persons	60 Kwh	1,500L	20 Kwh	1,000L	20 Kwh	750L

* water use on your bill appears in kilolitres per day so 1.2KL= 1,200 Litres

Car Travel ..... km per year
Australian average 15,000 km per year

Air Travel ..... km per year

I have time to spend with:

(For more information see Simple Living)	Yes 1	2	3	4	No 5
My family and friends					
My community					
I am happy					

(For more information see Healthy You)	Yes 1	2	3	4	No 5
I eat well					
I exercise regularly					
I manage my stress levels					

My Ecological Footprint: ..... hectares
of productive land and water

1.8 hectares are available per person

(For more information and links to Ecological Footprint see Living Simply)

Living Smart Story

Jo, Bunbury

I am a Human Biology teacher at Manea Senior College a four year old public school in Bunbury. I have always been interested in participating in my local community and was introduced to Living Smart at a community meeting. I was a bit unsure about attending but I went along to learn some more. As the course went on I could see why sustainability was a good idea and became particularly interested in energy use.

I became enthusiastic about not only how I could get involved in sustainability but how could I involve my wider school community. I initiated a sustainability focus when I first arrived at the College by contacting some community organisations to see if this concept could be incorporated into a senior College.

From this, a student/teacher working committee was established and the main community group involved in the initial stages was HOTROCK. The College has really embraced the Pandora Organic Garden, the chickens that provide eggs and recycle scraps (a project initiated from a leaders Millennium kids/HOTROCK conference), the College paper recycling program and the Seed2Seed replanting program. Working with the Water Corporation we have also looked at water conservation through the water saving weekend pledge program. The students have benefited from this program by becoming aware of these sustainable issues and experiencing empathy with live animals and plants and enjoying another outdoor area of the College. Getting involved in these kinds of initiatives does mean extra work but it's something that I have chosen to do. Lucky for me this kind of works also fits into our schools mission of leadership and community involvement.

I am looking forward to the future for my classes and am really keen to get our students to complete a Living Smart course. Sometimes, it is hard for 16 and 17 year old students to see the bigger picture in their lives. I think if they learn or are aware of just one small thing related to energy, water or living sustainability we have had an impact.

Manea Senior College Students building a kitchen garden.

Want to find out more?

How to guides

Victorian Green Renters Guide
www.environmentvictoria.org.au/renters

How to read your bills and track your consumption
www.transport.wa.gov.au/activetransport/24657.asp

Books

Diamond, J (2006) Collapse: How Societies choose to fail or survive, Penguin, Victoria

Flannery, T (2002) The Future Eaters, New Holland Publishers, Sydney

Jackson, T (2009) Prosperity Without Growth: Economics for a Finite Planet, Earthscan, 2009

Magazines

CSIRO reports on sustainability from a scientific perspective

ECOS Magazine- Science for Sustainability
www.ecosmagazine.com

ECOS Personal Sustainability Guide
www.ecosmagazine.com/nid/207.htm

Reports

Island Press, Millennium Ecosystem Assessment (MA), Ecosystems and Human Well-being: Synthesis.(2005) Washington.

Living Planet Report: Biodiversity, biocapacity and better choices,2012 World Wild Life Fund, Global Footprint Network and Zoological Society of London,
http://awsassets.panda.org/downloads/1_lpr_2012_online_full_size_single_pages_final_120516.pdf

Websites

Drawing on peer reviewed literature presents latest scientific knowledge on climate change in accessible format.

CSIRO Publishing (2011) Climate Change: Science and solutions for Australia. Collingwood:
www.csiro.au/Climate-Change-Book

Department of Planning and Infrastructure – Truth about travel in Perth
www.transport.wa.gov.au/mediaFiles/AT_LS_P_truth_about_travel_in_Perth.pdf

Notes

Notes

Photo by Peter Mathews

Living Smart

Thinking Smart

Knowledge is power

Knowledge is a crucial factor for making changes.

You need to know what choices you can make, what options are open to you and the benefit of those options. There are many different ways to get this knowledge.

This Living Smart Participant Handbook will provide you with some background information and direct you to other sources of information. At the end of each chapter look for **Want to find out more?**

You can also:

- Use the internet - type a few descriptive keywords into the search engine and see where you end up
- Use your local library
- Ask someone who might know, this can be anyone from a local expert to friends and family

Goal Setting

We often want to accomplish things like learning a new skill, putting in that veggie patch or becoming fit, but we just don't seem to get around to doing it.

Strategies for taking action on climate change, reproduced with permission from: www.learningfundamentals.com.au

Various things can stop us: a lack of time or motivation, too many other priorities or not knowing where to start.

There are many approaches to prioritising what we achieve with our time. Think about techniques that you have found effective in the past. Can you adapt them to your Living Smart journey?

This chapter concentrates on one technique, goal setting. Living Smart uses this method because it helps us identify something that we want to achieve and creates realistic, manageable steps towards achieving it.

Everyday we use forms of goal setting. Writing lists is a common way of organising yourself in everyday life. Shopping lists, a to-do list at home or work, or writing down New Year's Resolutions are all forms of goal-setting. Goal setting takes this way of thinking and reasoning and puts it into a more formal and effective process.

Why should you use goals?

Because they work!!! Goals work because they help you to:

Focus: You identify exactly what it is you want.
Commit: When you set a goal you make a commitment towards achieving it. It is something you have decided to actually do, rather than just think about doing.
Motivate: You are more likely to put effort and energy into achieving it and the goal will continue to motivate you until you do achieve it.

Goal setting steps

There are different ways to think smart. This is the method that Living Smart uses.

1. Write your goal down
If you write it down and put it in a visible place where it will be repeatedly seen, you will be continually reminded about your goal. This makes it harder to forget it or get distracted.

2. Make it specific
You need to know exactly what you are working towards.

3. Make it positive and put it in the present tense
This way you are reinforcing good behaviours. Putting it in the present tense creates a tension between where you currently are and where your goal will get you. This will help drive you forward.

4. Make it challenging and achievable
If a goal is too easy you won't put much effort into achieving it. However, the goal must be realistic; otherwise you are setting yourself up for failure and a feeling of disappointment.

5. Make it measurable
Measuring your progress towards your goals can tell you how close you are to achieving them. More motivation!

6. Give it a deadline
Setting a time in which to accomplish your goal will give you a sense of urgency. If you have a deadline you will not be able to put it off until later. However, goals need to be broken down into manageable steps. Estimate a realistic amount of time it will take to carry out each step and put those dates into your planner. Set your final deadline and place it into your goal.

7. Make your goal flexible
Circumstances often change and you may need to develop new strategies to reach your goal or you may even need to change your goal. This is okay. Adapt your goal if you have to but don't abandon it altogether.

8. Celebrate your success
Well done!!! You have accomplished what you set out to achieve.

Goal setting example

Sometimes you may need to refine the goal by writing a second draft.

	1st draft	2nd draft
Write your goal down Make it specific	I will try and throw less stuff in my bin	I will set up a compost bin to put all my food and vegetable waste
Make it positive	I will not drive so much	I am walking to work 3 times a week
Make it challenging and achievable	I am only using 40 litres of water a day	I am reducing my water consumption by 30 per cent
Make it measurable	To get exercise, I will walk to the train more often	As part of my plan to lose weight, I will walk to and from the train every working day
Give it a deadline	I want to set up a worm farm sometime	I will set up a worm farm in two weeks' time so as to use the vermicompost on my pot plants in six months' time

Setting your goals

Now that you know what a goal should be like, it's time to think about setting some of your own. Your goals can be anything you want. They don't have to be major life changes. They could just be something you've been meaning to do for a while.

Try understanding your motivation. Knowing why you want to achieve a goal will help keep you going when your enthusiasm starts to falter.

For example: ...*Your goal may be to save enough money to build your own home, but your motivation for this is to provide a better lifestyle and a more stable and sustainable environment for your children.*

Goal setting not going well?

Write down the negative messages you hear yourself saying. Then write down a much longer list of why you can do it. Now try again.

Do I have enough support?

Sometimes we want to keep our goals to ourselves, but by telling other people you can also feel more committed to a goal. Friends, family or work colleagues may be able to offer advice, encouragement and praise as you make progress. You can even get them to set a goal with you.

Trouble shooting

Things not going to plan?

Ask yourself: "Why do I want to achieve this goal?"

Does it meet the eight rules of goalsetting?

Do you have enough support?

Do you need some added incentive?

Should it be broken into smaller, more manageable goals?

Was the deadline realistic or does it need to be changed?

Break it down

A successful approach to goal setting is to divide the goals into

- short-term
- medium-term
- long-term

Breaking long-term goals into medium-term, and breaking those medium-term goals into short-term ones makes achieving your goals easier.

Example of a water goal

Goal: I will reduce my water consumption by 30% over the next 6 months

Step 1: During the next week I will reduce my showers from 10 minutes to 4 minutes. (Tick when complete)

Step 2: Over the next 2 weeks I will collect mulch material to put on my balcony garden to reduce water loss. (Tick when complete)

Step 3: During the next 3 weeks I will wash my vegetables in a dish and reuse the water on the garden. (Tick when complete)

Why I want to take this action:

Economic reason: I would like to save money on my electricity and water bills

Environmental reason: To contribute to conserving the water supply

I will achieve my goal by: 4 weeks from today

Living Smart Story

Shani, South Fremantle

I always find the words "goal setting" grate somehow. I have images of over blown Americans making us chant "I can I can!" while holding hands and doing silly dances.

My partner on the other hand, just does not understand why everyone does not goal set. I call him the goal setting master. Here is his routine.

Every week one morning he takes himself off to a café (usually the one with the best chocolate cake). He starts by writing what he calls a "stream of consciousness" – any old dribble that enters his head, in a diary. After 3-4 pages his brain has usually slowed down enough for him to note three things to do in the following week, three things to do in the following month, three achievements for the week and one affirmation. There is usually a direct correlation between what he has been writing and his goals – e.g. "I am so tired, I want to go to sleep all the time" might lead to a goal of going to bed before 9 pm three nights that week.

He can also look back over the previous week too. If he has achieved the three things set he gets a gold star and can order whatever he likes for breakfast.

Sometimes Tim has to miss a week of his diary time. I can always tell when this happens. He just seems less settled somehow, more frustrated.

Tim and Shani discussing their different approaches to goal setting (Photograph Hamish Darby)

Tim also has a routine that he does four times a year. He calls it his "3 1 5", basically because he sits down (again in a nice café) and makes goals for the next three months, one year and five years. He categorises his goals into four categories 1. friends and family, 2. financial and vocational, 3. emotional and spiritual and 4. health, education and recreation. Just by creating the grid it really forces you to think about all the different aspects of your life. So often it is out of balance!

Tim calls what he does goal setting, but for me I think it is more vision setting. His five year goals, for example are not about earning lots of money or having a new car, but are things like "live in a close community of people who care about me", "produce a significant percentage of my own food" etc. A five year goal of "have a good relationship with my family" might lead to a three month goal of "having my brother around for tea".

We have shared our thoughts on goal setting with many people over the years, and I find people are usually impressed with the method Tim uses. Sometimes they even give it a go.

And how do I set my goals? Well that is a different story...

My living simply goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"The difference between a dream and a goal is the written word."

Anon

My power smart goal

I am aiming to:

.....

(eg. cut my electric and gas bills by 20%)

By taking steps to:

☐ .....

☐ .....

☐ .....

(eg. turn off standby power, set my water heater, set my aircondidtioner to the optimal temperature)

Why I want to take this action:

.....

.....

(eg. to reduce my greenhouse gas emissions)

I will achieve this by :

.....

(date)

"Life is not a brief candle, it is a splendid torch that must be made to burn as bright as possible before it is handed on to the next generation."

George Bernard Shaw

My travel smart goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"There are no shortcuts
to any place worth going."

Beverly Sills

My water smart goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"The future depends on what we do in the present."

Mahatma Gandhi

My waste smart goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"Nobody made a greater mistake than he who did nothing because he could only do a little."

E. Burke

My smart gardens goal (Biodiversity)

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

" A society grows great when old men plant trees whose shade they know they shall never sit in."

Unknown

My healthy home goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"The future depends on what we do in the present."

Mahatma Gandhi

My smart gardens goal (Food Production)

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"One of the most delightful things about a garden is the anticipation it provides."

W.E. Johns

My healthy you goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"Be the change we wish to see in the world."

Mahatma Gandhi

My community smart goal

My overall goal and steps to achieve this are

Goal .....

By taking steps to:

Step 1 ..... ☐

Step 2 ..... ☐

Step 3 ..... ☐

.....

Why I want to achive my goal:

.....

.....

I will achieve this by :

.....

(date)

"Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed it is the only thing that ever has."

M. Mead

What I have achieved

"What ever you can do or dream you can, begin it. Boldness has genius, power and magic in it. Begin it now."

Goethe

What I have achieved

"The future belongs to those who believe in the beauty of their dreams."

Eleanor Roosevelt

Want to find out more?

There are many books on goal setting, personal development, positive affirmation and personal effectiveness. Take a look around and ask friends, or search online to learn which of these are the more credible and achievable.

Books

Allen, David. (2001) Getting Things Done. Penguin

Covey, S. (1989) The Seven Habits of Highly Effective People. Information Australia, Melbourne. ISBN 0-671-70863-5

Dingle, P. & Power, T. Goal Getting : The Science of Successful Goal Setting. Ordered through: www.drdingle.com

Edelman, Sarah. (2006) Change Your Thinking : positive and practical ways to overcome stress, negative emotions and self-defeating behaviour using CBT; ABC Books

Websites

Contains plenty of information about goal setting, as well as 20 minute tutorial: www.about-goal-setting.com

Overview of books about goal setting and personal effectiveness, extensive further readings list:
www.stephencovey.com

Articles on successful goal setting:
www.topachievement.com/blog/category/goal-setting-2

Learn how to mindmap:
www.learningfundamentals.com.au

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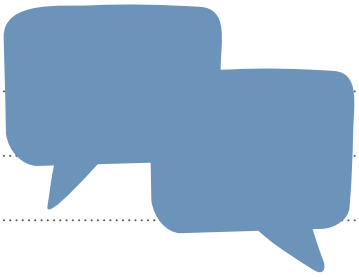

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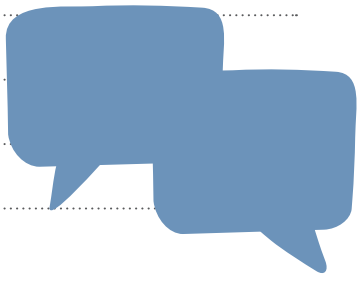


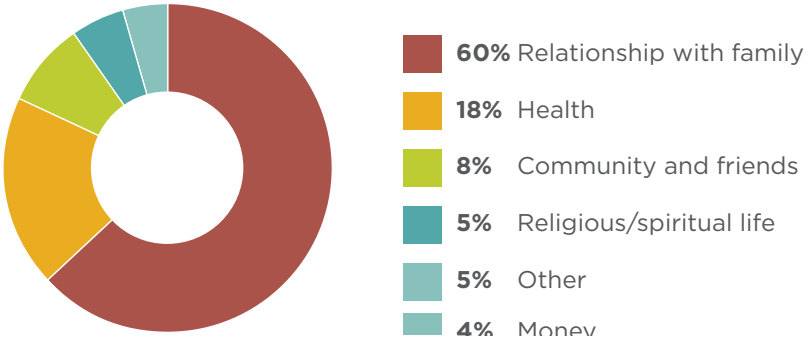
Living Smart

Living Simply

Living Simply

Every day we are bombarded with messages that equate happiness with more money and a higher standard of living. A higher standard of living is often equated with high consumption. But does this actually make us happy?

Graph showing the single most important factor of happiness for Australians[1]



Research from The Australia Institute has shown that the greater our income the higher the level of our dissatisfaction. It also showed that nearly two thirds of Australians say they cannot afford to buy everything they really need, despite the fact that Australians are richer than ever and about three times better off than their parents in the 1950s[2].

Research also shows that people who focus on money and materialistic possessions are less happy and are more prone to negative mind states like depression.

So why does this notion that money and consumption of goods equals happiness persist? The consumption of material goods has complex cultural and psychological roles in our lives that, for the majority of us, go beyond satisfying our basic needs. There is a trend for greater convenience in our lives, as well as a desire to keep pace with technological developments. Material possessions can play symbolic and cultural roles, showing our allegiance to certain social groups and ideals. Material possessions are being used to communicate status and try to enhance our self-esteem.[3] Our relationship with consumption is so complex we now buy things that we do not use. On average each Australian household wastes $1266 a year on unused purchases.[4] This preoccupation with money and consumption has personal costs too. As a result of working longer hours to buy things, we have less time to spend with our families and friends and we can neglect our health.

How do you measure your well being?

Conventional economics views human well being is tied to economic growth and consumption. Typically measured in Gross National Product (GNP), the value of goods and service produced in a year. GNP fails to differentiate between negative and positive social and environmental factors. For example, increased pollution that causes increased spending on health will actually show as a positive increase in GNP. It is difficult to measure intangibles such as the value of an ecosystem or community well being, however, it is essential that any definition or measure of development includes the environmental and social. Otherwise we are failing to measure the whole picture and risk ignoring the negative social and environmental consequences that comes from the singular pursuit of economic growth.

What is your ecological footprint?

High consumptive lifestyles also have negative environmental consequences. According to the Living Planet Report 2012 we are currently using 50% more resources than the earth can provide. This means we are in ecological overshoot. We are using resources faster than they can be regenerated.[5]

Australia: **6.68** hectares	World average: **2.7** GHA	Fair earth share: **1.8** GHA	Average footprint for Asia - Pacific: **1.63** GHA

Reference - Living Planet Index

The average West Australian has the largest ecological footprint in Australia. Based on actual land area the ecological footprint of an average West Australian was 14.5 hectares. Our large ecological footprint is largely to do with the reliance of the state economy on natural resources, agriculture and mining.

According to the WA Environmental Protection Authority (EPA) food, housing and transport have the greatest environment impact out of all the areas of WA domestic consumption patterns[6]. Food makes up a massive 46% of our state's ecological footprint.

We will explore these areas in more detail in later chapters (Food-Waste and Healthy You, Housing-Power, Water and Transport).

Did you Know?

The Ecological Footprint was developed as a way to measure demand on our ecosystems. Representing the amount of biologically productive land and water available to support human consumption as well as the land and area necessary to assimilate the associated waste. This can also be called bio capacity. Measuring the ecological footprint in Global Hectares allows for standardised comparison between different countries (Global Footprint Network, 2012).

Your Footprint

What is your ecological footprint?

How is your life impacting the planet?

What can you do to reduce your footprint?
www.epa.vic.gov.au/ecologicalfootprint/globalfootprint/index.asp

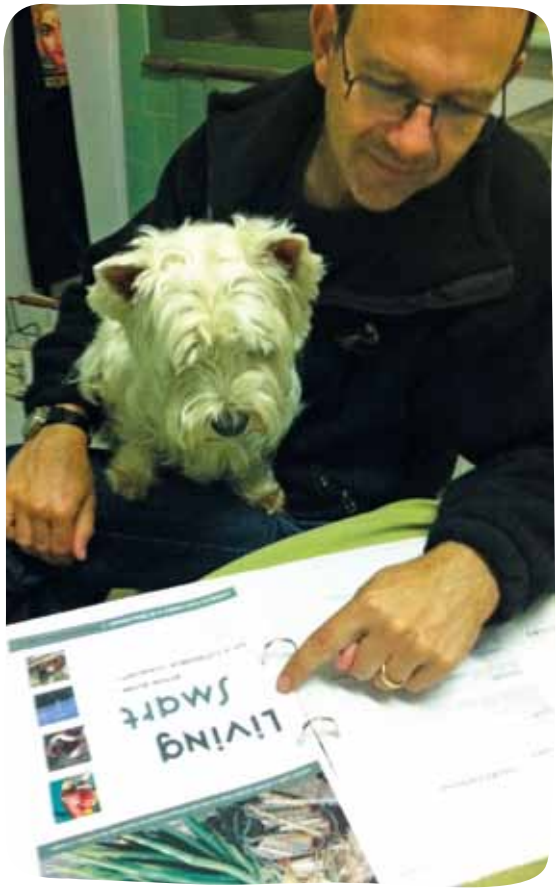
Living Smart Story

Colin, Beaconsfield

When I did a Living Smart Course in South Fremantle in 2005, I'd been working to promote sustainable transport for many years, had made the connection to climate change but not really put all the pieces together in my lifestyle. Living Smart set me on a journey that continues to this day. It started with finding a new action each week during the course, but just continued little by little over the years since.

I quickly halved my energy bills and switched to Green Power, but took another couple of years to get PVs. My home is now energy neutral, sending enough electricity back to the grid to 'offset' my gas. Veggie gardening came next, but still comes and goes with the trauma of harsh weather, pests or a trip away. Cutting water use seemed simple and signing up to an organic veggie box delivery inspired more healthy foods.

Everything came together through embarking on an eco-renovation of my weatherboard heritage cottage. Water tanks and ceiling fans went in, the garden got more mulch and a solar pergola transformed the thermal comfort. Now just experiencing a light-filled, comfortable home each day is enough to inspire more changes. I share this experience through 'house tours' with sustainability students and Living Smart groups from time to time.



Colin running through Living Smart with Oscar

I went part-time to be hands on renovating/extending the house and that, by accident, lead to me setting up a sustainable behaviour change consultancy. It seems that everything that matters to our planet is interconnected and the microcosm of my life has similar interconnections. From small light globe changes, bigger things just seem to happen.

Along the way I 'married' my work on sustainable transport with ways to 'coach' households on saving energy, water and waste: Living Smart Households was born – not as deep as Living Smart Courses, but a good first step for thousands of households.

I've found myself doing more in the community through talks at The Meeting Place and a brief stint on the Be Living Smart Board. Like my Living Smart journey such things come and go.

My partner has always been the gardener, researcher and intuitive sustainability influence in our house. She took part in a Living Smart Course in 2011 and has revitalised our thinking on reducing waste, and productive gardening.

Looking back at the visioning drawings and notes I made in the Living Smart 'class of 2005', I'm still not living as simply or as connected to community as I'd like to be, but little by little that will come about, just as my bills, footprint and busyness have halved.

What is Simple Living?

Essentially, it is voluntary simplicity. It is discovering what is important to you, the things, people and experiences that you truly love, need or cherish. It is streamlining your life and wanting less. This is not the same as having nothing. Simple living is also about freeing up time to do the things that you really would like to do, to have less dependence on material things and to have less impact on the environment. Simple living can be anything from moving to a smaller home, moving from full-time to part-time work, de-cluttering your house, prioritising your time, paying off your debts and living within your means, both financially and environmentally.

What's your money doing?

You can choose to bank or invest in a way that prioritises social and environmental responsibility.

Check with your financial institutions:
Do they invest in organisations that support internationally acceptable principles in human rights, labour, the environment and anti-corruption?

Do they prioritise investment in organisations that protect the environment and promote social well being? For example renewable energy, water conservation, social enterprise, social housing and education.

Do they avoid investment in organisations that cause damage to the environment, disadvantage people and cause harm? For example tobacco, arms manufacturing or carbon intensive industries?

How transparent and accountable are they? Do they produce and publicise a regular sustainability report?

[1] The Attitudes of Australians to Happiness and Social Well Being
[2] Overconsumption in Australia - the rise of the middle class battler
[3] State of the World, Rethinking production: Innovations for a sustainable economy
[4] Wasteful Consumption in Australia
[5] Living Planet Report: Biodiversity, bio capacity and better choices
[6] State of the Environment Report Western Australia 2007

Nana Technology

Making the time to learn or re-remember some of the skills that our grandparents had is an enjoyable way to benefit the environment and save money. Cooking meals from scratch, repairing clothes and growing your own veggies are a few simple ways to get started. Once our Living Smarties started to 'do it themselves' they found that making their own bread, cheese, beauty products or even honey wasn't too ambitious.

Ask around your friends and family, look for books in your local library or drop into one of your local Living Smarties group to find out more about Nana Technology.

Living Smart Story

Steph, White Gum Valley

I have always been passionate about sustainability and trying to embed it deeply into all elements of my life. Once in the position to buy a home, we worked towards making the technology changes (solar hot water heating, solar panels and rainwater) and basic behavioural practices like cold water washes, line drying and full loads. From the start of my working life in the environmental field, I chose to work four days a week to give me time to be a committee member in several local organisation as well as my passion for singing in choirs. Although I was already trying to live my life sustainably when I attended a Living Smart course I realised that there was so much more that I wanted to do. The big question was how would I fit it all in?

I realised that I wouldn't be able to fit it all in unless I worked less. It was a challenging journey to navigate as I really felt outside the norm. At first I doubted myself, was I mad in wanting to reduce my hours and promotional opportunities in a job that I enjoyed? When approaching my manager at work, he really didn't understand and even suggested I might need counselling! Then I happened upon a downshifting forum at Woodford Music Festival where Professor Ian Lowe asked how many other people in the audience were downshifting or considering it and hundreds of people put their hands up. I wasn't alone! So I looked at my finances and settled on proposing a 24 hour per week, based on my commitment to save more with more sustainable transport choices and home grown and home cooked food, on top of the energy and water savings already achieved. It took about 18 months to make it reality.

From this point I have had the time for and really enjoy growing my own food, travelling slowly (my journey's on public transport) and best of all delicious midday naps (until children came along)! Now that I have 2 young children I realise that time is the most precious thing I have and can give to my family. So in the future, I would like to create a healthy life balance that would involve working low hours while the family is young, growing more food and still finding the time to contribute to a happy and healthy community.

Steph and her daughter Elsa

Downshifting

Downshifters can be defined as people who make a voluntary, long term, lifestyle change that involves accepting significantly less income and consuming less. Most people do it to spend more time with family, for more personal fulfillment or for a more balanced healthier lifestyle. Working fewer hours to devote time to activities that you value more highly means considering:
How to work less?
How to live on less income?
How to cut back on expenses?

23% of Australian adults have downshifted. It is becoming an increasing trend both here and overseas.
Hamilton & Mail 2003

Top 5 actions

1. **Slow down and take some time to consider.**
   - What makes you happy?
   - What is important in your life?
   - Can you reduce some of your 'busy' activities?
   - Make time for family, friends and community.
   - Make a list of activities that you enjoy and don't depend on material things.
2. **Consume wisely.** Avoid new purchases. Don't buy on compulsion or without considering;
   - Can I do without it?
   - Why do I want to buy this?
   - Do I really need it?
   - Could I borrow it, hire or buy it second hand?
3. **Get informed.** Research items that you need to buy. Prioritise durability, environmental performance and social conditions of workers. Find out where you can buy from local producers and bulk buy. Check with your financial organisations how they are investing your money.
4. **Work less.** Do you have a work computer, mobile/smart phone? Switch it off out of work hours.
5. **Examine your weekly expenditure.** Where could you spend less? Look at ways you save on your household's bills. The less you spend, the less you may need to work, leaving you more time to live - now get started on your list!

"Life is really simple, but we insist on making it complicated."

Confucius

Want to find out more?

How to guides

www.transport.wa.gov.au/activetransport/24657.asp#25763

Living Simple - a guide to Nana Technology

What can I do to stop wasting money on bills

Books

The Thrifty Kitchen by Suzanne Gibbs and Kate Gibbs, Penguin Australia

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Ghazi,P. & Jones,J. (2004) Downshifting: The bestseller guide to happier, simpler living. Hodder Mobius, Great Britain

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www.epa.wa.gov.au/AbouttheEPA/SOE/2007/Pages/default.aspx

Websites

www.consumption-rebellion.blogspot.com

www.down---to---earth.blogspot.com

www.downtoearthforums.com

www.frugalincornwall.blogspot.com.au

www.oldrecipes.webs.com

www. seasonalfoodguide.com

www.simplicityinstitute.org

www.slowmovement.com

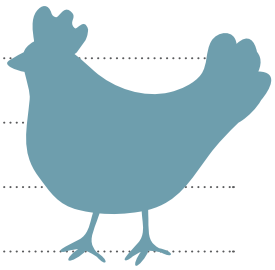
www.zenhabits.net/simple-living-manifesto-72-ideas-to-simplify-your-life

Two local Perth blogs on living sustainably

www.sustainaburb.blogspot.com

www.oliveonblonde.com

Notes



Living Smart

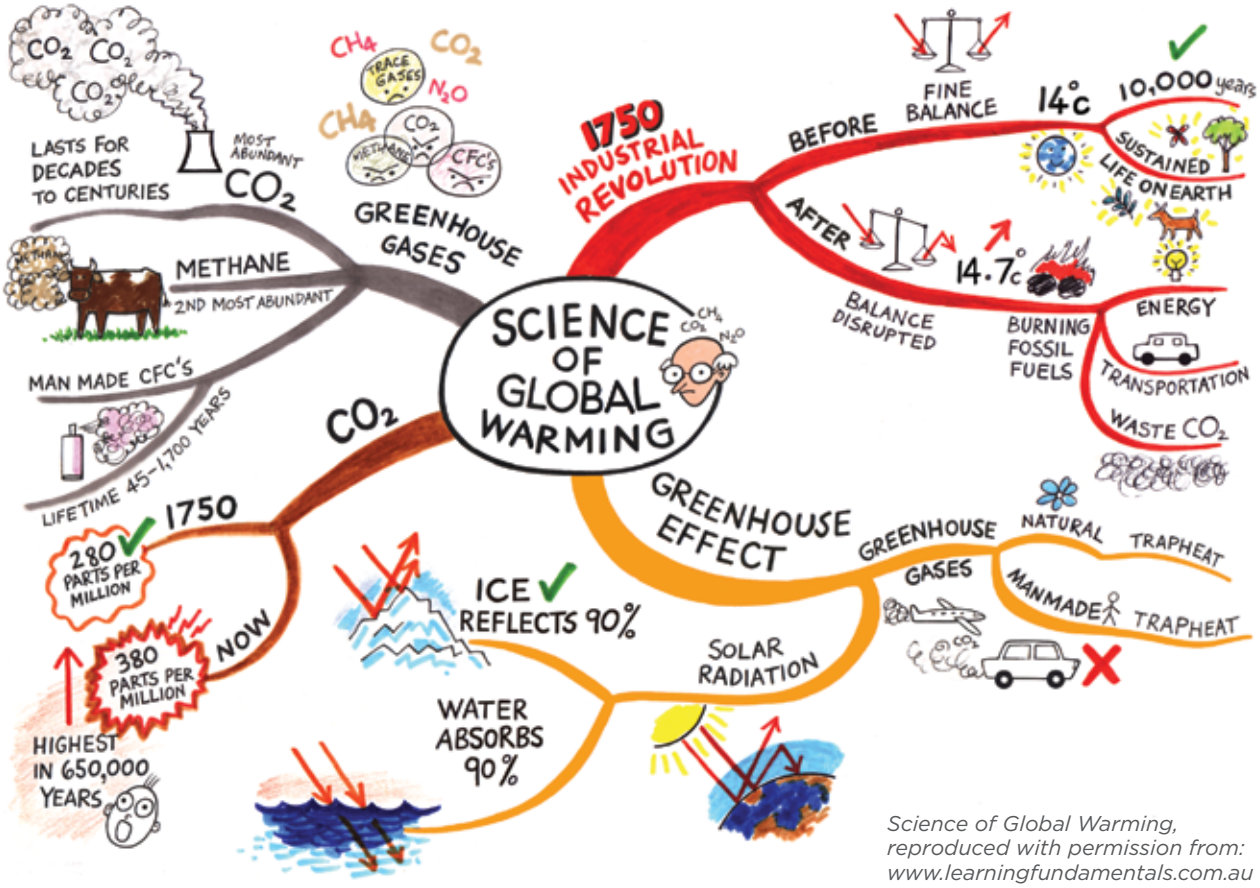
An overview of climate change

An overview of climate change

Life on earth depends on greenhouse gases, they absorb and re-radiate the Sun's heat energy in a process similar to that of a greenhouse. This natural process has produced a hospitable environment where humans and other life forms have been able to live. Since the mid-19th century a range of human activities - the burning of fossil fuels to generate electricity, heat and cool buildings, and power vehicles; reduction in carbon sinks (for example, through deforestation) and land use changes have led to increased emissions of greenhouse gases. This is called the enhanced greenhouse effect. This has led to an increase in average global temperatures. It has also affected our oceans, soil and biosphere.[1] This impacts, and will continue to impact, on all aspects of our lives and the lives of future generations.

The science of climate change

Climate change science uses observations of temperature (land and ocean), rainfall, sea level, ocean acidity and climate models. In 2011 the concentration of carbon dioxide in the atmosphere was 390 parts per million (ppm). The natural range in the past 800,000 years has been 170 to 300 ppm. Historical records of temperatures show that at no other point in human history have temperatures changed as rapidly as they have in the last 100 years. There is a lot of evidence to show that the observed changes in temperature on land and in the ocean and increases in sea levels are consistent with the changes expected due to increasing greenhouse gas emissions[2,3,4].



Science of Global Warming, reproduced with permission from: www.learningfundamentals.com.au

Climate confusion

80% of Australians believe that climate change is happening. But only about 40% of us believe that these changes are due to human activities.

Different theories have been posed as to why denial about our role in climate change is so high in Australia: Is it vested interests? Maybe it's our emotions, in particular fear or a way of coping with something we don't want to know? Or perhaps it's because we find the science complex or unconvincing, and we can't understand concepts of uncertainty and the long timescales involved? Or perhaps it's the media coverage presenting a debate in the scientific community when a debate does not exist? Or is it a mixture?

There are still some unknowns in climate science. However, many common misrepresentations and myths about climate change are based on confusing the basic concepts of weather and climate.

Weather and climate are often used interchangeably but they refer to different things. Weather is the changing conditions of the atmosphere at a given time and place.

Climate is the average weather conditions over a period of years to decades. Climate change refers to changes in the climate over many years or decades.

Climate variability means year to year variations. In the last century El Niño and La Niña events have produced climate variability in the form of hot droughts and cooler wet periods. Due to two consecutive La Niña events 2010 and 2011 were the coolest years recorded since 2001.

CSIRO, 2011, Climate Change Science and Solutions for Australia

Leviston, Z. & Walker, I, 2011, CSIRO Second Annual Survey of Australian Attitudes to Climate Change: Interim Report. CSIRO, Social & Behavioural Sciences Research Group

Schiermeier, Q 2010The real holes in climate science, Nature, vol 463, 21 January 2010, www.nature.com/news/2010/100120/pdf/463284a.pdf

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Australian climate change

Most of Australia has warmed over the past 50 years. Since the 1950s each decade has been warmer than the previous decade. Since the 1990s the frequency of extremely hot days has increased and frequency of cold days has decreased.

Annual average	Maximum daily	Mean daily	Overnight minimum
Temperature Since 1910	+ 0.75°C	+ 0.9°C	+1.1°C

Record rainfall was recorded in many areas in 2010 and 2011 due to La Nina events. Despite this southwest Western Australia experienced its lowest rainfall on record, continuing the drying trend of reductions in winter rainfall.

Globally sea levels have risen 210mm above 1880 levels, sea surface temperature has also increased by about 0.8 °C since 1910. Sea-surface temperature has increased around Australia faster than the global average.

Future changes

Australian average temperatures are projected to rise between 1 and 5°C by 2070, with more hot days and warm nights and less cool days and cold nights. It is likely that there will be an increase in droughts, particularly in south-western Australia, a decrease in wet years and an increase in intensive rainfall events[5].

Western Australia

WA is likely to see a reduction in annual rainfall and surface water runoff, days above 35°C will increase as will the frequency and intensity of bushfires. There is likely to be a decrease in the total number of cyclones with increases in their intensity[6].

	2030	2070
Rainfall	Decrease by 2% to 20%	Decrease by 5% to 60%
Summer temperatures	Increase by 0.5 to 2.1 °C	Increase by 1 to 6.5 °C
Winter temperatures	Increase by 0.5 to 2.0 °C	Increase by 1 to 5.5 °C[7]

What effect will this have?

Australia is vulnerable to the effects of climate change. It is already the driest continent, exposed to the dangers of extreme heat and drought. Our population mostly dwells on the coastline, making rising sea levels a concern. It is home to important and vulnerable ecosystems. Our industries and urban centres face on-going water limitations. Our economy, including food production and agriculture, is under threat[8].

Predicting the future

In order to predict future changes to our climate, scientists use different scenarios. These combine different social, economic and technological responses to climate change, levels of emissions and rates of global warming. A number of climate models are used. OzClim groups together scenarios with a similar storyline and uses climate models that are the most appropriate for Australia. This online tool can be used by anyone and generates climate scenarios in a few steps.

www.csiro.au/ozclim/home.do

[1] The Greenhouse Effect and Climate Change
[2] The critical decade: Climate science, risks and responses
[3] Climate Change Science and Solutions for Australia
[4] State of the Climate 2012
[5] State of the Climate 2012
[6] Climate Change-potential impacts and costs, Western Australia
[7] Adapting to our changing climate
[8] Impacts of Climate Change

Want to find out more?

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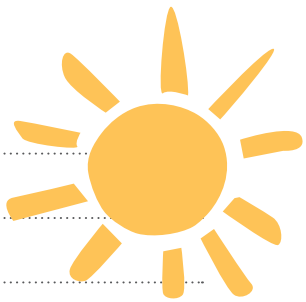
Notes



Living Smart

Power Smart

Power Smart

Energy plays a vital part in our daily lives. The advances in human society in the 20th century are closely related to the rise in the use of energy, in particular the burning of fossil fuels.[1]

West Australian's per capita energy use is increasing as we use growing numbers of electric and electronic devices to save labour, to communicate and for entertainment.[2] The burning of fossil fuels emits carbon dioxide; this is causing climate change, one of the greatest ecological, economic and social challenges that we face. Reducing our energy use and generating electricity from renewable sources helps reduce our contribution to climate change.

Trends and issues in Western Australia

Three-quarters of Australia's greenhouse gas emissions comes from the energy sector. Electricity generation is the single largest contributor of Australia's greenhouse gas emissions, producing 38% of total emissions. This reflects Australia's high reliance on fossil fuels for electricity generation[3].

Although the demand for primary energy in WA predominantly comes from the manufacturing and mining sectors, our per capita residential energy use has risen by 11% in the last 20 years. Since 1994 electricity consumption has sharply risen, this is likely due to the increased use of reverse-cycle air conditioners, appliances such as televisions and computers and increased use of appliances with standby[4,5].

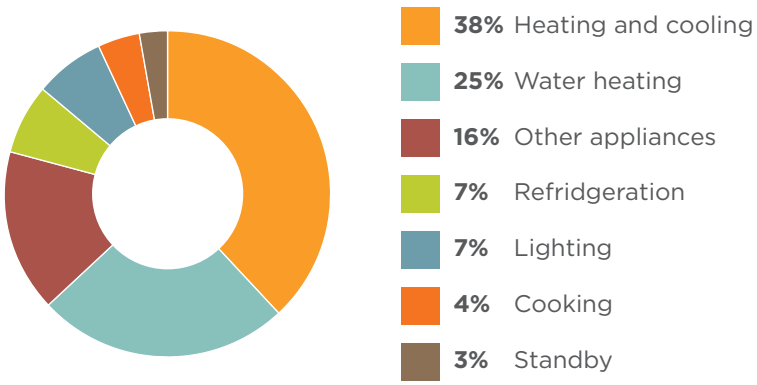
What you can do

'What we do now can have only a limited effect on the climate over the next 40 or 50 years, but what we do in the next 10-20 years can have a profound effect on the climate in the second half of this century'. Garnaut Climate Change Review[6]

Australia can significantly reduce its greenhouse gas emissions at a relatively low cost between now and 2020, and reducing our energy use is a key part of this[7].

The amount of energy that we use at home depends on the number of occupants, its design (orientation, insulation) and the materials it is made from. However, changing behaviour can reduce your energy consumption and greenhouse gases, as well as your energy bills.

Home energy use



Source: Baseline Energy Estimates, 2008
www.yourhome.gov.au/technical/fs61.html

The first step to reducing energy usage is measuring where and what amount of energy you use in the home. A home energy assessment is a good way to identify areas where you may be able to save energy and money. This can be conducted by a professional or you can carry out your own. Some local councils will have home energy assessment toolkits that you can borrow. Check at your local library or local council office. They will provide you with a step by step process. You can also borrow some useful tools such as Powermates; this will measure the electricity consumption of different electrical appliances. Alternatively you can use online home energy audits.

Once you have your home energy assessment plan you are likely to be faced with lots of choices. The size of your household, whether you are a homeowner, renting or about to build or renovate and your budget will all be important factors in your decision making, as well as any potential environmental benefits. Make time to research your options. Start with no cost and low cost options. Combining the savings you make through changing your behaviour with any rebates that are available might just make some of the more costly changes more achievable.

Living Smart Story

Anthea, Mandurah

I have always been aware of my energy use; I grew up with my mum telling me to turn off lights and to shut the fridge door. This has spurred me into good habits, that and paying my own electricity bills. I did like to use a clothes dryer although I knew it wasn't energy efficient. It was just a mind-set that I was in.

I live in a rental property and this house has a solar hot water heater on the roof. It makes a massive difference, I would really recommend this, we have so much sun here, and we should be using it.

I have become more aware of my power usage and standby. Unfortunately I can't turn it off on the microwave because of the way the kitchen is designed but I turn off the stereo, TV and my laptop before I go to bed. It has made me more aware of how much time I spend on the computer, I can spend a whole evening looking at craft, or books I would like to buy, now I turn it off, there are other things I can be doing.

Pic: Reuben, Anthea's son, rugged up in winter

I do have ducted AC but it doesn't cost too much to run, that's because I hardly use it. I close all of the vertical blinds. This makes a massive difference, then open up all of the windows when the sea breeze comes in. I only put on the AC if it is really hot. I have noticed other houses in the neighbourhood run their AC even when its only 25 outside, if the temperature goes up a bit, people just use it just because it is there. In winter I use a thermos to keep my water hot for coffee. I only use the heating when it gets really cold. We wear warmer clothes, thick socks, even a beanie during winter. I love a hot water bottle, so does my son.

There are a few things that I would like to change. If I had my own house I would love to have solar panels all over the roof. When I upgrade any of my appliances I will choose ones with the highest energy rating, otherwise it's not worth bothering. I would like to teach my son Reuben, that water and electricity are precious. At least if I make a difference in the way that I live, my little boy can make a difference too with his friends.

Getting started on energy saving

No cost

- Use cold water in your washing machine
- Turn off stand by
- Close blinds and curtains to prevent heat entering
- Open windows once it is cooler outside
- Use fans for cooling breezes
- Heat or cool only the room you are using
- Turn off lights when not needed
- Turn your thermostat down by a few degrees
- Check your electricity bill; have you reduced your usage?
- Turn off the extra fridge
- Use dishwasher and washing machine when they are full
- Dry clothes on a line

Low/medium cost

- Check for draughts, fit draught excluders
- Install low watt, energy efficient lighting such as LED or compact fluorescents
- Use a lamp for reading
- Buy energy efficient appliances, the greater the number of stars the more efficient it is.
- Insulate the outdoor water pipes from your electric hot water system
- Install external shading to keep heat from entering the house
- For more information see the How to guides at the end of this chapter

Energy Sources

The main sources for household energy are electricity, natural gas and wood. Conventional natural gas produces about 1/3 the amount of greenhouse gases that conventional electricity does . Renewable sources of energy solar and wind do not contribute additional greenhouse gases. Sustainably sourced biomass can be carbon neutral.

The easiest way to purchase electricity from renewable energy is to purchase Green Power. You pay a little bit more for your electricity to have energy from renewable sources put into the grid.

Visit www.greenpower.gov.au homes to identify the Government accredited providers in your state. Buying green power increases investment in renewable forms of energy.

GreenPower
Accredited Renewable Energy

What the frack?

Fracking is a method of extracting gas from shale rock. It involves pumping water, sand and chemicals to fracture the coal seams and bring their mixture of gas and saline water to the surface. There are concerns that fracking can contaminate groundwater and lead to seepage of high quality water from aquifers.

Around 90% of Australia's recoverable reserves of conventional natural gas are found in WA, off the north west coast. Currently there is limited production of shale gas or unconventional gas sources. Exploration of shale gas in WA is being undertaken at the Canning and Perth Basin.

Gas goes boom, A gas revolution in Australia's heartlands creates divisions, The Economist, June 2012

www.economist.com/node/21556291

Australia's shale gas resources, CSIRO

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Syed, A and Penney, K, 2011, Australian energy projections to 2034-35, Bureaua of Resources and Energy Economics

Carbon Neutral

Carbon Neutral means that zero greenhouse emissions are produced by an activity. To achieve this standard organisations or products must measure carbon footprint, monitor and reduce emissions. The last step is to purchase certified carbon offsets.

In 2012 South Fremantle High School became Australia's first carbon neutral school.

www.southfremantleshs.wa.edu.au

Top 5 actions

1. Get a home energy assessment.
2. Turn down your thermostat and insulate the pipes on your hot water system.
3. Minimise how often you need to heat and cool your home.
4. Turn off standby.
5. Purchase or generate your own renewable energy.

Generate your own renewable energy

Solar

With increases in electricity prices and decreasing costs, installing solar panels (also known as photovoltaic cells, or PVs) can give you the benefits of a clean and renewable energy source with minimal running costs once installed.

Residential solar systems are typically used to supplement mains grid power, so the more you can reduce your energy consumption the higher proportion of electricity you can generate yourself.

When selecting your panel you should consider how shading may affect them, construction quality, frame type, panel shape and weight and if it meets Australian standards. Some panels may be more suited to your roof shape than others and some panels can double as building materials, (reducing costs if you are building). Check Internet forums to find out whether the panel meets its advertised wattage, conversion efficiency and warranties; also check the performance of the inverters. Living in a hot climate, look for panels that have a low temperature coefficient as possible, this is the figure which tells you at what rate a panel output decreases with rising temperatures[9].

Biomass

Wood heaters are used to heat homes, water and to cook with, however, in urban areas they can contribute to local air pollution. Choose a low emission wood heater and operate it to minimise the amount of smoke it produces. Make sure your timber is sustainably sourced, never burn wet, green wood, it generates 50% less heat and creates more smoke. Choose a wood heater that is the right size for your room.

Other options you could consider are:

Solar leasing

Where a supplier leases a solar array to a customer, part of the saving goes to the customer and part to the supplier who is responsible for the capital costs and maintenance.

Community wind and solar

Combine time and/or funds with others in your community to build your own solar power station or wind farm. In August 2003 Denmark Community Windfarm Inc, was registered as a not-for-profit community organisation. Local people have been able to buy shares in the wind farm. Scheduled for completion in 2013 it will supply electricity to 40% of Denmark's homes www.dcw.org.au. Fremantle Wind Farm is building support to buy land to house a community wind farm in Fremantle www.fremantlewindfarm.com.au.

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[6] The Garnaut Review
[7] Low Carbon Growth Plan for Australia
[8] www.yourhome.gov.au/technical/fs61.html
[9] Solar panel buyers guide 2012: What's new and where to buy

Living Smart Story

Keith and Anne, Darlington.

In early 2009 an article appeared in our community magazine, asking what the structure was that had suddenly appeared on a roof in the village of Darlington. The answer came in the next edition. A homeowner had installed photovoltaic panels at a cost of $18,000 and was proudly generating his own electricity and selling the excess to Synergy! My partner Anne and I were surprised at the cost. We had recently installed a similar system for only $1,500 using a Commonwealth grant. More importantly, because electricity had become a focus in our household, we were now using much less energy through simple behaviour changes! What if the local community could do the same?

At the time I was enrolled in a post-graduate sustainability diploma at Murdoch. I needed to find and develop strategies to encourage a small focus group to live more sustainably, coach them through the process and track their progress. Always one to see an opportunity, Anne suggested that I aim much bigger and use the Darlington community as my focus group, saying "What if Darlington could become the first solar community in WA?"

Now I like a challenge, and I like my efforts to count for something. We printed 1,700 colourful flyers and hand delivered them within a week. We asked for expressions of interest, mentioned saving money and the planet for our grandchildren. I said that it was a university project and I would receive no financial benefit. The emails quickly rolled in.

I soon found a local retailer interested in working with our community. I would survey community needs, email regular updates and energy tips to encourage behaviour change. The retailer would do roof assessments and installations. In the second week I set up a Saturday stall at the local shop to encourage even more locals to take part. The next day we opened our home (in two sittings) to show-off our PV system, introduce the retailer and their technology to the 70 households who attended.

The project went for nine months with 340 homes assessed. The adjoining suburbs of Glen Forrest and Boya were keen to be included and the retailer had to employ another sales person to cope. Many homes had unfortunate tree-shading problems preventing them from installing the technology, but most of these households stayed connected to the project and used other strategies to save energy.

70 homes were approved by June 2009 when Minister Garrett prematurely withdrew funding due to over subscription. Three years later we are still hearing from residents about low electricity bills and new PV installations.

Keith and Anne

Want to find out more?

How to guides

Energy efficient lighting
Energy saver ready reckoner
How to adjust your water heater
How to choose the best electricity tariff for you and the environment
How to convert downlights to a more energy efficient option
How to set up your fridge
How to shade your windows from the summer sun
Installing roof insulation
Introduction to saving energy
Investing in a photovoltaic (PV) system for your home
Natural heating and cooling for a comfortable home
Solutions to standby power
Upgrading to an energy efficient hot water system

www.transport.wa.gov.au/activetransport/24657.asp

Energy saving tools
www.switchthefuture.com.au/Energy-Saving-Toolbox/

Comprehensive information on saving energy in the home, rebates, home energy assessment
www.livinggreener.gov.au/rebates-assistance

Guide to Solar PVs, how they work, Australian standards, different subsidies and questions to ask your electricity retailer and distributer. Find an accredited installer
www.cleanenergycouncil.org.au/resourcecentre/Consumer-Info/solarPV-guide.html

Online home energy assessments
www.sa.gov.au/subject/Water,+energy+and+environment/Energy/Energy+efficiency/Understanding+your+energy+use/Check+your+home+energy+use+-+home+energy+audit/Do+your+own+home+energy+audit

www.originenergy.com.au/calculator

Books

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Mobbs, M (2010) Sustainable House, 2nd Edition, CHOICE Books, Australia

Wrigley, D (2012) Making Your Home Sustainable A Guide to Retrofitting, Scribe Publications. ISBN (13): 9781921844171

Magazines
Alternative Technology Association. ReNew: Technology for a Sustainable Future. www.ata.org.au See issue 118 for 'Solar panel buyers guide 2012: What's new and where to buy'.

Articles and Reports
Energy In The Twentieth Century: Resources, Conversions, Costs, Uses, and Consequences, Annual Review of Energy and the Environment, Vol. 25: 21-51 (Volume publication date November 2000)

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Syed, A and Penney, K, 2011, Australian energy projections to 2034-35, Bureau of Resources and Energy Economics
http://www.bree.gov.au/documents/publications/aep/Australian-Energy-Projections-report.pdf

Office of Energy (2011) Energy 2031. Strategic Energy Initiative Directions Paper: A smarter energy future for Western Australian

Websites
Australian Academy of Science
The science of climate change, Questions and Answers
www.science.org.au/policy/climatechange.html

Carbon Neutral
www.carbonneutral.com.au

The Climate Institute
www.climateinstitute.org.au

Climate change projections, flood maps in Australia
www.ozcoasts.org.au/climate/sd_visual.jsp

Climateworks (2010) Low Carbon Growth Plan for Australia
www.climateworksaustralia.org/low_carbon_growth_plan.html

Department of Environment and Conservation, 2012 Western Australian Government, Adapting to our changing climate,
www.dec.wa.gov.au/our-environment/climate-change.html

Department of Climate Change and Energy Efficiency, The critical decade: Climate science, risks and responses, Published by the Climate Commission Secretariat,
www.climatecommission.gov.au

The Department of Health, The Health Impacts of climate change: Adaptation strategies for Western Australia
http://www.public.health.wa.gov.au/cproot/1510/2/Health_Impacts_of_Climate_Change.pdf

[1] *www.garnautreview.org.au*

Indian Ocean Climate Initiative (2012) Western Australia's Weather and Climate: A Synthesis of Indian Ocean Climate Initiative Stage 3 Research. CSIRO and Bureau of Meteorology, Australia. Editors: Bryson Bates, Carsten` Frederiksen and Janice Wormworth.

www.dec.wa.gov.au/our-environment/climate-change.html

www.yourhome.gov.au/technical/fs61.html

Films

I'm a climate scientist
www.youtube.com/watch?v=H7wdKg8rYL0

Notes

Notes

Living Smart

Travel Smart

Travel Smart

Electric car recharge network

Perth is the first Australian city to have an electric car recharge network. The network reduces the amount of time it takes to recharge a car by about 30%. Currently there is a limited supply of electric cars but it is possible to convert a conventional car. Smaller cars generally make better conversions to electric vehicles as they are lighter.

www.myelectriccar.com.au/faq/

www.therevproject.com

Australian capital cities are among the most car dependent in the world. Cars are expensive and generate carbon pollution and photochemical smog that affects the respiratory system. They are also the cause of road accidents that are a major killer and cause of disabilities. Alternatives forms of travel are cheaper, less stressful, benefit the environment and your health.

Trends and issues in Western Australia

The average Western Australian household owns 1.9 cars; this is the highest rate in Australia. As urban Perth and the South West continue to develop, West Australians are driving further.

Perth is one of the most car dependent cities in the world, with 81% of all trips undertaken by car (55% as driver and 26% as passenger). Current trends in car use and urban growth would result in car traffic in Perth increasing from 25 million kilometres per weekday in 2003 to 44 million by 2031.

From 2007 to 2012 the numbers of registered vehicles increased by 18% from over 1.5 million to just under 2 million. That means for every 1,000 residents there are 828 vehicles[1].

The high and growing level of car use in Perth is a concern because[2]:

- Owning and running cars represents a major cost for households, accounting for 15% of expenditure by WA households. These costs can be a source of financial stress and can only increase if fuel prices rise.
- Maintaining and extending the urban road network is a significant public cost.
- Traffic congestion is becoming a significant issue in Perth. Adding road capacity will not solve all future congestion problems in Perth.
- Greenhouse gases from transport are a significant and growing component of WA's total emissions. Emissions from car travel contribute more than half of all transport emissions. Motor vehicle emissions are the single largest contributor to the pollution load in the Perth air shed contributing to health risks and environmental damage.

There are many ways that car dependency can be reduced. Some of these, such as provision of better public transport services, allocation of special bus lanes, construction of more cycle ways and paths, lie with government authorities. As well as lobbying for these changes, individuals should also take personal responsibility for how they travel.

Peak Oil - the end of Cheap Oil

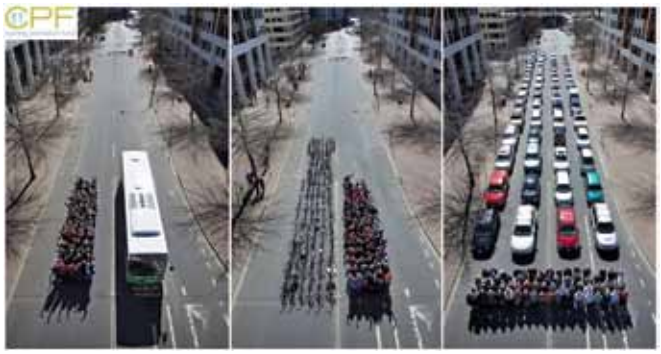
Transport behaviours and planning has been hugely influenced by the availability of cheap energy-intensive fuel for many decades. The imminent arrival of peak oil and gas, where supply from the world's dwindling reserves can no longer meet demand, will force a serious rethink in how we transport ourselves and our goods. See more in Big Issues.

What are the alternatives?

To find the alternatives that are most suitable for your lifestyle, keep a travel diary for a week or so - how are you travelling, why are you travelling?

Planning your week and combining tasks on your journey is an easy way to reduce the total number of car journeys you make. Many car trips are short trips - half are less than 5 km and many are less than 1 km. Walking, cycling or public transport can easily replace half of all car trips. With some planning you may be able to replace the majority of your car journeys with healthier, more enjoyable and environmentally friendly forms of travel.

Reducing car ownership will create more space in urban areas:



www.bit.ly/PJ0ZAD

There are four main alternatives to the car:

1. Public Transport

Catch the bus, train or ferry. Visit your city or regional pubic transport website to find out what services are available in your area. For city-based travel, a journey planner is typically provided on the public transport website allowing you to enter details of your journey – where you are travelling to and from, at what time and on what day. It will then calculate for you all possible travel options. Transperth will also calculate the total journey time and allow you to select different modes of transport. Many people are surprised to find that if travelling at peak hour, using public transport often takes the same amount of time if not less, while avoiding parking fees and the stress of being stuck in a traffic jam.

2. Walking

It takes about 10-12 mins to walk 1 km. So walking can provide an efficient way to travel to destinations 2 to 3 kms away. On an average day in Perth 400,000 1 km car journeys are made, which could easily be replaced by walking. Walking to a friend's house, work or the train station is an easy way to stay active. Get neighbours and friends to join you - it's a great way to socialise.

3. Cycling

It's fast, fun, keeps you fit and is practically free. Keen to start riding but lack the confidence or want to brush up on your skills? 'Be active cycle instead' run by Cycling Western Australia offers accredited training that slowly builds your confidence, bike handling and traffic skills.

TravelSmart

TravelSmart is a state government program that encourages the local community to walk, cycle and use public transport as an alternative to the car. Workplaces, schools, hospitals and universities are supported with a range of resources. Your local TravelSmart guide features public transport, walking and cycling routes as well as local facilities. Download for free

www.transport.wa.gov.au/activetranspoort

Living Smart Story

Rebecca, Bassendean

I used to be mindful about sustainable living but that all seemed to go out of the window when I had kids. Participating in a Living Smart course 2 years ago reignited my interest in sustainable living. I was keen to reduce my use of our old diesel 4 wheel drive and travel more sustainability when I could. During the course I was inspired to dust off my bike. It had flat tyres. Every time I wanted to use it I couldn't and I never seemed to find the time or inclination to fix it. So armed with a $10 discount voucher for a local bike shop and the inspiration from the course I took my bike for a service.

I now have another transport option to the car. It has been easy to incorporate riding into my life without too much effort. I cycle to the gym, previously I would drive and spent the first 10 minutes on the treadmill warming up. Now I arrive ready to go! As I have young kids I don't have the luxury of doing things when I want, so I have to be organised and mindful of time. To use my bike I just have to plan my time, allow an extra 10 minutes or so for each journey. Sometimes I get into my car and I think I could have used my bike, it probably would have been quicker. I often do to the school run with my son in the bike trailer. On some days the school run might be the only exercise I get. Although it isn't too far away it's up a hill so it's quite a good, if short, work out!

I try to substitute as many car journeys as I can with my bike, its something that I have been doing for 2 years now and in the future I would like to do more riding and less driving. Ideally I think it would be good to have a more environmentally friendly car but there are other changes that I would like to make in my life first. Buying solar panels, for example. The changes that I have made are life long ones. Participating in my local Living Smarties group keeps me motivated and the changes that I would like to make front of mind.

Rebecca and her son

No time to ride your bike?

How much does your car cost you?
Average cost of medium sized car per year:
$7,360* average car per year +
$4,145 standing costs (Stamp, Registration, Insurance, Club Membership).
$ 2,842 running costs (fuel, tyres, servicing) (14,000 km per registered vehicle) =
$14,347

*(Based on RACV, Vehicle running costs for 2012, Medium vehicles and ABS Motor Vehicle Census, 2012 figures). *Average age of vehicle 10 years*

So, car ownership can cost 15-38% of a household's weekly income!

How long does it take you to drive to work?
3 hrs 40 mins per week average commute time in Perth +
14 hrs per week to pay for car =
17 hrs 40 mins.

(Based on full time worker in WA ABS 2011 Census QuickStats and Flood, M and Barbato, (2005) The Australia Institute Off to work: Commuting in Australia).

Average cost of a bike?
$300-$1,000 = New bike including helmet, gloves, lights and lock
$35-150 = Bike service or do it yourself
$100 = Insurance (aprox)
0.6% to 1.7% of household income.

How long would it take you to ride to work?
14-40 mins per week to pay for bike +
___km x 0.25 hrs per km =

Are you a keen rider? You can encourage others in your workplace to ride by organizing a Ride2work day. A free kit will provide you with promotional materials and suggestions on how to involve others, including senior representatives in your organisation.

4. Carpooling

Many car trips are made alone. Carpooling, or travelling with two or more people in the car, is a great way to reduce costs and reduce your environmental impact. Your workplace may have a carpool register, alternatively you can use an online site. Carpoolers in Perth get discount parking in 3 city car parks.

The Convenience Factor

The most common resistance to alternative forms of transport is the convenience of the car. Bad weather, multiple destinations, too much stuff to carry, are all common excuses we give ourselves. It does take some organisation and commitment to reduce the number of times you jump in your car. How about buying a granny trolley to load up your groceries for the walk home from the shops? Use an umbrella on your walk – for rain and shade – or wet weather gear for your bike ride.

Efficient driving

For many of us there is no avoiding using the car on some occasions. In these cases, using your car effectively will reduce its emissions and save money.

- Drive smoothly.
- Keep your car well maintained and regularly serviced.
- Keeping the tyres inflated will also save on fuel costs and will extend the life of the tyres.
- Plan your trips - Rather than making multiple trips a day run all your errands at once. For example, go to the bank and do your shopping on the way to picking the kids up from school.
- Avoid using your air-conditioner, this can increase fuel consumption. Park in the shade, use sun shades and open the windows for natural cooling. If you must use the air-conditioner make sure you let the hot air escape by winding down the windows. Once the hot air escapes close the windows and then use the air conditioner in economy mode.
- Avoid using the roof rack, this will create wind resistance and lower your fuel efficiency. Put things in the boot instead.
- Don't idle the car while waiting for someone, running an errand or when stopped in traffic. Contrary to popular belief, it doesn't use more fuel or create more emissions if you turn your car off and on. In fact, 10 seconds of idling can use more fuel than turning off the engine and restarting it[4].

1 Motor Vehicle Census, Australia

2 Benefits of being Travel Smart, WA Department of Transport

3 Getting Started – Walking, WA Department of Transport

4 California Energy Commission, Consumer Energy Centre

Bio fuels

Bio fuels are derived from plant and animal matter. Biodiesel can be made from vegetable oils, animal fats and recycled from cooking oil. Fermenting plant materials makes bio ethanol. Research is focusing on the potential of micro algae to mass produce bio fuels and second generation bio fuels, which use non-food biomass.

Renewable, and with lower carbon emissions than petrochemicals, bio fuels have been celebrated for their role in reducing transport's greenhouse gas emissions. Expansion in bio ethanol production to meet the renewable fuel standard in the US and EU, as well as recent droughts, however, have contributed to massive increases in corn prices. Dramatic price swings have lead to financial speculation causing further rises in food prices. This has cost southern (developing) countries over $11.6 billion in the past 6 years in rising food prices.

Australia's bio fuel industry is small and currently uses wastes and co-products of food. With a drying trend in much of Australia and increases in population forecast food versus fuel may well become an issue in the future.

Wild, A (2011) Bio fuels and competition in Australia, CSIRO

Wise, T (2012) The cost to Developing Countries of US Corn Ethanol Expansion, GDAE Working Paper 12-02

Living Smart Story

Gareth, Karratha

My wife and I used to live and work in the UK, so we were used to using public transport. When I lived in Perth I would drive to the train station and then catch the train into the city. When we moved to Karratha a friend and I talked about cycling the 24 km to work, but everyone in the office said it would be too hard, too long or too hot. So it became a challenge.

Once we started to ride one way to work, others thought that they could do it too. Now lots of people have bought mountain bikes. I have really noticed the difference, we really struggle for bike storage, so our office is full of bikes. We even make our boss cycle one way to work when he comes up from Perth.

It's such a stress reliever, we go through the gorges and see wildlife. It's fun. There is also the fitness aspect. I have noticed a remarkable difference in my health. There are people who you thought would never be able to cycle that distance, who now do. I also notice where there is rubbish along the way, so the next time we do a clean up we go back to that spot and pick it up. Another friend of mine, who started cycling, got in touch with the local council. He wanted to know why a cycle path hadn't been included on the new road upgrade. I have heard on the grapevine that there is going to be a separate bike path made of gravel.

I don't ride every day, as I have a newborn and I like to get back from work to see him so sometimes I carpool. Karratha is a small community, everyone lives close by and there is lots of community spirit. Our office teams us up with people who live close by. Rather than 16 cars going to our office, 4 go instead.

In the future, I would like to ride to work more often, it keeps me fit and it's sustainable.

Gareth cycling to work

Top 5 actions

1. **Combine exercise and your commute to work** - walk, scoot or cycle all or part of the way.
2. **Consider car pooling** if you need to travel to a regular location by car.
3. **Plan your journeys and associated tasks**, look at how you can reduce your journeys by combining tasks.
4. When considering public transport journeys **consider** not only the time it takes, but also **the benefits of the extra productive time** during which you can read, listen to music or watch the world go by.
5. If using the car, **follow our efficient driving tips**.

Want to find out more?

How to guides

Travelsmart, information on travel alternatives to the car.
www.transport.wa.gov.au/activetransport/24634.asp

Lots of information on cycling skills, equipment and accessories, types of bikes, how to choose and maintain your bike,cycling maps in Perth, safety tips and lots more.
www.transport.wa.gov.au/activetransport/25165.asp

Find out more about bike paths in your area. WA Bicycle Network
www.transport.wa.gov.au/activetransport/25673.asp

Lots of information on walking, its benefits, walking trails in your area and road safety information
www.transport.wa.gov.au/activetransport/24759.asp

For information on organised bike rides and bike skills training:

Peak Oil
Association for the Study of Peak Oil and Gas
www.peakoil.net (International)
www.aspo-australia.org.au (Australian)

Biofuels
http://therealnews.com/t2/index.php?option=com_content&task=view&id=31&Itemid=74&jumival=8931

Bicycling Western Australia
www.bwa.org.au

Cycling WA
www.wa.cycling.org.au
Search for your local BUG (Bicycle Users' Group)

Carpooling
www.mycarpools.com
www.sharemycar.com

Electric Vehicles
www.myelectriccar.com.au
www.aeva.asn.au

Walking
Department of Transport, Getting Started – Walking
www.transport.wa.gov.au/activetransport/24759.asp

Cars
Australian Bureau of Statistics, (2012) Motor Vehicle Census, Australia,
www.abs.gov.au/ausstats/abs@.nsf/mf/9309.0/

California Energy Commission, Consumer Energy Centre,
www.consumerenergycenter.org/myths/idling.html

Department of Transport Benefits of being Travel Smart
www.transport.wa.gov.au/activetransport/24609.asp

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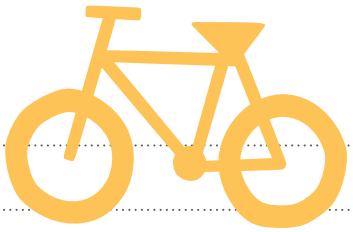

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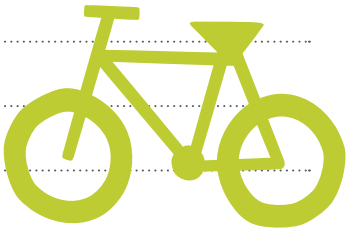


Living Smart

Water Smart

Water Smart

Australia is the driest inhabited continent on the planet. Water is a scarce resource due to the combination of low rainfall and high temperatures that causes high levels of evaporation. As our population increases and rainfall decreases, our water resources will be placed under further stress. This threatens our fresh water ecosystems, food production and domestic water supplies. Managing water sustainably in the home is more cost effective than creating new supplies and can benefit the local environment.

Trends in Western Australia

Western Australia has historically been known as a land of floods and fires, storms and droughts however, human activities are having a major impact on our water supplies. Rainfall is on the decline in most parts of Australia. Western Australia, in common with many other areas in Australia, is use to fluctuating rainfall patterns. Analysing average amounts of rainfall over long time periods establishes trends that move beyond these short term fluctuations.

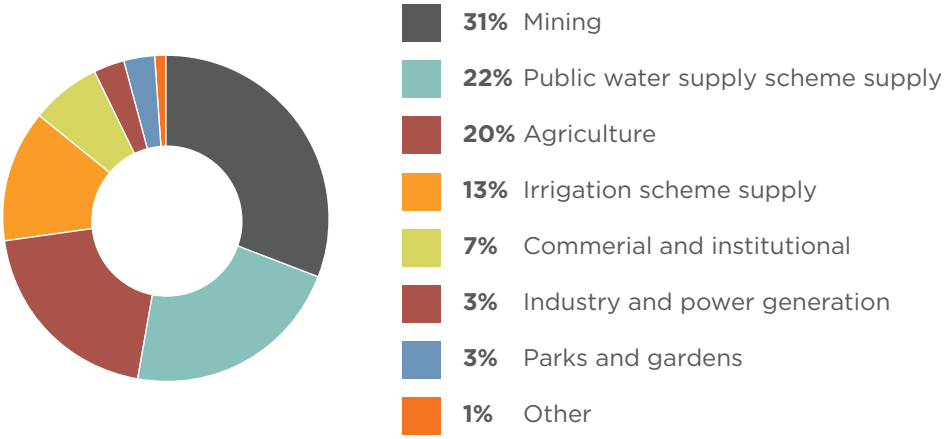
In South-West WA (SWWA) in a line approximately from Esperance to Northampton rainfall has reduced by around 15% since the mid-1970s. During the last sixty years there has been a 20% reduction in winter rainfall and even sharper reductions in streamflows. Indian Ocean Climate Initiative (IOCI) has investigated the changes to WA's weather and their likely causes:

'Modelling shows that these large-scale changes are consistent with those expected in an atmosphere influenced by increasing concentrations of greenhouse gases. This is a major signature of climate change on the global climate system[1]*.*

Predictions indicate that this drying trend will continue in SWWA. Climate change is likely to impact Perth the most out of Australian cities in terms of water scarcity[2]. Projections also show a drying of Kimberley and Pilbara region climates by mid-century[3,4]. For more information see the chapter, An Overview of Climate Change.

Issues

Water use by sector in Western Australia, 2012



Source: Department of Water, 2012, Annual Report 2011/2012
www.water.wa.gov.au/PublicationStore/first/103564.pdf

Perth is one of the highest water using cities in Australia, and Australians are the highest water users in the world[5]. Perth dams have seen a major reduction in average stream flows. Average stream flows into Perth dams have reduced from 338 gigalitres (GL)(1911 to 1975) to 21 billion litres (2006 to 2012).

Although the average person in Perth has reduced their water usage by 18% from 2000/1 to 2008/9, rainfall has also decreased and our consumption of water is increasing due to population growth. Our water supply is being met through the use of finite ground water supplies and desalination plants. Groundwater supplies need to be maintained at a high enough level to ensure that catchment areas, rivers and streams remain wet from year to year. If these areas dry out it reduces the amount of run off into dams even if the rainfall is high. This not only impacts our future domestic water supplies but our capacity to supply water for agriculture and maintaining the appropriate water flows to ensure there is a healthy ecosystem.

Sources of water in Western Australia

Western Australia's water supply is drawn from surface water, ground water and desalination plants.

Surface water:
water that collects in lakes, rivers and streams or collects on the ground.

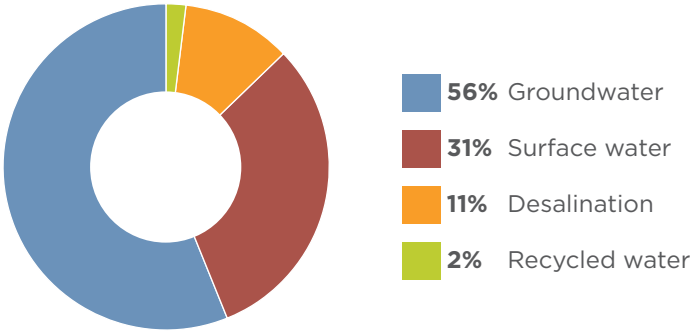
Ground water:
water which seeps through soil or fissures in rock and reaches the water table (upper surface where soil or rocks are permanently saturated). The water table will rise and fall depending on precipitation. Licensed users of groundwater in WA include The Water Corporation, industry, pine plantations, schools and parks and backyard garden bores. Ground water can be a renewable resource if water is taken at a rate that can be recharged by rainfall. Groundwater maintains wetlands and their flora and fauna.

Desalination plants:
Western Australia has 2 desalination seawater plants that have the combined capacity of providing 95 billion litres (giga litres) of drinking water per year. Although it is an energy intensive process both plants use renewable sources of energy. Work has commenced on expanding the capacity of the newly opened Seaport plant. Salt is removed from seawater via reverse osmosis, the diffusion of water through a membrane at high pressure. The by-product of this is brine. Its concentration is twice that of seawater. The long term environmental effects of sourcing seawater and disposal of brine have not been documented[6]. There are also concerns regarding safe levels and amounts of boron, that is left in the drinking water[7].

Recycled Water:
Wastewater from sewage and storm water can be treated and reused. Currently only 2% is treated. Its level of treatment depends on its final use. It is released into the ocean or aquifers, used on public open spaces such as sporting ovals and golf courses, in agriculture and for industrial processes.

The treatment and use of recycled water will increase in the future, its use as drinking water is being considered. Waste water is always available, even in dry years, its volume is growing, as our population increases and recycling water uses less energy than desalination[8,9,10].

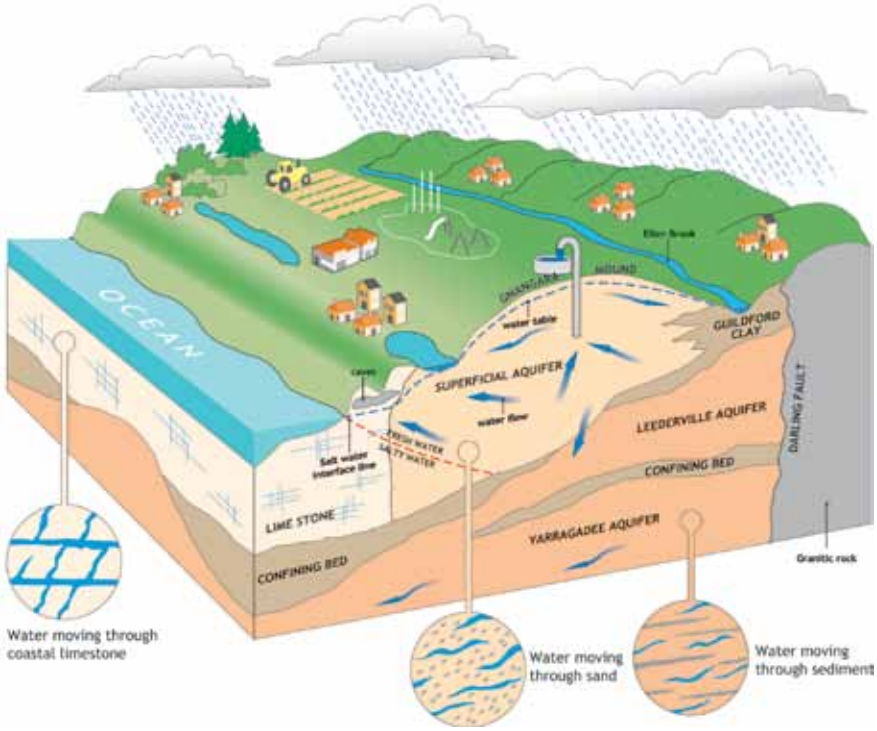
Sources of Perth's water, 2010-11[11]



Source: National Water Commission, National Performance Report 2010-11, Urban water utilities,
http://archive.nwc.gov.au/__data/assets/pdf_file/0016/21913/1280-NWC-NationalPerformanceReports-Urban-WEB-appendices.pdf

The Gnangara mound is Perth's largest source of groundwater, it comprises of 4 main aquifers.

Source: Department of Water, WA



http://www.water.wa.gov.au/Understanding+water/Groundwater/Gnangara+Mound/default.aspx

Exploitation of the Gnangara groundwater has led to falling water levels and quality in the lake Loch McNess, reductions in habitat and macroinvertebrate richness and declines in vegetation health.

Source: Water Corporation - average Perth residential water use by area (%) (Perth residential water use study 2008/09).

Living Smart Story

Kath, Busselton

I think that water is the most valuable natural resource that we have. When we bought our home in beautiful Busselton, about 5 years ago it had lawns, no trees or shade, a backyard that we were not able to use in summer. Progressively I planted natives, to create an atheistically pleasing garden with shade and screening, somewhere for the children to play in. Our back garden has been transformed, we have frogs, geckos and lizards, there are even ringtails living in the trees. It is a much more diverse place, we can use it all year round and it uses less water than if we had all lawn. On a Saturday morning when I sit out the back, it makes me feel good. The garden is like another room, and I am always looking at ways to maximise how we use it. My girls and I do mosaics and make clay mushrooms, so we have colourful things hidden in our garden.

About 3 years ago we replaced the front verge with natives, we kept a small piece of lawn, somewhere to play 'Duck, duck, goose' with the kids and wash the car. Although the kids probably play more in the natives, there is a native wisteria they sit in and pretend to be pirates or on a ship. I think it looks fabulous, there are tunnels, nooks and crannies, it's full of birds and it's flowering at the moment. It is a buffer between the lawn area and road, the front of the house is now quite private, and it has increased our living area.

We are very water conscious; when we moved in we changed our water fittings and installed a dual flush toilet. Here in WA we are not even close to the level of water conservation that we should be. Recently, I went on business trip to Canberra and Melbourne, they have reduced their domestic water use by 40%. We are still a long way off valuing water to that extent.

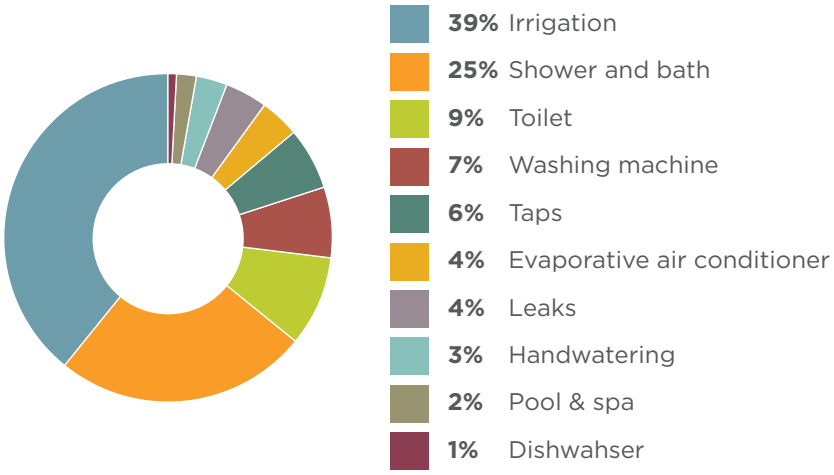
My dream home would be a green home, rainwater tanks, grey water systems, maybe, that's where we will go next. We have done the small fixes, next for us is to do the big stuff.

Kath's kids enjoying the backyard

What you can do

71% of scheme water is used in residential houses; this means our collective capacity to reduce water is large. Changing some simple behaviours in and around the home can save a lot of water.

Water use in an average Perth home



Source Water Corporation, Average Residential Water Use

www.watercorporation.com.au/_images/waterwise/water_use/PRWUS_average_residential_wateruse_large.PNG

In Perth we use 44% of water outside. See Smart gardens for biodiversity for more information on how to plant native species in your garden, replace your lawn and how your household can help to protect our waterways. See Smart gardens for productivity for more information on how to reduce your water consumption in your gardening by mulching and the way in which you water your garden.

Rainwater tanks

Gather, accumulate and store water. Before purchasing a rainwater tank consider how you will use the water you collect, what space you have available, rainfall patterns and how much rainfall you can potentially harvest. Most local governments require a building approval. Plumbing a rainwater tank into the house is the best way to maximise use of captured water.

Use the following formula to calculate how much rainfall you can potentially harvest: Roof area m2 x Amount of rainfall mm x 0.9 = rainfall potential.

My potential harvest .....

.....

.....

.....

.....

Getting started on water saving

No cost

Find out where you use water, carry out a waterwise assessment

Turn off the tap when brushing teeth, shaving or washing

Shorter showers, 4 minutes or less

Capture cool water in bucket whilst running tap/shower for hot water, and then use it on your plants

Only use dishwasher and washing machine when they are full, select eco or low water settings

If it's yellow let it mellow, if it's brown, flush it down!

Make a dual flush toilet, place drink container full of water into the tank

Keep car washing to a minimum, use a bucket and do it on a lawn

Low/medium cost

Repair leaky taps inside and outside your house

Check your toilet for leaks, drop food colouring into the cistern, if it appears in the toilet you have a leak, so get it fixed

Fit aerators to taps, they reduce flow whilst maintaining pressure

Fit a low flow shower head

Insulate hot water pipes, avoids waste water whilst waiting for it to heat up

Buy AAA water efficient appliances

Install a dual flush toilet

Living Smart Story

Peter, Applecross

Before we did Living Smart we weren't aware of our water use, we were aware of water restrictions but that was about it. The course seemed to come at the right time for us. I had recently sold my business and my wife Paula and I were looking for something more in our lives. We have always been anti consumerism, living a modest lifestyle even though we are quite well off. The global financial crisis had just hit and it was good illustration that the way we are heading, economic growth, is the wrong direction. When we went into the course we wanted an approach to life, Living Smart was the impetus to get off our backsides and do it.

Peter's veggie patch has replaced his front lawn.

With 5 adults in the house, (we have 3 teenage kids) and all of us taking long showers our water consumption was over the average, about 12,000 litres per year. By changing our lifestyles and behaviour we have reduced that by 70%. We started to collect water from our shower and pour it down the toilet. We ripped up our lawn and converted it into a 5m by 1.5 m vegetable garden. I also planted some fruit trees or as I like to call it my orchard. We then diverted the water from our down pipes into our unused green waste bin. We put a tap on it and gravity fed it onto the veggies. We don't need our green waste bin as all of our food scraps go into our compost, our neighbours bring us their scraps too and we make compost every 4 weeks. The produce I grow has doubled from last year (I weigh all of my produce) but we are using less water, as we don't have a lawn. We have done the sums and although we realise that financially it doesn't make sense for us to put in a water tank, we would love to do it. So this year was the year of the chooks and water. Now that I've built my chook pen from salvaged material, we are going to concentrate on making the reuse of our water more easy and convenient.

We used to look at the world and worry, but now we have hope and don't have to worry about what other people are doing. We can concentrate on what we can do as a family. It's been great for our kids to see all of this happen. Every time I look outside and see everything growing I get so much joy, once you do all of this you can't go back.

Water-footprints

Waterfootprints are indicators of the water (both direct and indirect) used in a product. Waterfootprints depend on where and how a product is produced.

The global average water footprint of:
1 tomato is 50 litres
1 glass of wine is 110 litres
1 kg of beef 15415 litres

To find out more:
www.waterfootprint.org/?page=files/home

Reusing water

When water has been used domestically it is graded as grey or blackwater. Greywater is water discharged from household appliances and water using fixtures such as showers, washing machines and basins. This water can be reused for watering the garden or for flushing toilets.

The easiest way to reuse greywater is manual bucketing; transferring water from your laundry sink or bath onto the garden rather than down the drain.

Revamping your bathroom? There are a range of products that will divert greywater from showers and hand washing into water for flushing the toilet. Greywater can be treated in the home via a primary treatment system which uses a sedimentation tank to screen out oils, grease and particles and uses a below ground irrigation system; secondary treatment systems further treat the water which can then be used in above or below ground irrigation.

Water discharged from the toilet is known as blackwater. Septic tanks and composting toilets can treat blackwater.

Installation of a grey water system requires Local Government approval and most metropolitan local governments do not allow the use of composting toilets. If you bucket greywater by hand you do not need any approvals.

Top 5 actions

1. **Conduct a waterwise assessment** (see Water Corp website).
2. **Reuse greywater** in your garden.
3. **Replace your lawn with native ground** cover and minimise water use in the garden.
4. **Install a low flow shower head** and have shorter showers.
5. **Install** or make **a dual flush toilet** and only flush when you need to.

Do's and dont's for greywater reuse

Do apply in several locations

Don't let it pool

Don't apply to areas used by pets and children

Don't use water that has been used to wash soiled nappies

Don't discharge onto edible plants or where fruit has fallen

Don't store greywater

Don't let it go on your neighbours' property

Whatever you put down the sink will end up in your garden; restrict your use of household chemicals (see Healthy homes for more information).

Do use biodegradable, low phosphate, sodium, boron, chlorine and borax products; restrict the use of bleaches and other household chemicals.

[1] Western Australia's Weather and Climate: A Synthesis of Indian Ocean Climate Initiative Stage 3 Research.

[2] Climate Change-potential impacts and costs

[3] Climate Change - Potential Impacts and Costs – Western Australia.

[4] North- west Western and central-western Australia has increased rainfall during the winter. North- west Western Australia has seen increases in rainfall associated with tropical cyclones and closed low weather systems. These changes have been linked to particulates from aerosols, the influence of Antarctic ozone depletion and natural variability. Further study is needed to confirm the links to aerosols.

[5] Perth residential Water Use Study 2008/9

[6] Environmental concerns of desalinating seawater using reverse osmosis

[7] Desalination: A National Perspective: Committee on Advancing Desalination Technology

[8] Towards Climate Resilience

[9] State water recycling strategy: An overview

[10] Water Recycling- Public Open Spaces

[11] Perth desalination production was 52, 010 ML, 55% was transferred to customers (shown in graph) the remainder was transferred to surface water storage.

Want find out more?

How to guides

Waterwise Assessment, Water Corporation
http://www.watercorporation.com.au/_files/waterwise/Waterwise_Household_Assessment.pdf

Being Waterwise, information and tips on how to save water in your home and garden
http://www.watercorporation.com.au/W/waterwise_index.cfm?uid=0837-2686-2368-6916

Rainwater Tanks, Information Sheet
http://www.watercorporation.com.au/_files/waterforever/rainwater_tanks_factsheet.pdf

Introduction to saving water

How to re-use greywater
Installing a rainwater tank
Your guide to waterwise gardening
How to install drip irrigation
Soil conditioning and mulching
Waterwise toilet solutions
How to fix a leaking tap
How to install a flow regulator
How to install a waterwise shower head
www.transport.wa.gov.au/activetransport/24657.asp

How to save water, information on water efficiency, appliances, gardens, restrictions, greywater and rainwater
www.livinggreener.gov.au/water

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Ha, T, 2006, Greeniology: How to live well, be green and make a difference. 2nd Edition, Melbourne University Publishing.

Magazines

Alternative Technology Association. ReNew: Technology for a Sustainable Future. www.ata.org.au

Reports and articles

Indian Ocean Climate Initiative (2012) Western Australia's Weather and Climate: A Synthesis of Indian Ocean Climate Initiative Stage 3 Research. Pg vii. CSIRO and Bureau of Meteorology, Australia. Editors: Bryson Bates, Carsten Frederiksen and Janice Wormworth.

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Tularam, G and Ilahee, M Environmental concerns of desalinating seawater using reverse osmosis, Griffith Research Online www98.griffith.edu.au/dspace/bitstream/handle/10072/18023/47826_1.pdf?sequence=1

Water Science and Technology Board, 2008 Desalination: A National Perspective: Committee on Advancing Desalination Technology, The National Academies Press, Washington DC, www.nap.edu/openbook.php?record_id=12184&page=R1

Water Corporation, 2009 Towards Climate Resilience, www.watercorporation.com.au/_files/Water_Recycling/Water_Forever_50_Year_Plan.pdf

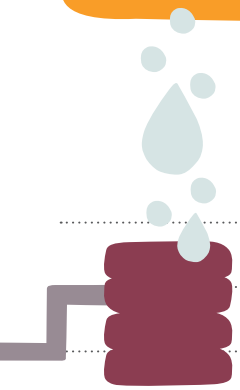
Department of water, 2008, State water recycling strategy: An overview, www.water.wa.gov.au/PublicationStore/first/80011.pdf

Water Recycling- Public Open Spaces, Information Sheet, 2010, http://www.watercorporation.com.au/_files/waterforever/Water_recycling_open_space_factsheet_AW.pdf

Websites

How is water allocated in your area?
www.water.wa.gov.au/Managing+water/Allocation+planning/default.aspx

Notes



Living Smart

Waste Smart

Waste Smart

Western Australia Waste Facts

Highest rates of waste generation in the country measured per capita (Waste Strategy 2012)

Increasing levels of waste generation
Total waste per capita
2008/9 = 2944 Kg
2009/10 =3504 Kg

Increasing levels of recycling
2008/9 = 27.8%
2009/10 =33%
(Hyder Consulting 2010)

Zero waste

In nature there is no waste. Zero Waste is a goal that is inspired by natural cycles, where all discarded materials are designed to become resources for others to use. www.zwallianceuk.org/wpzw01/wp-content/uploads/ZWIA-Peer-reviewed-Definition.pdf

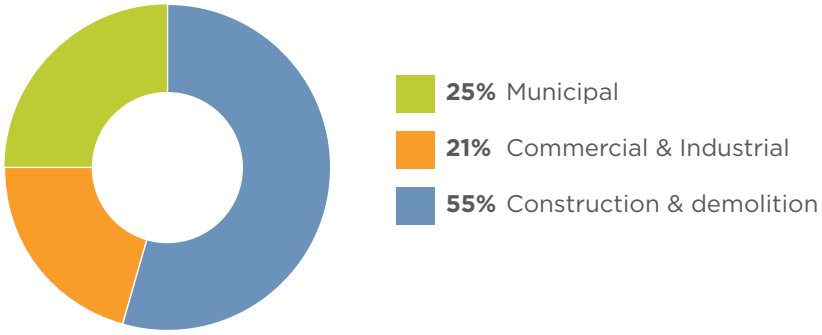
Labour smart
Recycling and buying products with recycled content can save resources and create more jobs. Making a can from recycled materials saves 95% of the energy needed to make it from scratch. Each single can recycled, saves enough electricity to run a TV for 3 hours. www.recyclingweek.planetark.org/documents/doc-148-aluminium-factsheet-2012.pdf

Most of us have heard of reduce, reuse and recycle but what does it really mean and why should we be doing it?

What is waste?

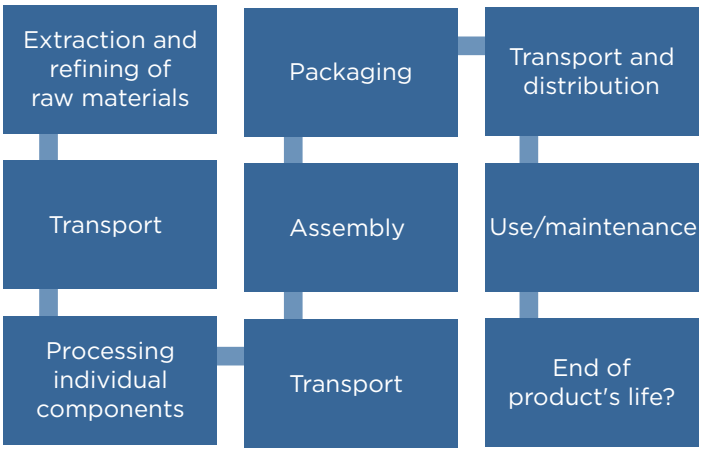
Waste is materials or products that we no longer use. In Western Australia, waste is defined as unwanted or discarded substances. It may present threats to the environment and public health.

Waste streams in WA's landfill, 2005[1]



We often associate waste with the end of a product's life, when we put it in a bin and it is taken to landfill. However, waste can be generated at every stage of a product's life cycle. Often the production phase is where the greatest amount of waste is generated.

Life cycle analysis is a technique that is used to assess the amount of resources used and waste generated in the life cycle of a product. It is designed to allow companies to make better decisions about the amount of resources used in production and how to reduce waste generated. If possible/practical, research the total impact of the products you buy, considering the following stages:

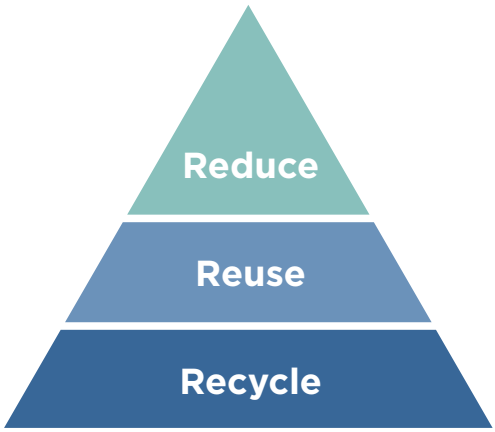


Unsurprisingly, as West Australians grow more affluent and demand more consumables there is an increase in the production of waste. The majority of solid waste generated in WA ends up in landfill sites. Landfills are costly, generate methane, a major greenhouse gas and can cause

litter problems. The EPA reports that some landfills in WA are practising poor waste management practices. This can lead to land contamination and pollution of surface and groundwater resources and obviously cause concern about potential health effects to local communities.[2] Increasingly waste management is focusing on preventing valuable resources from ending up in landfill, through promoting the efficient use of resources, waste avoidance, resource recovery (recycling and energy from waste) and the use of the waste hierarchy.

What can you do?

The waste hierarchy is a simple guide to help us minimise waste. Always consider how to reduce or refuse waste, reuse where possible and then recycle or compost what is left over.



Western Australia's municipal waste stream is 80% organic waste – 30% from the garden, 26% food, and 24% paper and cardboard. The remaining 20% is potentially recyclable materials such as plastics, metal, glass and inert wastes such as rubble.

What's in your bin? How can you use the 3 R's to reduce waste, save resources and money?

Top 5 actions

1. **Reduce** the amount that you buy. If you really need something can you make, borrow, swap, hire or buy it second hand? If you have to buy new, ensure the product has minimal or recyclable packaging.
2. **Compost**, worm farm or use a Bokashi bin for food scraps.
3. **Find out** what recycling services there are in your area. Check with your Local Government and/or Planet Ark www.recyclingnearyou.com.au
4. **Give unwanted goods** to charity or organise a swap meet.
5. **Audit your bin;** find out what you are throwing away. Consider how you may be able to reduce, reuse or recycle to slim your bin.

What? In which bin?

Fremantle residents have a great green reputation and have high rates of participation in the City's recycling scheme. When the City of Fremantle audited 100 household bins they found that 32% of the green compost bin was contaminated with plastic, metal, paper and glass that could be recycled.

Do you know what goes in which bin?

Living Smart Story

Jess, Hilton

Nathan and I moved into Hilton nearly 2 years ago from New Zealand. Being new to the area we were interested in meeting new people and getting involved in the local community. At the Hulbert Street Sustainability Fiesta we signed ourselves up for a Living Smart course. I suppose we would have considered ourselves to be 'greenies'. We didn't really know what to expect but soon found ourselves being blown away by the session on waste and how much we didn't know.

Our local government's scheme actually composts some waste. So knowing what to put in each bin can be tricky. We decided to share what we had learnt with our housemates and set up a few different bins with signs in our kitchen to make it easier. After that we seemed to get more and more involved in waste. We heard about Plastic Free July. It's a challenge where we pledged to buy no new plastic for a month. That took about a month of preparation and investigating how we could go about it. It was actually quite hard.

Jess grinding her own coffee

We then got involved in a waste audit for the City of Fremantle in 2011, cycling back from it I found myself saying to a friend 'I am going to go plastic free for a year'. Our guidelines were no virgin plastic, second hand plastic was ok and medication was exempt.

It was harder to be plastic free for one month than it has been for a year. As after a few months I have got into the habit of not buying plastic, knowing where I could source milk or olive oil in glass bottles. I even managed to persuade a few shop keepers to stock products in bulk. There have been a few challenges along the way; we had to make our own toothpaste and potting mix as we couldn't find any without plastic packaging. We also decided that replacing 2 broken/lost bike lights with new battery free ones was worth the plastic.

It actually has been a huge experience and learning curve. We are still hanging out with people that we have met through doing all of this. I have really come out my shell too, as I have been doing lots of public speaking. We have another few months of living plastic free and then we will move back to New Zealand. I am now really interested in sharing this experience, whether it is educating people about waste or even running my own Living Smart course. I am not sure whether we will be able to live totally plastic free but I know that there will be plenty of plastic things that I will always refuse.

Food

A survey from The Australia Institute shows that Australian households throw out more than $5 billion worth of food per year. The average West Australian throws out $619 per household or $238 per person worth of food each year[3]. Again there are strong links between level of food waste and household income. The higher the income, the higher the levels of food wastage.

The growing worldwide demand for food and unsustainable farming practices have led to the loss of biodiversity, decrease in soil fertility and degradation, contamination of soil, water and air[4]. In addition, greenhouse gas emissions are related to agricultural production, transportation, processing, and refrigeration as well as methane emissions if sent to landfill. Reducing your food waste and growing your own organic vegetables will reduce your food's resource footprint (for more information see Gardening for Productivity).

Reduce
Buy only what you need by planning your meals and writing a shopping list.

Reduce your food's environmental footprint by prioritising local and organic produce. Look out for Farmers' Markets and Food Collectives.

Store your food correctly; airtight storage of salad and vegetables will prolong their life.

Reuse
Reuse your leftovers, storing and refrigerating means you can eat them for lunch the next day.

Recycle
Recycle your food scraps by composting, worm farming or feeding your scraps to chickens!

For more information on reducing food waste go to www.lovefoodhatewaste.nsw.gov.au

Garden waste

Most councils provide a bin that allows households to dispose of garden waste in the weekly pickup. This waste is then turned into compost on an industrial scale. While this is a reasonable option for many households, it is important to ensure that your garden waste goes into the correct bin, and is not contaminated with other materials. Some councils sort this at the composting facility, others require the householder to do so. Check with your local council to ensure you are sorting your waste correctly.

You can reduce your garden waste by creating your own compost heap, or feeding weeds to your chickens.

Living Smart Story

Dianne, Albany

Before moving to Albany, we lived a suburban life in Sydney and recycled according to council rules and even tried composting. The compost never got hot enough and we didn't have much use for it.

Seventeen years ago we moved to a ten-acre bush block near Albany. There was no council rubbish collection so we made regular trips to the tip. There seemed little point in storing up kitchen waste so we put this in a 44 gallon drum with the top cut off as a lid. To our surprise, it took many years to fill, and when it did, we buried it.

The next big change occurred when I took up veggie gardening five years ago. I now had a need for nutrients to put back into the soil. My husband built a meter cubed space near the garden where most of the garden refuse and all our kitchen waste goes along with other items like wood chips, grass clippings, paper or manure.

I fill this space every three months or so and then add more material over two more months as it breaks down. Turning it weekly and then leaving it for a month seems to make reasonable mulch which I then mix in the garden.

We have a worm farm, to get the benefits from using diluted worm juice, and as a place to put kitchen scraps while the compost heap is finishing off. When the worm farm is full we use a bokashi bucket for the remaining few weeks. We have a compost heap for things that take a long time to break down, mussel shells, meat bones and grease. Living in the bush we don't have a problem with mice and rats as there is a python living in our roof and a goanna near our compost heap.

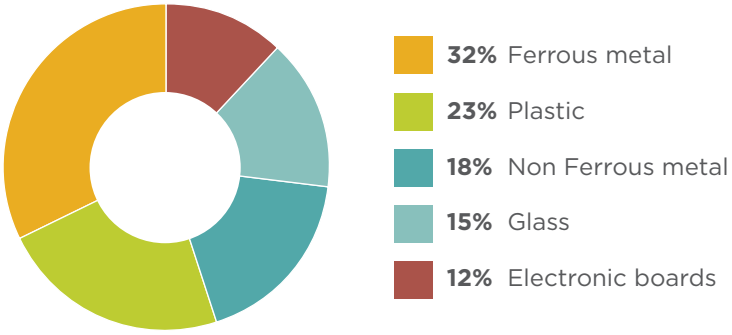
We now take one bag of rubbish to the tip every six weeks and have six or eight bags of recycling. We've reduced our recycling by making our own soft drink, bread, sauerkraut, jams, pickles, sauces, and cooking dried beans to freeze rather than buy tins.

We're not big on consumption and we try to buy everything second hand, apart from some clothing, and goods that we expect to last a long time. We also try to reduce our consumption of processed foods to reduce our recycling. We have been doing what is easy and what works for us. Financially and for long-term health, it makes a lot of sense.

Dianne in her backyard

E-waste

In Australia and across the world there are rapid rates of take up of new electronic goods. As new products are developed the lifespan of older ones gets shorter and shorter. We are also accumulating more and more electronic products. In 2011 37% of Australians had a smart phone. By 2012 this rose to 52%. Unheard of 20 years ago, E-waste represents the biggest and fastest growing manufacturing waste.



Reduce

Do you really need it? Can you make do with the technology that you already have? Extending a product's lifespan saves enormous amounts of resources.

A United Nations study found that the manufacturing of a computer and its screen takes at least 240 kg of fossil fuels, 22 kg of chemicals and 1.5 tonnes of water (that's heavier than a car).[5] 81% of a desktop computer's energy use is in its production, not its use.[6]

Reuse

Do you know someone who wants it? You could sell or swap unwanted technology through Freecycle, eBay or Gumtree.

If your electronic equipment is too old you may not be able to rehome it. For more information on donating your computer go to: www.givenow.com.au/otherways/computers#Western_Australia

Recycle

The National Television and Computer Recycling will provide free recycling to Australian householders and small business. Any company that makes and/or imports TVs and computers into Australia will be required to pay for the end-of-life recycling of these products.

Started in 2012, it will be nationally available by end of 2017. Keep an eye on your local press for details or check. Use your local council recycling schemes or store in weather-protected area until available in your area.

Choosing a new piece of technology?

How easily can it be repaired, upgraded and recycled?

Find out more about popular brands in Greenpeace's Guide to Greener electronics

www.greenpeace.org/international/en/campaigns/climate-change/cool-it/Campaign-analysis/Guide-to-Greener-Electronics

Packaging materials

Most people are horrified by the amount of unnecessary packaging used on all manner of products. The good news is that the National Environmental Protection (Used Packaging Materials) Measure 2011 and the Australian Packaging Covenant are bringing this issue into focus. More than 800 government bodies and manufacturers in Australia have signed the voluntary Covenant to signal their commitment to reduce the environmental impacts of consumer packaging by:

- designing packaging that is more resource efficient and more recyclable
- increasing the recovery and recycling of used packaging from households and away-from-home sources and
- taking action to reduce the incidence and impacts of litter.[7]

Reduce

We can vote with our feet by choosing the least packaged products – buy an organic veggie box, or buy at farmers' markets. Drop a note in the suggestion box at your supermarket requesting less packaging on items that don't need it. Say no to plastic bags at the checkout.

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[1] State of the Environment Report Western Australia, 2007
[2] State of the Environment Report Western Australia, 2007
[3] What a waste: an analysis of household expenditure on food
[4] Global Agriculture in Need of Sustainability Assessment
[5] E-waste, the hidden side of IT equipment's manufacturing and use
[6] Environmental Science & Technology
[7] Australian Packaging Covenant

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Eric Williams United Nations University, Environmental Science & Technology 38(22), 6166 - _6174 (2004).

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www.zerowaste.wa.gov.au/media/files/documents/WA_Waste_Strategy.pdf

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http://www.comlaw.gov.au/Details/F2011L02093/Incorporated%20Document%203/Text

Earth Carers educate and support their communities to reduce waste at home, school or work and encourage earth friendly living. For resources:, factsheets and workshops.

Eastern Metropolitan Regional Council
http://www.rgang.org.au/earth-carers.html

Mindarie Regional Council
http://mrc.wa.gov.au/Community/Earth-Carers.aspx

Western Metropolitan Regional Council
www.earthcarers.org.au

Investigation into plastics and their effect on our waterways, oceans, and bodies
www.bagitmovie.com

Love Food Hate Waste
www.lovefoodhatewaste.nsw.gov.au

For information and lots of practical tips on reducing food waste
Planet Ark
www.recyclingnearyou.com.au

The New MacBook Pro: Unfixable, Unhackable, Untenable
www.wired.com/gadgetlab/2012/06/opinion-apple-retina-displa

Zero Waste International Alliance, Definitions of zero waste for business and community.
www.zwia.org/index.php?option=com_content&view=article&id=12&Itemid=5

Waste Authority. The Government body that is charged with waste management in WA.
www.zerowaste.wa.gov.au

Waste Management World. A very informative website that has stacks of articles on what the rest of the world is doing.
www.jxj.com/wmw

The following guidance on conducting a waste audit can be adapted to your home:
http://education.dec.wa.gov.au/waste-wise/resources/waste-audit-dvd.html

http://www.environment.nsw.gov.au/resources/wrapp/01118wasteaudit.pdf

How to guides
Living Smart at Home, Department of Transport
www.transport.wa.gov.au/activetransport/24657.asp#25763
- Home composting and worm farming
- Reduce waste and save
- Seasonal produce guide

Earth Carers WMRC
Plastic free July
www.earthcarers.org.au/programs-and-courses/plastic-free-july
- How to compost
- How to worm farm
- How to Bokashi

Notes

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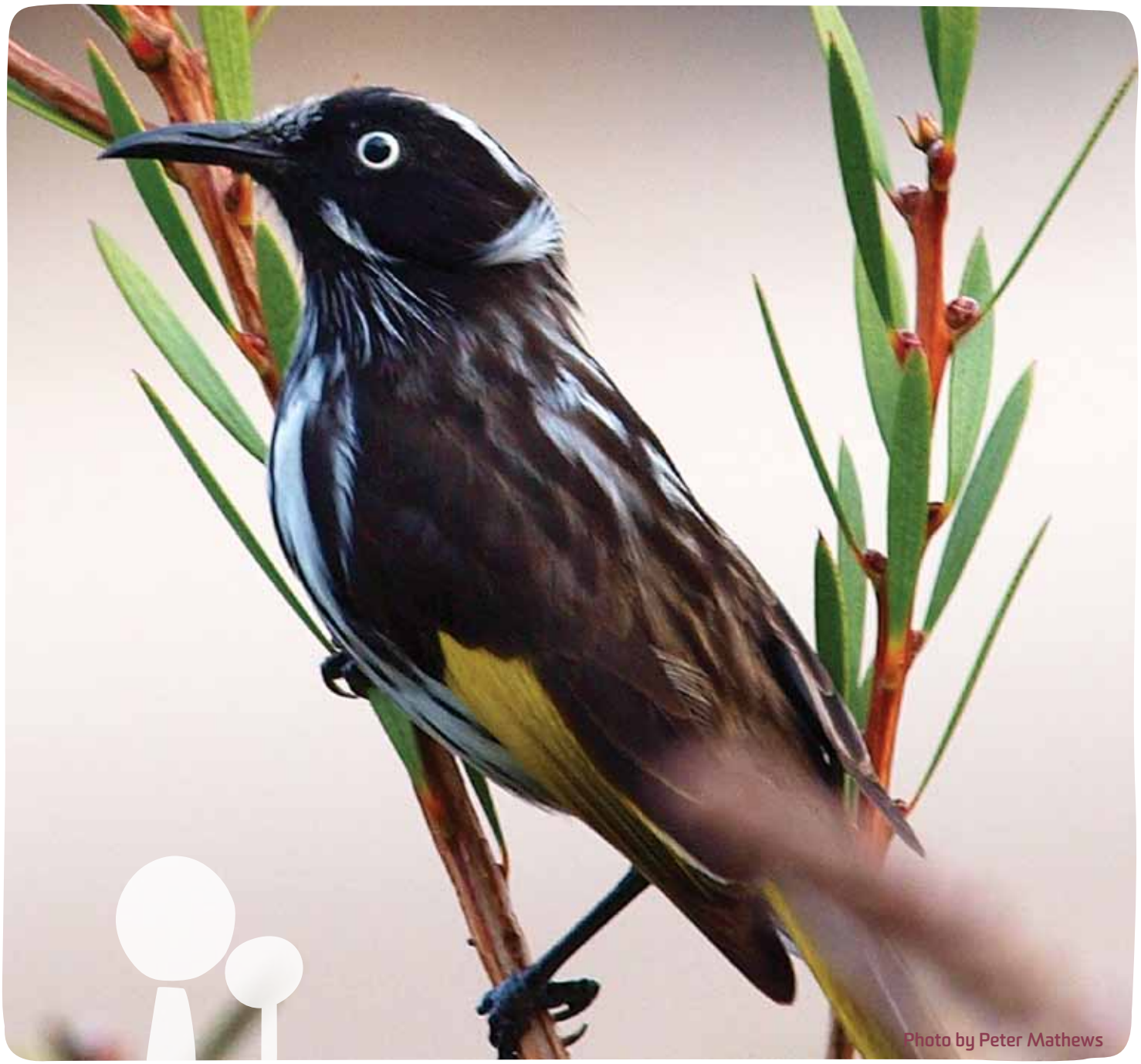


Photo by Peter Mathews

Living Smart

Smart Gardens for Biodiversity

Smart Gardens for Biodiversity

Biodiversity is all life forms – the different plants, animals, fungi and microorganisms, their genes and the ecosystems they form. We can play an important role in protecting and managing biodiversity through the way we garden and by supporting conservation efforts.

Biodiversity and Western Australia

Australia is 'mega diverse'; one of the 12 most biologically diverse nations in the world. Western Australia is particularly renowned for its biodiversity. The southwest of the State is recognised as one of the world's 32 biodiversity hotspots. We also have 8 of the 12 Australian biodiversity hotspots.

Western Australian's bioregions (natural boundaries of land characterised by the landscape and its interaction with flora and fauna) range from sub-alpine areas to tropical rainforest and desert. They are home to 50% of Australia's mammal species, 25 of which are unique to WA. Over 40% of the reptiles found here are unique to WA. About 80% of our native plants are not found elsewhere (endemic)[1,2].

This complex and rich web of life provides us with the basic materials for human life - food, water, fuel, fibre and clean air. Biodiversity also takes care of our health, mind and soul. Access to natural places makes us feel better and provides opportunities for recreation. For some, nature has cultural, spiritual and philosophical value.

Trends and issues

The number of species on the planet is declining. 10–30% of mammal, bird, and amphibian species are currently threatened with extinction[3]. Since European settlement Australia has lost 27 mammals, 23 birds, 4 frogs and 76 plant species. Currently 1750 species and 46 ecological communities are vulnerable to extinction[4]. Under threat in Western Australia are 362 plants, 199 animals and 69 ecological communities (interacting organisms that live together in a specific habitat)[5]. Current and historic removal of native vegetation, primarily through clearing but also burning, overgrazing, draining or flooding threatens WA's biodiversity. This removal of native vegetation leaves behind small and unconnected pockets[6]. Protecting existing native vegetation and planting new areas helps to connect these pockets, making it easier for wildlife to hunt, feed, find shelter and reproduce.

At a national level conservation reserves play an important role in protecting biodiversity. At a local level the way in which we garden and support conservation efforts is important.

Going Native

You can plant native species in your garden. Of course, retaining existing natives and plants on your property is a good first step. Each area has a variety of soil types, landforms and weather conditions that influence what native plants will grow best in your garden. These are known as

No blooming good!

Too many nutrients can cause toxic algal blooms in our waterways. This can kill fish and other aquatic animals by starving them of oxygen. It can also be toxic to humans and other animals. Nutrients can enter into our rivers and wetlands via run off, leaching into ground water and storm water drains. Good organic gardening practices such as using organic fertilisers and applying mulches, avoiding phosphates in detergents and chemical fertilisers, and planting natives can all contribute to the health of our water ecosystems.

For more information see River Guardians

www.riverguardians.com/get-active

vegetation complexes. Your local council, native nursery or Landcare Australia will be able to help you select the best plants. If you live in the Perth Metropolitan area APACE, a community revegetation nursery, has information on soil types and vegetation complexes on their website, see the nursery section www.apacewa.org.au/pages/nursery

Cool and green

Swap your thirsty, high maintenance lawn for low maintenance native ground covers that are cool and green.

No trees or plant roots to worry about? You can steam or solarise you lawn.

To solarise wait for a prolonged hot period, water the lawn well and cover with thick plastic sheeting (weighted against the wind) or cover lawn with thick layers of newspaper and top with mulch.

When the lawn is dead (watch out for couch grass, it's good at pretending to be) use a blade to slice the lawn into 60cm widths and roll up. An old bread knife or long handled pruning saw works well. Water the bare soil well and wait to see if any deep rooted sections start to regrow. Tackle them promptly.

If you remove all of your lawn you may wish to incorporate different types of surfaces in your garden. Hard wearing entertainment areas can use porous paving, mulch, decking or pavers interspersed with ground covers. Instead of grass, a safe, easy-care space for kids could include porous rubber matting. Alternatively, use the already established grassy spaces at your local park, and get to know your neighbours at the same time!

Artificial turf is a substitute for paving, not lawn. It stores and releases heat, often being 6o °C hotter than plants in the same location, and it is as prone to weeds as paving. If you do have paving, steam or boiling water can be used to kill weeds.

If you do choose to have a small patch of grass, ask your nursery for the most water tolerant variety and keep the length a bit longer in summer to shade the roots.

Pool to Pond

Convert your swimming pool into a natural pond. Using plants as natural filters, you can continue to swim in it or even breed fish to eat. Either way it can increase biodiversity in your garden and be a cool spot to laze by in the heat of the summer.

If you are interested in establishing a native garden, think about the following as you plan:

Site analysis	• What features does your garden/plot already have? • Think about sun, soil, wind, drainage and existing structures.
Vegetation complexes	• What communities of plants are local to your area?
Levels	• What levels do you want in your garden? • Start with the tallest (trees if you have the room or large shrubs), then screening and medium sized, small shrubs, non-woody plants and finally ground covers.
Seasons	• You can choose plants to ensure that you have colour all year round.
Habitat	• Design your garden to include habitat for local wildlife. • Some plants attract butterflies and birds. Creating a boggy area or a pond in your garden will attract frogs and invetebrates. Diverted rainwater from down pipes can maintain this habitat.

Top 5 actions

1. **Replace** your lawn with a native garden or native ground cover.
2. **Find** out your soil type and use plants that are endemic.
3. **Create** habitat for local wildlife in your garden.
4. **Protect** local waterways by the way you garden and products that you use in the house.
5. **Support** local conservation activities.

Going further?

Want to do more or maybe you don't have any available land? Support conservation organisations such as Bush Heritage or Australian Wildlife Conservancy with your time or money. These not-for-profit organisations own or lease high conservation value land. (For more information on volunteering see **Community Smart: Join a group and Become an Environmental Volunteer**).

[1] Department of Environment and Conservation, Biodiversity
[2] State of the Environment Report Western Australia, 2007
[3] Living Planet Report: Biodiversity, biocapacity and better choices
[4] Australia's Environment: Issues and Trends
[5] State of the Environment Report Western Australia, 2007
[6] State of the Environment Report Western Australia, 2007

Living Smart Story

Robyn, Geraldton

I have always had an interest in nature. I used to live on a farm, it was like living the dream, it was set in a couple of hectares of native bush. When the children were ready to attend high school we moved into Geraldton and that was when I started my native garden.

Robyn and Living Smart participants in her garden

I planted a range of different layers, ground covers, herbaceous, small shrubs and mallees. Also prickly things to help protect birds for nesting. I am trying to mimic what nature does. I visualised what I wanted to see, what I was aiming for in my garden and then worked backwards from that. As I used to work in this area, doing pre and post mining surveys of flora, I have been able to use this knowledge. I mostly use endemic species, those local to this area, not just natives. I have planted a range of species in our native garden, so there is always something flowering, even in summer. I like the idea that the native trees provide shade and wind protection for us as well as islands for the birds, so that the birds can have a place to stop off when they are on the way to larger areas of bush. Those of us that have the space should grow them. I used seeds from locally grown provenance plants and tube stock from a local nursery.

I know it can be hard to grow a native garden, that's why I am happy to share with others. There are now 2 other gardens in my street that are similar to mine and I have just started to facilitate a Living Smart Course. It's been fantastic as people are so into it. Everyone came to my place at the weekend to look at my garden, we folded newspapers into pots and we planted tomato seeds and everyone took a packet of Rhodanthe chlorocephala wildflowers away with them. You can see carpets of these wildflowers throughout the mid-west.

The back of my garden is an organic veggie patch and chickens and we even have room for a small orchard too. I use the produce that I can, freezing, making jams and giving away to friends and family when there is a glut. Ideally my family and I would like to move into an environmental house, one that is designed and made from mud brick, with solar panels but in the meantime we do what we can with what we have got.

Want to find out more?

How to guides

Lots of information from creating a frog bog, growing local plants to reducing phosphates
www.sercul.org.au/downloads.html

River Guardians, information, fact sheets and volunteering
www.riverguardians.com/get-active

Convert your pool to a pond
http://www.kmc.nsw.gov.au/www/html/1190-wildthings.asp

Some native nurseries:

APACE, community revegetation nursery, North Fremantle
www.apacewa.org.au

BoolaWongin Nursery, Armadale Rd, Forrestdale

CarramarCoastal Nursery, Mandurah Rd, Baldivis

Lullfitz Nursery, Wanneroo
www.lullfitz.com.au

Narrogin Plant Nursery, Hough St Narrogin

Zanthorrea Nursery, Maida Vale
www.zanthorrea.com

Books

The Wildflower Society of WA and the Museum of WA have an extensive range of books.
http://members.ozemail.com.au/~wildflowers/
http://museum.wa.gov.au

The Department of Environment and Conservation has a range of books and field guides

http://www2.dec.wa.gov.au/component/option,com_virtuemart/Itemid,2526/

Archer, M & Beale, B (2004) Going Native Living in the Australian Environment, Hodder Headline, Sydney

Attiwill, P & Wilson, B (2003) Ecology: An Australian Perspective, 2nd Edition, Oxford University Press

National Trust of Australia, Green Gardening Australia, Bush plants for Perth Gardens, Perth, other titles available for South West
www.blackwoodbasingroup.com.au/resource-centre

Powell, R &Emberson, J, (1990) Growing Locals- Gardening with local plants in Perth, Western Australian Naturalists Club

Magazines

Design a native garden
www.universalmagazines.com.au/magazines/design-a-native-garden

Department of Conservation and Environment. Landscope-WA's conservation, parks and wildlife magazine
www2.dec.wa.gov.au/component/option,com_virtuemart/Itemid,2526

Reports and Articles

State of the Environment Report Western Australia, 2007 Environment Protection Authority
www.epa.wa.gov.au/AbouttheEPA/SOE/2007/Pages/default.aspx

Living Planet Report: Biodiversity, biocapacity and better choices,2012 World Wild Life Fund, Global Footprint Network and Zoological Society of London
http://awsassets.panda.org/downloads/1_lpr_2012_online_full_size_single_pages_final_120516.pdf

ABS (2010) Australia's Environment: Issues and Trends
http://www.abs.gov.au/ausstats/abs@.nsf/mf/4613.0/Websites

Fact Sheet: Marion's Sanctum- story about gardening on the coast
www.abc.net.au/gardening/stories/s3621536.htm

Information on Western Australia's parks and reserves
www.wa.gov.au/information-about/recreation/parks-reserves

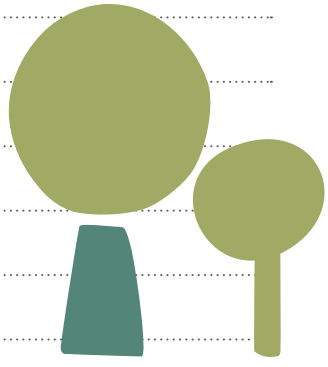
Maps of Australia's Bioregions
www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html

Mitchell, D, Williams, K, Desmond, A (2002) A Biodiversity Audit of Western Australia 53 Biogeographic Sub regions
www.dec.wa.gov.au/our-environment/science-and-research/biological-surveys/a-biodiversity-audit-of-wa.html

Pools to ponds
www.inspirationgreen.com/natural-pools-swimming-ponds.html

Department of Environment and Conservation, Biodiversity
www.dec.wa.gov.au/our-environment/biodiversity.html

Notes



Living Smart

Smart Gardens for Productivity

Smart Gardens for Productivity

The organic gardener's cheat sheet (part 1)

Composting: turn kitchen and garden waste into plant food. Made in bays, plastic bins or just in a heap, mix with sand and coconut fibre to make your own potting mix.

Crop rotation: rotate crops to avoid plant disease and maintain plant health by reducing nutrient loss.

Companion planting: some plants will benefit others by providing pest control, enhancing growth or the flavour of nearby plants.

Heirloom varieties: have adapted over time to whatever climate and soil they have grown in; often resistant to local pests, diseases, and extremes of weather (see Seed Savers next page).

Integrated Pest Management: uses multiple techniques: knowledge, observation and experimentation to manage pests, rather than toxic chemicals.

Mulch: can be made from different materials, provides a physical barrier to weeds and reduces water loss.

No dig gardens: reuse waste materials to build soil, garden beds, even paths from scratch without digging!

One of the biggest impacts that an Australian can have on the environment is the way that we choose to eat[1]. Food and drinks make up 46% of Western Australia's ecological footprint[2]. How and where we grow our food is important. Local food production, local farmers' markets, community gardens and edible gardens play an important role in reducing our environmental footprint.

History

Until the 1950s growing your own food, whether you lived in the city or the country would have been relatively common. In the 1960s the introduction of relatively cheap vehicles, ownership of fridges, developments in food preservation and the growth of the supermarket giants began to change our food production and consumption habits. Supermarkets focused on low prices and pre-packaged food due to its longer shelf life, preferring to deal with industrial sized producers who could guarantee a regular supply[3]. Farmers had begun to adopt high input farming methods that required increasing amounts of oil, fertiliser and pesticides to produce crops. Food production was focussing on breeding for the mass market, standardisation, longer shelf life.Varieties that were more robust in transportation as well as high yielding were prioritised. Factory farming, the raising of livestock in confinement and at high density was also introduced. This transformation in agricultural production has brought relatively low prices for food globally[4] (as described by the Food and Agriculture Organisation food price index- the prices of 5 commodity groups) until relatively recently. By mid-2008 prices of food had dramatically increased. This was caused by a combination of factors including drought and unfavourable weather and economic conditions.[5]

Trends and Issues

In Australia our variable climate has affected yields and can lead to spikes in food prices. With the frequency and severity of droughts and other extreme weather events likely to increase as a result of climate change so are price shocks for food, particularly for fruit and vegetables[6].

In Western Australia there is a growing trend of buying food grown interstate and overseas, as well as eating more processed foods. This has environmental implications due to higher inputs of energy, water and materials, land degradation, reduction in biodiversity. In addition there are health concerns about increases in calorie consumption from processed foods.

As the urban footprint of Perth increases we are building houses on land that we once used to grow food on.[7] Some consumers are also concerned about food safety and animal welfare. For example, factory farming requires high volumes of pesticides, antibiotics and growth hormones to maintain animal health[8,9]. There are also concerns about the potential long term effects on human and environmental health of Genetically Modified Organisms (GMO). For more information seeThe big issues.

What you can do

Most of us live in an urban environment, we don't have access to huge swathes of land. However a garden, a small plot, a verge or even a few pots can be enough to supply us with at least some of our food.

Organic gardening is gardening at its best

The principles of organic food growing have been practised for centuries. Current interest in organic gardening began in 1960s, as there were increasing concerns about the environmental damage of pesticides and other agrochemicals. By developing healthy soils, growing a mixture of crops and working with nature, organic gardeners aim to achieve a balance within their gardens. Organic gardening aims to avoid external inputs, pesticides and chemical fertilisers, although technically chemical preparations from biological sources can be used. Most organic gardeners avoid these, as they do not discriminate between useful insects and pests.

Get into gardening

The following can be useful places to find out more about organic gardening:

- Find a friendly green thumb, talk to friends, relatives, neighbours and work colleagues.
- Borrow books from your local libraries, check the notice board for gardening workshops.
- Use the How to guides in the Want to do more section at the end of this chapter.

You don't need a very large area to start growing; a good sized planter box is a great way to get started on growing your favourite herbs, salads and vegetables. Pots are also perfect for balconies or smaller backyards – and you can move them around to catch the sun and rain.

Top 5 tips

1. Choose an area that gets full sunlight (with a minimum of 5 hours), often in Western Australia you will have to shade plants as we get so much sunshine.
2. Soil is the most important aspect of an organic garden. Set up a compost bin or worm farm and dig organic compost into the soil. You will be reducing waste at the same time!
3. Save seed such as broadbeans or peas, or choose heirloom varieties, as they are best suited to local conditions.
4. Add bentonite clay to the soil to help it retain moisture, and add a thick layer of mulch to slow down evaporation.
5. Don't water too frequently or too quickly, a slow fine spray or a drip on each plant is best for vegetable gardens (and is more water efficient). For more information on waterwise gardening see Water Smart.

The organic gardener's cheat sheet (part 2)

Permaculture: a design principle based on care for the earth and each other, as well as making a contribution by distributing excesses.

Seed Savers: swap seeds and cuttings with other gardeners in your local area (see Heirloom Varieties above).

Worm farms and vermicomposting: turns kitchen waste into high quality nutrient rich fertiliser.

Living Smart Story

Michelle, Ocean Reef

Having studied and worked in UK as a vet for many years, I decided that the rat race wasn't for me. About 9 years ago I quit a full time job and moved here to live off the land. As a keen diver, I learned how to spear fish free diving. I completed a Living Smart Course in June 2012 and was asked to give a presentation on how to grow food during my course.

Michelle and her chickens

My block is 600 m2. When I first started I didn't realise Perth has the worst soil in the world, as well as being the third windiest city in the world. Living close to the coast, with alkaline bore water and salt, growing food is not as easy as one would hope. Over the years I have read lots, I mostly borrow books from the library.

I make my own soil, I have 6 worm farms, compost heaps, make my own seaweed tea, fish heads and guts can be used to make fish hydrolysate (fish based fertiliser). And I try to grow everything from seed or cuttings. My neighbour gave me a cutting of an olive tree about 5 years ago and now it is bearing fruit. This year a friend and I collected 100 kg of olives for pressing, we got 16 litres of oil. My other neighbours saw I had a compost heap, they started to compost, when I got chickens, so did they!

I don't use chemicals, not even organic ones because they can't be selective; they kill the good guys as well as the pests. My method is to establish a balanced ecosystem through diversity, the predators e.g., frogs, ladybirds, will see to the pests. Living in WA, we are more likely to be exposed to organochlorides and organophosphates because they were used to control termites. I got my eggs tested as these chemicals could last a hundred years. Exclusion method is the most effective way of pest control, if you want to stop white butterfly getting to your brassicas put them under a net or a shade cloth. I am growing lots of medicinal herbs and flowers, as well as mushrooms, and I also re home bee swarms, as they are very important in pollinating our food crops.

I am trying to increase the diversity of what I grow, a food forest that looks after itself generating food for me and my chooks, fertiliser, medicine, timber and fuel. Nature has provided us with everything we need. I strive to learn more each day of the things that she has to teach us.

Test your soil

Organochlorines pesticides (OCPs), commonly used to control termites and argentine ants in residential properties and to control pests on livestock and crops in agricultural areas. OCPs are long lasting and bio accumulate in the food chain. Poultry can ingest soils contaminated with OCPs. As they are fat soluble they are stored and accumulate in the fatty tissues of animals. This includes their eggs. If you are concerned you can have your soil or eggs tested by a laboratory. For more information see Department of Health Guide to OCPs residues in home garden soils: www.public.health.wa.gov.au/cproot/3949/2/Organochlorine%20pesticide%20residues.pdf

If you have a larger area available or are keen to establish a permanent garden, think about the following:

Stages in planning and constructing a garden (reproduced from the Randwick Living Smart Action Guide, by Russ Grayson)

Site analysis	**Identify:** Sun access, winds, drainage, soils type, topography, services, existing vegetation and structures.
Needs analysis	**What people want to grow:** Vegetables, herbs, fruit, nuts, flowers, native plants, eggs and other garden uses.
Design concept plan	**Where to place things in garden:** Garden beds, compost bins, propagation area, tool storage, etc.
Design final plan	Size, scale and location of components.
Construct	Path > soil improvement > garden beds > irrigation > mulch > plant out.
Maintain	Irrigate, add compost/mulch, pest/disease management, planting, harvesting, seed saving.

No land or no idea?

Find your nearest community garden, it's a place where people come together to grow food and their community[10]. Each community garden is different but there are two main forms, shared gardens where people garden collectively or allotment gardens, where people pay a nominal fee to lease a plot of land. Community Gardens WA can help you to find out your nearest community garden, ways to get involved, there are even guides to starting your own[11].

---

[1] Secure Food Systems for Victoria, What do we know? What do we need to know

[2] State of the Environment Report Western Australia, 2007 `

[3] The Cambridge world history of food

[4] FAO Food Price Index

[5] FAO Guide for Policy and Programmatic actions at country level to address high food prices

[6] Drought, Climate Change and Food Prices in Australia

[7] State of the Environment Report Western Australia, 2007

[8] CAFO uncovered: The untold costs of confined animal feeding operations

[9] Factory Farming's hidden impacts

[10] Growing Community: Starting and nurturing community gardens

[11] Community Gardens WA website

Living Smart Story

Helen, Hilton Harvest

I became involved in Hilton Harvest Community Garden because I really wanted to grow food in my garden at home, rather than ornamental plants. I thought that working alongside others would be a great way to tap into their wealth of experience and find some inspiration for my home garden. The challenge for me has always being finding the time and right information to make my own compost and to know what to plant when. I wanted some simple strategies.

I was so excited to find this garden being established in my community and pleasantly surprised to find that a lot of the gardeners were like me – keen, but not experts. We swapped stories, seedlings, worm castings and tools, and learned from each other's mistakes and successes. I learnt that Perth soils are incredibly hard to grow in, and our summers are too intense. All this information made me feel less discouraged about my failures. I got help with my compost and in setting up a fridge worm farm, and started to become just a little more self-sufficient.

Helen is an active member of Hilton Harvest

The results? Simple pleasures! I am delighted that this morning I could walk outside with my 7-year-old and watch him pick lettuce and cherry tomatoes and blueberries for his lunchbox, that my kids run outside after rain and help me pick the snails from our vegetables, that they feed weeds to our chickens.

Growing your own incredible edibles...

- Fresh, delicious and low cost.
- Fun and healthy.
- Reduces your environmental impact.
- Recycles your green waste.
- Uses urban land or our back gardens.

Food in a box!

Want to find out more?

How to guides

Australian City Farms & Community Gardens Network
How to compost
How to build a no dig garden
Integrated pest management
What is crop rotation?
www.communitygarden.org.au/acfcgn/fact-sheets

Companion Planting
www.sgaonline.org.au/?p=6986
www.permaculturenews.org/2010/07/30/companion-planting-guide

Earthcarers
How to compost
How to worm farm
How to Bokashi
www.wmrc.wa.gov.au/documents/brochures-factsheets

Sustainable Gardening Australia
Footprint Flicks-How to videos and factsheets; compost, mulch, grow food, garden when you are a renter, grey water and much much more
www.sgaonline.org.au/?page_id=4786

Books

There are many books about organic gardening on the Market, here is a selection:

Bennett, P. (2006) Organic Gardening 7th Ed. New Holland Publishers, Australia

Byrne, J (2006) The Green Gardener, Penguin Australia
Byrne, J (2011) Small Spaces Organics, Hardie Grant Books

The Cambridge world history of food
www.cambridge.org/us/books/kiple/australia.htm

CSIRO (1996) Composting - Making Soil improver from Rubbish, Division of Soils

Cundall, P (2007) Seasonal Tastes for the Practical Australian Gardener, Penguin Books, Australia

Ha, T (2006) Greeniology: How to live well, be green and make a difference, Melbourne University Publishing Ltd

McFarlane A (2001) Organic Vegetable Gardening, ABC Books

Marshall, T (2003) Recycle Your Garden, ABC Books

Mollison, B & Slay, (2003) R.M Introduction to Permaculture. TAGARI Tasmania

The Rodale Book of Composting, (1992) Rodale Press Pennsylvania, New revised edition

Films

Food,Inc
Documentary about America's food industry

Magazines

ABC The Organic Gardener
www.organicgardener.com.au/magazine

Good Organic Gardening

Reports and articles

FAO's Initiative for soaring food prices, (2011) Guide for Policy and Programmatic actions at country level to address high food prices
www.fao.org/fileadmin/user_upload/ISFP/revisedISFP_guide_web.pdf

Food and Agricultural Organisation of the United Nations (FAO) Food Price Index
www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/

Friends of the Earth, (2010) Briefing Factory Farming's hidden impacts
www.foe.co.uk/resource/briefings/factory_farming.pdf

Nettle, C (2010).Growing Community: Starting and nurturing community gardens. Health SA, Government of South Australia and Community and Neighbourhood Houses and Centres Association Inc

Quiggin, J Drought, Climate Change and Food Prices in Australia, University of Queensland
www.acfonline.org.au/sites/default/files/resources/Climate_change_and_food_prices_in_Australia.pdf

Sherman, D (2008) CAFO uncovered; The untold costs of confined animal feeding operations, Union of concerned scientists
www.ucsusa.org/assets/documents/food_and_agriculture/cafos-uncovered.pdf

State of the Environment Report Western Australia, 2007 Environment Protection Authority
www.epa.wa.gov.au/AbouttheEPA/SOE/2007/Pages/default.aspx

Victorian Eco Innovation Lab, (2008) Secure Food Systems for Victoria, What do we know? What do we need to know? The University of Melbourne
www.sustainable.unimelb.edu.au/files/mssi/VEIL_Sustainable-and-Secure-Food-Systems_Apr-2008_0.pdf

Websites

Australian City Farms & Community Gardens Network

What is organic gardening?
What is permaculture?
www.communitygarden.org.au/acfcgn/fact-sheets

Bill Mollison's permaculture website
www.tagari.com/home

Blog on gardening in WA
www.wahorticulture.wordpress.com

The Cambridge world history of food
www.cambridge.org/us/books/kiple/australia.htm

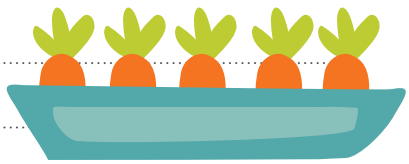
Community Gardens WA- find your local community garden
www.communitygardenswa.org.au/display/index/index

Department of Health Guide to Organochlorine pesticides residues in home garden soils, May 2011
http://www.public.health.wa.gov.au/cproot/3949/2/Organochlorine%20pesticide%20residues.pdf

Seed savers
www.seedsavers.net

Waterwise plants in WA
www.watercorporation.com.au/W/waterwise_plants.cfm

Notes



Living Smart

Healthy Homes, Healthy you

Healthy Homes, Healthy you

Healthy homes

Australians can spend 90% or more of time indoors. Our homes are where we spend the greatest amount of our time (51%) and have the largest area of control. Our choice of building design and materials and the way we clean and maintain our homes can also have major impacts on our health and the environment[1]. Whether you own your own home, or are renting, there are many changes you can make to create a healthier environment for you and your family.

Many behavioural changes have been covered in the preceding chapters on power, water, waste and gardening. The actual construction and design of your home also have a significant impact on the health of your family and the planet.

Building or renovating?

Western Australia is currently experiencing the fastest population growth rate of all states and territories in Australia. Projections from the ABS predict that our population will double, reaching over 4.3 million people in 2056. Perth is projected to experience the highest percentage growth (116%) of Australia's capital cities[2,3].As our population increases so do the number of new dwellings. Currently houses are getting bigger whilst block and household size decrease[4,5].In Perth from 1994 to 2004 the average size of new houses grew by 17%, from 215 to 250 square metres. Current development trends are creating pressure on our State's biodiversity, as well as leading to increased resource consumption and greater challenges in managing waste. Construction and demolition waste already makes up the largest proportion of our waste stream in Western Australia[6].

Fact

Ecological Design makes use of resources so that they can be returned to the earth in way that does not cause harm, in a cycle that echoes natural things.

What can you do?

Building your own home gives you the greatest scope to incorporate ecological design. However, restoring, recycling, renovating or retrofitting an existing building provides an opportunity to prolong its use and improve its environmental performance. This minimises its environmental impact over time; reduces the generation of waste associated with the demolition of existing buildings (as well as generating the highest proportion of waste, demolition also has the lowest proportion of recycled materials attributed to it) and reduces the environmental impacts associated with greater material use when building from new.

Before undertaking a building project consider the following:

Energy efficiency - for more detail see Power Chapter.

Water use and efficiency - for more detail see Water Chapter.

Longevity and flexibility - design and build for durability, ease of maintenance and repair and consider future needs.

Site impact - choose Brownfield over Greenfield sites for new builds, minimise disruption to existing habitat and trees, landscape and garden sustainably for more details see Gardening for productivity and biodiversity.

Size - limiting the building's footprint can reduce use of materials needed and energy consumption needed to heat and cool the building.

Material choice and use - building and renovating uses a huge amount of materials. Minimise wastage through design, choose products with low environmental impact, prioritise materials that have a low embodied energy (sum of energy used in production, transportation and construction) are recycled, salvaged and from renewable sources.

Choosing building materials is a complicated business as it is necessary to weigh up its function and performance post occupancy with its impact on the environment from production, use as well as effects on human health. For example, it may be justifiable to use materials with a high embodied energy, such as brick and concrete, if their thermal mass reduces the building's energy consumption over its lifetime.

The following is a quick guide to some common building products.

Wood

Avoid	Choose
Old growth, endangered and exotic hardwoods.	Approved sustainably managed plantation. Forest Stewardship Council or similar. www.fscaustralia.org/buy-fsc
	Locally sourced, salvage or reclaimed.
	Manufactured wood products use timber waste. Formaldehyde-free or lower concentrations (classified as E0 to E1) of composite products such as plywood, MDF*, particleboard. Concentrations of formaldehyde. **Bonding agents used to make formaldehyde particleboard have own ecological problems.*
Toxic timber treatments.	Wood preservatives derived from borax (exterior). Interior - beeswax, linseed, natural stains and varnishes.
Wood laminate flooring that contain formaldehyde binders and high levels of epoxy resins. Adhesives to fix may off-gas.	Wood veneer over softwood base, thicker veneer, more resanding = last longer. Secret nailing or snap and fit systems to fix.

Flooring

Material	Avoid	Choose
Bamboo Strong, fast growing and renewable.	Has to be transported long distances. Check what adhesives are used. No third-party organisation monitors environmental regulations and worker safety.	
Cork Resists rot and mould, renewable.	Polyurethane seals.	Wax for finishing.
Linoleum Made from natural products, anti-bacterial, long lasting, durable and easy-care.	Maturing process entails VOC.	Install with water based adhesive. Good alternative to PVC.
Rubber Made from recycled tyres, strong, resilient, useful for high traffic areas.	Concerns about indoor air quality.	Anti-slip and weather resistant.

Other materials

Material	Avoid	Choose
Straw Agricultural waste product.	Check which binders are used for panels and particleboard.	Bales for walling. Panels for non-load bearing walls and sound proofing particleboard.
Stainless Steel Durable.	High embodied energy and pollution in manufacturing process.	High recycled content glass or ceramic.
Tile Durable.	Tile adhesive with high VOC content.	High recycled content. Recycled aggregate. Ceramic is biodegradable, limit to areas where water protection is needed (too many increase humidity and condensation). Terracotta- seal with wax or linseed oil. Water based adhesive.
Stone Natural and durable. High thermal mass.	Non renewable. Avoid adhesive for flooring.	Use low VOC sealer. Flooring use sand and cement mortar. Reclaimed or salvaged. Locally sourced. Location to enhance thermal mass.
Bricks	High embodied energy.	High thermal mass. Salvaged or recycled. Honey combed with air pockets lighter and better thermal insulation. Mud brick or rammed earth.
Concrete Strong and resistant to moisture, insects, low maintenance, high thermal mass.	Carbon intensive. High embodied energy.	Use fly ash (waste from coal fired power stations) rather than Portland cement. Add pigment to basic mix for final finish (avoid other materials for final finish).
Paints, varnishes and seals Use to protect materials from moisture and decorative	High levels of pollution in manufacturing process. VOCs affect indoor air quality.	Natural finishes containing vegetable or mineral pigment and natural solvents.

Indoor Air Quality

There are varying levels of knowledge regarding the effects of being exposed to common sources of household air pollution. Common sources have been linked to mild and immediate effects such as watery eyes, dizziness, headaches, nausea, to more extreme damage to the central nervous system and cancer. Effects on health depend on factors such as the type of pollutant and the length and severity of the exposure[8]. Indoor air pollutants come from the way in which a building operates, construction materials, household products (such as cleaning products) and human activities (such as smoking indoors). Indoor air quality can be improved through ventilation and using alternatives to chemicals and choosing zero or low emission building products were possible[9].

What can you do?

Check Material Data sheets for any new products that you buy. This will contain information on any potential health or environmental impacts.

Common sources of indoor air pollution

	Common pollutants	Major sources	Solution
Carpets	Allergens.	House dust mites.	Replace carpets. Use vacuum cleaners with cyclonic action/HEPA filter.
Various	Benzene, 1.3-butadiene, particles, carbon monoxide.	Vehicle exhausts (attached to garages).	Design garages to be separate from homes, seal well, don't let engine idle.
Humans	Tobacco smoke.	Smokers.	Give up! Do not allow smoking in house.
Wet areas, bedding	Mould & Dust mites.	Lack of ventilation/ too much moisture.	Ventilate. Install fan in wet areas. Air out bedding, carpets, etc., every couple of months. Treat mould with soapy detergent & 10% solution of bleach.
Various	Volatile Organic Compounds (VOCs).	Some furniture and carpets. Cleaning and personal care products (makeup, deodorant, etc.).	Old and new furniture, mostly solid timber or fully laminated particleboard. Replace carpets. Choose natural or chemical free cleaners.

Cleaning and household products[10]

Common cleaning products, disinfectants and air fresheners are creating a toxic environment at home.

A US EPA study on indoor air quality found that the use of common cleaning products result in levels of several Volatile Organic Compounds (VOCs) that are on average two to five times higher indoors than outdoors. During (and for several hours immediately after) certain activities such as paint stripping, levels may be at 1,000 times the background outdoor levels. Natural non-polluting alternatives are available to replace many common cleaners and some products such as paints, paint strippers, and other solvent-based products. Solvents should be used with extreme caution and with adequate time and ventilation for the toxic chemicals to leave the indoor space before you go back into it.

Having poisonous chemicals in the house creates a likelihood of you absorbing some of their toxins over time. This can lead to respiratory problems, sore eyes, irritated skin and even cancer. As these chemicals leach out into the environment they persist and accumulate in soils and waterways and can make their way into the food chain.

What can you do?

Replace toxic cleaning products with non-toxic (or low-toxic) alternatives. Stock up on a few safe, simple ingredients that can be used in most cleaning situations. Soap, water, baking soda, vinegar, lemon juice, borax, and a coarse scrubbing sponge can take care of most household cleaning needs. See references at the end of this chapter for links to natural cleaning product recipes. Of course, you can buy ready-made chemical and toxin free cleaning products, but be sure you know what you are looking for and that the manufacturing company is ethical and trustworthy.

I don't own my home. What can I do as a renter?

In preceding chapters, we have explored ways to change your habits to reduce your energy and water use, reduce waste and lower your costs. These changes can be put into place regardless of whether you own or rent your home.

In addition, many landlords may be willing to make changes that increase the environmental sustainability of their property – especially if you can show that it will increase its market value, or lower their costs. For example, there are tax deductions available for energy efficiency improvements to rental properties, and numerous government rebates for specific upgrades. Write a letter to your landlord outlining changes you would like to make, and you may be surprised how willing they are to co-operate .

Living Smart Story

Shani, South Fremantle

When I did my Living Smart course I was a little confused by the Healthy Home topic. Really? I thought what does that have to do with saving the planet?

The first week I sat next to a lady who was unable to live in her brand new sustainably designed home because of all the off gassing from the new furniture and furnishings. She got a headache within 20 minutes of entering her home.

Shani, sharing toothpaste recipe

My goal was to get as eco as I could with my cleaning. I started by researching different products but soon became totally confused and a bit despondent.

Then I heard about a study where they found that the most effective cleaner of mould was actually a 90% vinegar 10% water solution. This was found to be even more effective than bleach. I was hooked.

Now I only use three cleaning products in my home. Vinegar, microfiber cloths and mops, the odd bit of bicarb (mostly for those bathtub rings!).

I used to mix my bicarb and vinegar (that foaming and fizzing made me feel like it is doing something) until I met a chemist who pointed out that the reaction was actually neutralising the effect of both products – bicarb losing its scrubbing and disinfecting power and vinegar its acidity. I have found somewhere that sells bulk vinegar and bicarb so my cleaning is plastic free too!

I have attempted the Plastic Free July Challenge for about four years now. Each year some new dilemma pops up, but with a bit of planning I can usually find alternatives. Last year the toothpaste ran out half way through July. I had tried cleaning my teeth with straight bicarb a few years ago but ended up destroying the enamel on my front teeth. But when I googled "home-made toothpaste" I found heaps of recipes. My favourite is four parts baking soda, to one part table salt mixed with as much glycerine as you need to make a paste. I have also found a great deodorant recipe (half corn flour and half bicarb mixed with coconut oil). What has amazed me since I started sharing is those who prefer the homemade version to their expensive store bought alternatives.

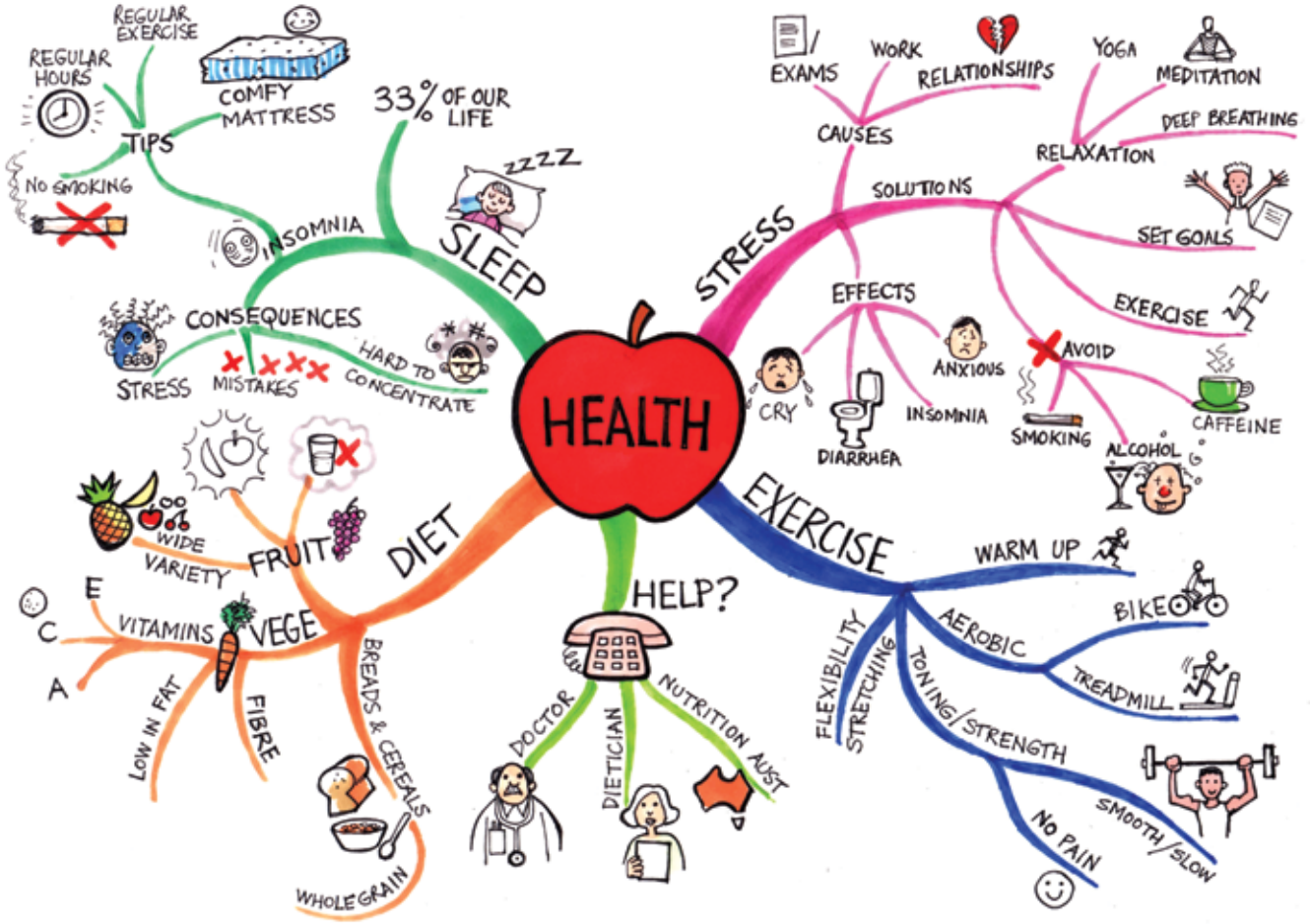
Now that I have this area sorted I am working on my goal of a plastic free bathroom!

Top 5 actions

1. When building or renovating consider how design and materials choice will impact on your health and environment.
2. If you purchase furniture prioritise mostly solid timber or second hand. If furniture is new, ventilating outdoors for a few weeks before installation will reduce some sources of indoor air pollution.
3. Ventilate, open a window and install fan in wet areas to reduce mould. Air out pillows and doonas every couple of months. Don't keep your home at a constant temperature, allow natural cooling and heating.
4. Reduce household chemicals (cleaners, personal care products, detergents, pest control, etc.) make your own or buy natural, low toxic alternatives. Use microfibre cloths for cleaning, not only are they reusable but they grab dust and hold on to it.
5. Leave it at the door - take your outside shoes off at the door and reduce possibility of contaminants in your home.

Healthy You

Health, physical and mental, and wellbeing are closely linked. Our lifestyle choices can improve our health and happiness. Taking a moderate amount of exercise, eating a good diet, not smoking and avoiding excessive alcohol consumption as well as keeping off the kilos are the main ways to keep healthy. The Australian Health Survey, carried out by the Australian Bureau of Statistics, is the largest survey on the nation's health ever undertaken. It found as a nation we are smoking and drinking less, but the number of overweight and obese people continues to rise. Most of us would benefit from increasing our levels of exercise and consumption of vegetables and fruit[12].



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Our choice of food cannot only improve our health but that of the environment too. Our eating patterns are influenced by external factors, such as availability of foods, our cultural and family background, cost, knowledge and beliefs and values, as well as our likes and dislikes. Unfortunately West Australians are consuming more food that is processed, out of season and imported from overseas or interstate. This requires greater inputs of energy, water and materials (e.g. packaging) that are used in production, manufacturing, transport, consumption and/or disposal[13]. The Living Planet Index recommends that our consumption

of red meat and dairy and generation of food waste must decrease in order for us to live within the Earth's ecological limits[14].The largest environmental impact that most Australians have on the environment is related to the food we eat.[15]

What can you do?
Grow your own organic vegetables and fruit, raise backyard chooks or buy organic produce.

Buying direct from the producer at a farmers' market or through a food collective, supports local producers and will give you access to fresh and seasonal produce. Seasonal produce is fresher and will therefore be more nutritious.

Find out more about your food; find out more information about the different standards for certification for cattle, sheep, pig, and poultry welfare schemes. You can check food labels with www.animalwelfarelabels.org.au

CSIRO recommends prioritising local fish, check with www.sustainableseafood.org.au to make better choices of fish.

Keeping a food diary for a few days or a week or so can give you more information on your eating patterns. This can help you to decide what you should eat more of, less of or what may be missing from your diet. Looking at recipes and then menu planning - organising what you are going to eat in advance - is a great way to increase the diversity in your diet, try new types of food and reduce food waste. Minimise your consumption of pre-packaged and processed food. And of course, buying in bulk and from food markets can reduce food packaging.

Healthy mind and body

The human body was designed to be active. For most of us, however, modern work, transport and entertainment encourage us to be sedentary. This is leading to an increase in health problems. Stress is a normal part of our lives, however, high and persistent levels of stress and anxiety can have a detrimental effect on our health and happiness.

What can you do?
Being active in as many ways as possible during the day combined with moderate daily exercise can improve our health. Increase your activity where ever you can: walking or cycling rather than using the car, use stairs not the lift, get off the bus or train early and walk the extra distance, or park your car further away, go for a walk. You can split the recommended 30 minutes of daily activity into shorter 10-minute blocks. For additional health benefits incorporate regular vigorous activity into your weekly routine, a minimum of 30 minutes 3 to 4 times a week .

How do you react to stress? Pay attention to how you and your body react to stress. Recognising when you are experiencing stress allows you to deal with it before it becomes a major problem. There are many positive ways to manage stress. This can include positive self-talk,

General recommendations for a healthy diet

Eat a minimum of 2 serves of fruit and 5 serves of vegetables a day.

Have a varied diet and eat more raw vegetables.

Choose wholemeal or whole grain for more fibre, vitamins and minerals.

Buy local and seasonal, these can often be better value for money, travelling less.

Eating less red meat (no more than 3-4 times per week).

Drink lots of water.

For more information see: The Australian Guide to Healthy Eating

www.health.gov.au/internet/main/publishing.nsf/Content/E384CFA588B74377CA256F190004059B/$File/fd-cons.pdf

Organic farming

Prohibits the use of synthetic chemicals, irradiation, nanotechnology, GMO and food additives.

Farming typically benefits the environment through using less water, no run off of fertiliser into waterways; builds soil matter and biology, increases biodiversity on and around farms, stores carbon in soils, are less dependent on fossil fuels (no fertilisers and pesticides and less fuel use).

Have guidelines for better animal welfare: www.ogawa.org.au/about_organics.php

Mindfulness meditation

Meditation has been practised for thousands of years for religious or spiritual reasons. There is a growing body of evidence that the regular practice of meditation can improve our health and well-being. Meditation can help shut out unhelpful and negative thoughts such as replaying the past and worrying about the future. This helps to reduce the activation of the body's stress response.

Mindful meditation can help you to:

- Know what your mind is paying attention to.
- Find out where your mind's attention needs to be focused.
- Maintain attention on what you want to be focusing on

spending time with friends, relaxing (listening to music, dancing or reading a book), physical activity, ensuring you have a balanced life and taking time out to enjoy yourself. If you are experiencing high levels of stress that you are finding difficult to manage it is important that you get help. Your local GP or organisations such as Lifeline www.lifeline.org.au or Samaritans www.thesamaritans.org.au/contact-us.aspx will provide you with free and confidential advice.

Top 5 actions

1. Build regular moderate and vigorous exercise into your week. Choose exercise that you enjoy, take it with friends or join a regular class or group.
2. Eat more seasonal fruit and vegetables, minimise your consumption of processed food.
3. Prioritise organic and locally grown produce.
4. Learn to recognise signs that you are stressed. Build time into your daily routine to relax.
5. Find out more about food, where it comes from, how it is produced and its properties. Planning your meals, writing shopping lists and using recipe books can help you to eat a healthy and diverse diet.

[1] Air toxics and indoor air quality in Australia
[2] www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0
[3] www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/3222.0?OpenDocument
[4] 1994–95 to 2003–04 approximately 1.5 million new dwellings were completed in Australia (an average of 146,000 per year). http://www.abs.gov.au/AUSSTATS/abs@.nsf/Latestproducts/8DD7826E7F7235D8CA25732C0020820B
[5] State of the Environment Report Western Australia, 2007
[6] Creating the right environment, Western Australia Waste Strategy
[7] Recycling Activity in Western Australia, 2009-10
[8] National Pollutant Inventory substance factsheets
[9] National Pollutant Inventory VOC factsheeets
[10] City of Stirling website, Use Non-Toxic Cleaners
[11] Alternative Technology Association Renters' Guide to Sustainable Living
[12] Australian Health Survey: First Results, 2011-12
[13] State of the Environment Report Western Australia, 2007
[14] Living Planet Report: Biodiversity, biocapacity and better choices
[15] Our Water Mark: Australian's Making a Difference in Water Reform
[16] Department of Health and Aging Physical Activity Guidelines
[17] Australian Medical Association Stress and your health

Living Smart Story

Joan, Bunbury

I have a long background as a health professional. I started doing yoga with a friend, over 35 years ago. We went to an Ashram to listen to a talk, I was very moved, I found it quite profound. I decided to get more involved, so I undertook a teacher's course. It was quite arduous. Over the years I found that I started to incorporate yoga into my work, as well as practise it in my own life. I was working with children with physical developmental problems. You can change the body and make a difference; it depends on what you can commit to. What we do with our bodies, there can be a whole flow on effect in our lives together with meditation and observation. Meditation provides the opportunity to be quiet, to observe and to think more. I found that I had a growing awareness of the gift of life, how we need to look at it more clearly, treat it better and respect it. It also gave me a broader awareness of our overall environment.

Getting involved in yoga and meditation also meant that I met more like minded people, I felt more at home with people who fundamentally cared and thought further than themselves. As I have science degree, and I read a lot I understand the science of climate change so I have trained and present about climate change for the Australian Conservation Foundation. That's why I took the Living Smart facilitator training; I wanted to improve how I did this. I have also founded Friends of Earth in Bunbury and I am member of the WA Greens Anti-Nuclear. I am committed to doing what I can for the world whilst I am in it. Hopefully I walk the talk.

Joan with solar panels

Want to find out more?

How to guides

Healthy Homes

Safer Solutions for Safer Renovations – guide to better decisions when renovating.
www.safersolutions.org.au/home-renovating/292?task=view

Learn about the effect of household chemicals on your health.

The following sites list common chemicals found in household products that can damage your health.

- Safer Solutions is committed to changing householder behaviour by increasing knowledge of the environmental, health and safety risks of hazardous household chemicals and by presenting safer alternatives.
- Healthy Child Healthy World lists chemicals hazardous to children.
- US National Institute for Occupational Safety and Health (NIOSH) is a pocket guide to chemical hazards.

Additional Resources

This Easy Guide to Natural Cleaning (PDF) brochure is a good resource to download, print and throw on the fridge.
www.livingthing.net.au/rc/guides/2005125_NatClean_ENG.pdf

Safer Solutions to control household pests

Avoid hazardous chemicals in the control of common household pests.
www.safersolutions.org.au/ipm/online/index.html

Your Home: a guide for sustainable homes written by Commonwealth Government and industry.
www.yourhome.gov.au

Make your own: Deodorant, Homemade Soap or Dishwashing Liquid.
www.earthcarers.org.au/programs-and-courses/plastic-free-july

WA Department of Transport fact sheets:
Healthy home and healthy you
http://www.transport.wa.gov.au/mediaFiles/AT_LS_P_Healthy_home_healthy_you.pdf

Information contained in the online brochures from the above website has been provided in good faith by the Department of Transport's Living Smart Households program. Since 2008, the Department of Transport has sub-leased the Living Smart brand to deliver an intensive, community-wide behaviour change program. Its program has empowered tens of thousands of households across Perth to live more sustainable lifestyles by reducing their demand for car travel, energy and water, and waste services."

Healthy You - Food
Preparing and cooking food. Serving sizes and recipes based on recommended serves of fruit and vegetables.
www.lovefoodhatewaste.nsw.gov.au/cook-it/preparing-your-food.aspx

Healthy Weight Website
Healthy eating information, tips and Body Mass Index calculator.
www.healthyactive.gov.au/internet/healthyactive/Publishing.nsf/Content/healthyweight

Healthy You - Healthy body and mind
Meditation Toolkit- Life Matters, Radio National.
www.abc.net.au/radionational/programs/lifematters/features/meditation-toolkit

Healthy Homes
Books
Wrigley, D (2012) Making Your Home Sustainable: A Guide to Retrofitting, ISBN (13): 9781921844171

Mobbs, M (2010) Sustainable House, 2nd Edition,CHOICE Books, Australia

Safer Solutions A-Z guide to learn more about common chemicals found in and around the home.
www.safersolutions.org.au/a?task=category&sectionid=10

The Owner Builder Australasian Homebuilder's magazine has plenty of sustainable material information.
www.theownerbuilder.com.au

Building and renovation: Research over 5500 eco-products, materials, technologies and resources, for homeowners and professionals.
www.ecospecifier.com.au

Factsheets on substances, health impacts and common uses and sources.
www.npi.gov.au/substances/factsheets.html

Greenpeace Good Wood Guide helps you to make informed, environmentally responsible decisions when buying wood and wood products.
www.goodwoodguide.org.au

Reports and Articles
Australian Health Survey: First Results, 2011-12
http://www.abs.gov.au/ausstats/abs@.nsf/atestproducts/4364.0.55.001

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www.zerowaste.wa.gov.au/media/files/documents/WA_Waste_Strategy.pdf

Lenzen, M (2002), cited in Watermark Australia (2007), Our Water Mark: Australians Making a Difference in Water Reform, The Victorian Women's Trust, Melbourne.

Living Planet Report: Biodiversity, biocapacity and better choices,2012 World Wild Life Fund, Global Footprint Network and Zoological Society of London,
http://awsassets.panda.org/downloads/1_lpr_2012_online_full_size_single_pages_final_120516.pdf

Recycling Activity in Western Australia, 2009-10, Final report, Hyder Consulting Pty Ltd.
http://www.zerowastewa.com.au/documents/external_docs/WA_Recycling_Activity_09_10.pdf

State of the Environment Report Western Australia, 2007 Environment Protection Authority.
www.epa.wa.gov.au/AbouttheEPA/SOE/2007/Pages/default.aspx

State of Knowledge Report Part B: Air Toxics and Indoor Air Quality in Australia. Provides information on a range of indoor air quality issues including sources, levels and effects of particular pollutants and the management of indoor air quality in Australia.
http://www.environment.gov.au/atmosphere/airquality/publications/sok/index.html#partb

Websites

www.npi.gov.au/substances/factsheets.html

www.npi.gov.au/substances/volatile-organic-compounds/health.html

City of Stirling website, Use Non-Toxic Cleaners.
www.sustainability.stirling.wa.gov.au/categories/products/actions/use-non-toxic-cleaners

http://www.ata.org.au/wp-content/sustainability/ata_renters_guide_sustainability.pdf

Healthy you Food

List of healthy food andnutritional properties.
www.whfoods.com/foodstoc.php

Perth and Western Australia Seasonal Food Guide.
www.seasonalfoodguide.com/perth-wa-seasonal-fresh-produce-guide-fruits-vegetables-in-season-availability-australia.html

Micro lives- Winton programme for the public understanding of risk, Statistical Laboratory, University of Cambridge, UK.
www.understandinguncertainty.org/microlives

Organic Association of Western Australia.
www.ogawa.org.au/index.php

Whole food list of organic food suppliers in Perth.
www.wholefoodcooking.com.au/06-resources.html

Healthy You

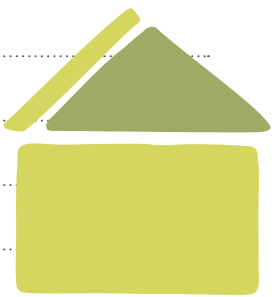
Find an experienced meditation teacher through Australian Teachers of Meditation Association.
www.meditationaustralia.org.au/?page_id=490

Short video on mindfulness training and stress.
http://www.youtube.com/watch?v=hcjaYuV7dc8&feature=related

Guidelines for physical activity, Department of Health and Aging.
www.health.gov.au/internet/main/publishing.nsf/content/health-pubhlth-strateg-phys-act-guidelines#guidelines_adults

Information on stress and your health, Australian Medical Association
www.ama.com.au/youthhealth/stress

Notes



Living Smart

Community Smart

Community Smart

Your Community

Getting involved in your local community brings a range of benefits to individuals. Australians who see friends and family that live outside of their home, once a week or more, are more likely to be satisfied with their lives.

People with strong social capital are less likely to have colds, heart attacks, strokes, cancer or commit suicide. They are also more able to recover from illness. 63% of Australians had participated in a social group during 2010. Most of this activity is based around sporting and social clubs that have bars or restaurants, or religious/spiritual groups.

Social capital also has an important role to play in creating a better community - strong social connections reinforce similarities and can bridge differences. Social capital also plays a part in making our government more responsive, efficient and innovative. ,

Social capital can be eroded through different factors: longer working hours, more isolated activities, such as watching TV, car travel and the lack of community spaces.

There are many different ways that you can participate in your local community, increase your social capital and help build the type of community that you want to live in.

What can you do?
Just by participating in a Living Smart course, you are building community with like-minded people. It's a great way to start!

Get to know your neighbours
Make the time to get to know your neighbours. There are many ways to do it, but getting together over food and/or drink isn't a bad way to start!

What is social capital?

The people we know, our social networks have value. This is because we are more inclined to do things for each other (reciprocity).

There are many different definitions of social capital. Most highlight the benefits that flow from our social networks such as trust, reciprocity, information sharing and cooperation.

Here are some ideas put into practice by other Living Smart participants:

Driveway drinks - Drop a note in to your neighbours and ask them if they want to have a driveway drink. Give about 4-6 weeks notice and remember to tell them if it is BYO or if you will provide drinks.

Kids' activities - can be a good way to meet local families. Organise some games or a competition like build a scarecrow in a local park or front garden. Having it in a public place may make people feel more comfortable to drop in.

Grow a veggie garden on your verge - when you are gardening lots of people will stop and chat to you. Before you know it you will be swapping seeds and ...

Share a compost pile - If there are some keen green thumbs in your street, organise a spot for a communal compost bin.

Living Smart in your lounge room - Invite your street to run a Living Smart course in your lounge room or from a local café. To find out more get in touch with our Living Smart Coordinator

Hold a movie night - borrow a projector, some speakers and a wall and show a film. Don't forget to ask people to BYO their own chairs.

Have a street party - Reservoir Close in Mosman Park won an award for being the friendliest street. Every 2 months everyone in the street has a party. During the summer months it takes place on the street, during winter different households take it in turns to host it. The host is responsible for providing chairs, plates, knives and everyone else makes the food and brings the drinks.

Living Smart Story

Tim, South Fremantle

This story begins a couple of years ago when a friend of mine decided to hold his wedding at our Eco B and B, The Painted Fish. The wedding was really beautiful but the thing that really struck me was the way in which a large number of wedding guests were fed. My mate had hired a mobile pizza oven. I helped out, whipping up pizzas for the throngs of wedding guests. So much food with so little effort. It really got me thinking; Hey, why don't we make our own street oven? I asked around and about half the people in the street put in $100 each but it wasn't quite enough. That year our annual Hulbert Street Sustainability Fiesta ran at a profit. What should we do with the left over money? Hey, why don't we build a mobile pizza oven? During the fairly chaotic discussion that followed it emerged that there was a strong feeling that at least some of the money should be given to a local community group in need of funds for a worthy project. I argued that if we built the mobile oven then we could lend it out to other similar groups to raise funds for their own projects. And now we have a street-owned mobile pizza oven.

People are drawn together through the sharing of food and fire each week. For the previous year one of our neighbours had been hosting an open invitation afternoon tea on Wednesday afternoons. Since the pizza oven was available people started bringing toppings and dough and afternoon tea has morphed into dinner, feeding half of the street and anyone who happens to be passing by.

These weekly pizza fests provide an excellent opportunity for the sharing and showing off homegrown produce. The well insulated oven stays hot until at least the next morning, so our sour-dough guru, drops over on Thursday mornings to cook up mouth-watering bread while others might make use of the remnant heat to bake potatoes or tomato passata. The oven is heated in the first place using kindling fallen from street trees and then ramped up using scrap and offcuts of jarra collected from road verge pickups.

For me, personally, the most exciting aspect of the oven is that it's a significant piece of equipment that isn't owned by any one individual. It actually belongs to everyone in the street. Despite all appearance to the contrary I don't actually have shares or any other financial investment in the pizza oven industry. It could just as easily have been a large, communally owned solar oven, community garden or collectively owned and shared electric car (Hey, maybe that's next!!).

The ripple effect

In 2008 in Hulbert Street, South Fremantle one house had solar panels and none had veggies growing on the verge or in front gardens.

Four years later over 50% of houses have solar panels and 10 have veggie gardens visible from the road. 42% of Hulbert Street residents have participated in two street Living Smart Courses.

And now with lots of shared food, regular afternoon teas and pizza nights, and regular fun activities together such as film nights and gardening days, Hulbert Street is not only more sustainable but more of a community.

How did it happen? Psychologists call it social proof, if other people are doing it, we presume its ok and want to behave in a similar way. We are more likely to be influenced by people whom we like, trust or are similar to us. This is called likability. Put them together, add some goal setting and fun and the effect is very powerful.

Start a local group

What are you interested in doing? Check to see if there is a group that you can join locally. No one else taking action on it? Start your own group. Australia has a history of local groups that have made a difference.

Talk to your friends, neighbours and family. Find out who else might be interested. Create interest in the issue by doing a letter box drop, writing to the local newspaper and social networking. Having a shared experience can be a good place to start.

Join a group

There are now 6 Living Smarties groups that meet fairly regularly. They all run in different ways and do different things.

Groups currently run in the following suburbs: Fremantle, Melville, Subiaco, Mosman Park, Bassendean, Rockingham, Canning and Mandurah.

If you want to find out more information or would like to join a group get in touch with the Living Smart Coordinator: info@livingsmart.org.au.

There are many different community groups that may operate in your area. The following can be useful places to find out more about groups that may operate in your area:

- Give your local council a call or check their website. Each council is different but a good place to start is in the community development or volunteers section. They may also have 'Friends of" groups, that look after nature reserves, rivers and coasts.
- Libraries check the notice board or ask the Librarian.
- Keep an eye on your local newspaper or notice boards in your local area, they can often be good sources of information.
- Use a search engine to find coast care, landcare and other groups in your area.

Get involved in a programme

This can be run by a not for profit, charity, state or local government or even a combination of all four. There are many different types of programs that you can choose from.

Become an activist

As an individual or a group (remember groups have more clout) you can express your point of view, raise concerns or object to things by:

- Writing a letter to the newspaper or your local, state or federal representative. Be quick and concise. Explain what your letter is about and look for opportunities to praise positives and suggest solutions.
- Commenting on draft government policy by making a submission, you may have to follow guidelines. Get these from the appropriate Government Department or its website.
- Asking questions or raising an issue at your local council meeting. Councils will have different rules about how you can participate in or raise an issue. Ask your council or check its website for its rules.

There are many different organisations that advocate on behalf of the environment and the community. You will be able to support campaigns by signing petitions, sending letters, attending events and other activities.

CHERP

Community Household Electricity Reduction Pilot

The City of Mandurah is trialling the reduction of household electricity in 2 streets. 12 households have committed to reducing their electricity usage by 15%. Households were given an information pack and officer support that helps them work through 4 checklists, starting with no/low cost actions through to harder to do/ more expensive actions. They were also given a bin sticker to show that they are part of the program and information on how they are progressing compared to last year's bills and their most energy efficient neighbours. New bin stickers are given to the household when they reduce their electricity consumption by 5, 10 and 15%.

Living Smart Story

Living Smartie, Rebecca from Bassendean.

After I finished my Living Smart course (October 2010) I would often bump into people from the course and we would all say the same thing, 'wouldn't it be great to keep on meeting'. Early in 2011, I sent a group email, was anyone interested in meeting monthly? At first I didn't get any responses, how embarrassing!

Eventually, 6 people replied. I had already decided that I was happy to coordinate but didn't want to have the responsibility to organise everything – I wanted people to feel that the group was theirs too.. I went to the Local Council and asked them if they could waive the fee for one of the meeting rooms in the library, which they did. It has been important to have a regular venue, with good facilities, audio visual equipment and a kitchen.

Our first meeting in May 2011 was a planning meeting. We decided it would be a good thing to re-visit the topics that were covered in the Living Smart course so we could look into things in more detail. We now have a simple monthly planner that shows the topic, activity, any resources and the person responsible for the session.

It has been important to get the support of the council, our deputy mayor actually comes to some of the sessions. We now have a pool of about 20 people, with about 8 to 12 people coming to each session. I would like to promote the group more to other like minded people, as there needs to be a critical mass to keep the group viable.

Being part of Living Smarties, Bassendean keeps sustainability at the front of my mind and keeps me accountable. I didn't want to lose my motivation. It is a major incentive for me, I also feel like I am contributing to my community.

Organising a meeting or is your group meeting regularly? As a group you will need to discuss the issue and what you want to do about it but also the logistics of running a group. Have a clear purpose and keep organisation simple.

In the future you may want to become an incorporated association, you can access funding from more sources and have the security of an organisation that is responsible for the group's decisions and actions. It also means that you have legal responsibilities too.

LIVING SMARTIES AND FRIENDS

Transition Town Guildford

Transition Towns is a worldwide movement of local people building community and taking action on climate change and peak oil. There are 14 Transition Groups in WA, each group is independent and their activities are shaped by the community's plans and priorities. Established in 2010 Transition Town Guildford has an active Kitchen Gardeners' Society (KGS). Meeting every month, the KGS shares knowledge, tools and tips to support anyone who wants to grow their own vegetables, fruit and even small livestock. Passionate cyclists get together through the Bicycle Users Group, and campaign for better bike paths. Transition Town Guildford also provides upskilling opportunities to its members, recent workshops have included bee-keeping, food preserving, composting and bike maintenance. Co-founder and Living Smart facilitator Peter said: 'Transition Towns' philosophy is that the best responses come from local people. It is also about building local skills and networks. Sometimes I worry that we're not doing enough, but Transition Town Guildford's impact has been wider than we first realised, sometimes in a way that is unexpected. For example, our local council is getting on-board, and people in other communities are now starting Transition Town Groups too'.

For more information see www.transitiontownguildford.com

Transition Town Guildford

One million Trees

2029 and beyond has been initiated by the City of Geraldton and partners. Residents from in and around Geraldton wanted to be more involved in planning for the region's future. Local residents were invited to participate in world cafes, online surveys, even the local radio stations got involved. Community members identified that they wanted to have more trees planted in their area. Working with 'Men of the Trees' local residents and schools are getting involved in seed collection and propagation and native tree planting. Local native species have been chosen as they are adapted to local conditions, as well as being waterwise.

Living Smart Story

Glenda, Geraldton

I became a One Million Tree Challenge Leader because I have a passion for Geraldton Wax, it's a plant that is native to this area but there are very few of them. As I work at the visitors centre tourists would often ask where they could see some. I would like the Geraldton Wax to be accessible to locals and tourists. When I heard that the One Million Tree Challenge needed local input and drive I decided to get involved.

We are still in the planning stages; there are lots of different ideas about what we can do to contribute to the program, even what the outcomes will be. There is a group of us that are similarly interested; we have planned a Geraldton Wax walk. Men of The Trees are investigating whether we can get permission at the sites that we have identified, whether it will be feasible and if we can get funding. The big challenge will be working with the climate, as we have a short rainy season and a long, dry summer. We will have to plant the seedlings in winter so that they can get established and we will have to organise watering for the first year. When we have a definite plan sorted then we will garner assistance from the local community, we might approach schools to assist, but that's further down the track. It's like working in my garden; you fine tune it as you go along.

Transition Town Guildford, Clean Up Australia Day

Top 5 actions

1. Stay aware of what is happening in your community and participate in community consultation processes.
2. Get involved. 'Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed it is the only thing that ever has', anthropologist and activist Margaret Mead.
3. Get to know your neighbours. Although it can take time to get to know people, it is definitely worth the investment.
4. Start a group, if nothing exists that appeals to you. Never under estimate the power of a cup of tea or a slice of pizza. Shared activities such as gardening or creating an artwork are a great way to start conversations and action about wider issues.
5. Help however you can to build a resilient local community.

[1] Australian Bureau of Statistics, 4159.0 - General Social Survey: Summary Results, Australia, 2010 www.abs.gov.au/ausstats/abs@.nsf/Latestproducts/4159.0Main%20Features12010?opendocument&tabname=Summary&prodno=4159.0&issue=2010&num=&view=

LIVING SMART

Inc

Living Smart began in 2002 as a partnership. More courses were delivered and the demand for Living Smart grew. It became harder for the partnership to keep up. Committed Living Smarties worked with the founding partners to transition it to an incorporated organisation. The process took several years, lots of meetings, discussions, and many cups of tea. In July 2011 Be Living Smart Inc was born. As an Inc it has been easier and quicker to make decisions, gain funding and develop the program. It also comes with the responsibility of making the program financially sustainable.

Want to find out more?

How to guides

Start a local group

Ourcommunity.com.au guides and information on every aspect of becoming a community organisation from funding, finding a board to insurance
www.ourcommunity.com.au/boards/boards_main.jsp

INC A guide for incorporated associations in Western Australia
www.commerce.wa.gov.au/associationsguide

Run a world café - Youth Services Toolkit
www.theworldcafe.com/method.html

Designed to support people working with youth but has useful general advice on how to organise meetings, obtain funding etc
www.youthservicestoolkit.com.au/YouthServices/RunningTheOrganisation.html

Websites

Become an activist

Australian Conservation Fund
www.acfonline.org.au

Avaaz
Takes action on global, regional and national issues mostly through online activity
www.avaaz.org/en/index.php

Conservation Council WA, Advocates on environmental issues in Western Australia
www. ccwa.org.au

GetUp!
Takes action on national issues mostly online, some events. Participate in pre-existing campaigns or suggest one of your own.
www.getup.org.au

Geraldton-One Million Trees and Men of the Trees
www.menofthetrees.com.au/milliontrees.html

Greenpeace
www.greenpeace.org/international/en

World Wildlife Fund
www.wwf.org.au

Oxfam
www.oxfam.org.au

Become an environmental volunteer

You can support efforts to improve or rehabilitate your local area.

Australian wildlife conservancy
Longer term volunteer placements
www.australianwildlife.org/Support-AWC/Volunteering.aspx

Bush Heritage Australia
Mostly skilled placements
www.bushheritage.org.au/getting_involved/getting_involved_volunteer

Conservation Volunteers
Get your hands dirty and make a difference to your local environment, day and weekend volunteer work is available.
www.conservationvolunteers.com.au

Department of Environment and Conservation has a range of volunteer programs that include scientific research, community education and manual labour. For more information see:
www.dec.wa.gov.au/community-and-education/volunteer-programs.html

River Guardians
Friends of Swan and Canning Rivers, volunteer projects include planting, weeding, drain stencilling, and rubbish removal.
www.riverguardians.com

Books

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Hopkins, B (2008) The Transition Handbook: Creating local sustainable communities beyond oil dependency, Australian and New Zealand Edition, Finch Publishing.

Reports and articles

Better together report (2001) The Saguaro Seminar, John F. Kennedy School of Government at Harvard University, America
www.bettertogether.org/thereport.htm

Websites

Cialdini's Six Principles of Influence: Convincing Others to Say "Yes"
www.mindtools.com/pages/article/six-principles-influence.htm

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Notes

Community Smart

The big issues

The big issues

Living Smart is about being practical and taking local action. The following few pages provide a brief overview of the major sustainability challenges. It provides a context for those who want to know more about how these challenges affect WA.

Economic

The current economic system has delivered unequal benefits both in and between countries, 1/5 of the world's population earns 2% of global income. In Australia, there is also an asymmetrical distribution of wealth between households. The Bureau of Statistics defines the net worth of individuals as being the value of their homes minus liabilities. It found that the high net worth Australians (1/5 of Australians) hold 62% share of the country's wealth whereas, the lowest net worth Australians (1/5 of Australians) hold only 1%[1]. There are also inequities in the use of resources and production of waste and emissions. The world's richest, about 7 % of the global population, are responsible for 50% of the world's annual greenhouse gas (GHG) emissions. Whereas the poorest 50% of the global population are responsible for just 7% of global emissions[2]. These issues and the Global Financial Crisis (GFC) have led to scrutiny of our economic model.

The GFC has been attributed to malpractice and lack of regulation, however, other economists state that economic growth has caused this crisis; growth shaped the architecture and the freedoms granted to the finance sector and the credit granted was a crucial mechanism to ensure continued growth. Mainstream capitalist economic theory holds that economic growth and environmental degradation can be decoupled through increased resource efficiency. Yet our current use of finite resources and production of emissions need to be dramatically reduced[3].

The Australian banking sector has been accused of being overly concentrated: this allows the banks to accrue super profits through activities that are not in the interest of the general community[4]. Research also shows that many Australians believe that the lack of regulation in the financial sector as well as the lack of corporate social responsibility is leading to credit being pushed on vulnerable consumers. In Australia private levels of debt are increasing faster than increases in our wages and in other comparable countries. 17% of consumer demand is currently funded through debt[5]. In Western Australia high commodity prices have brought large profits to the resources sector and high wages for its employees. There are concerns about the environmental impacts[6], the volatile dollar, high interest rates and the effects on the wider community, such as the impact of the fly in and fly out lifestyle, on family life and rising costs of houses for first home owners. High levels of consumption are not compatible with a sustainable lifestyle.

Land degradation

Much of Western Australia's land has been highly modified since European settlement and the protective cover of native vegetation has been removed and degraded in many areas. This has led to changes and deterioration of soil health. This reduces the profitability of the land and it affects water ways and ground water supplies. There is limited monitoring in Western Australia of land issues, bar salinity but much

A caring economy

Different economic theories and grassroots movements are proposing different ways to provide prosperity that stands outside the traditional model of economic growth. This includes accounting for externalities:

- How we use, damage or improve common goods like air and water or the equality of exchanges that occur beyond countries' borders.
- Increasing investment in public infrastructures, sustainable technologies and ecological maintenance and protection.

Grass roots and community movements are also providing alternative ways for people to participate in society that ignores economic competitiveness, focusing on enhancing community relationships, cooperation and making time for family and friends.

of Australian agricultural land is under pressure from soil erosion, loss of natural vegetation cover, over use of irrigated water and impacts of pests. Soil salinity, acidification and rising groundwater are also on the increase[7]. Soil erosion rates vary across the State. The highest rates of loss are in the Kimberley and west Pilbara. Gascoyne, Murchison, Pilbara and Kimberley have declining rates of soil stability, whereas soil stability rates have improved in the Goldfields and Nullarbor. Approximately two thirds of south-west agricultural land is at risk of acidification[8]. Much of Australia, particularly Western Australia is classified as drylands, or arid and semi-arid land. Drylands are defined as land where production of crops, forage, wood and other ecosystem services are limited by water[9]. It is estimated that 75% of Australia's dryland salinity problems are in WA.

Loss of biodiversity

Australia is 'mega diverse', one of the twelve most biologically diverse nations in the world[10]. Western Australia is renowned for its biodiversity. The southwest of the State is recognised as one of the world's 32 biodiversity hotspots[11]. Current and historic removal of native vegetation, primarily through clearing but also burning, overgrazing, draining or flooding threatens WA's biodiversity[12]. Clearing is the primary cause of the loss of biodiversity across the world[13].

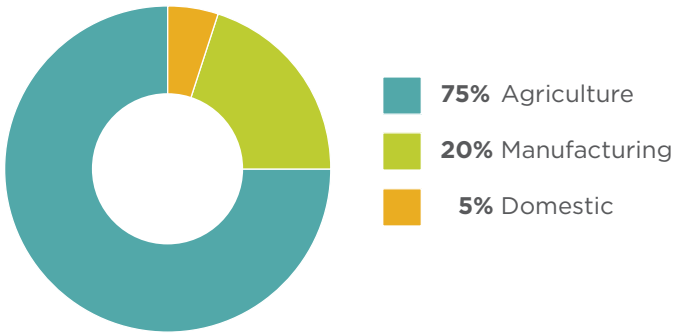
Climate Change

Increased levels of greenhouse gases caused by human activities are already causing drought and extreme weather events, sea-level rise, coastal erosion and ocean acidification. This threatens food and water security, biodiversity, increases health risks and is already causing population movement. These risks are disproportionately borne by the world's poorest[14].

Recent research released by the Indian Ocean Climate Initiative shows that the decreases in rainfall in south-west WA during the past 60 years are consistent with changes expected as a result of climate change. If greenhouse emissions continue to rise, it also projects the south west of WA will have reducing rainfall and warmer maximum and minimum temperatures[15]. Estimates for Australia predict that in 2030 there will be an annual warming of around 1 degree above 1990 levels, less rainfall in southern and eastern areas with more intense rainfall events and significant increases in flooding[16],[17],[18].

Food security

Can be defined as the right of everyone to have sufficient, safe and nutritious food that also protects our natural resources[19]. In Australia access and capacity, availability (such as location of stores, price, quality and availability) as well as knowledge are important factors[20]. Currently 5% of Australians are estimated to experience food insecurity[21]. The challenges of climate change, competing demands for land and water and use of land for bio fuels threaten our food security. The growing



Global consumption of water

demand for food in the last century has largely been met through intensification of food production and expanding areas under cultivation.

This has resulted in losses in the forms of loss of biodiversity, decrease in soil fertility and degradation, contamination of soil, water and air[22,23]. These challenges are likely to grow as human demands increases, as a result of changing diets and increases in population[24].

Water

Our wetlands ecosystems (lakes, rivers, marshes and coastal regions) play a key role in maintaining water quantity and quality. They also have a role in preventing damage from flood and storm water, as well as being highly productive ecosystems for birds, mammals, fish, reptiles, amphibians and insects. Over 50% of wetlands across Australia have been destroyed. There is limited data on the condition of Western Australian wetlands, as a result, it is not possible to provide an overall assessment. Salinity levels in South West rivers are rising (bar Collie and Denmark due to clearing control and afforestation); many of Perth wetlands are drying up due to excessive groundwater extraction and climate change. The Swan and Scott coastal plains are being degraded with most serious degradation happening in urban areas. This compromises the wetlands ability to supply us with fish and fibre, water

supply and purification, climate and flood regulation, coastal protection and recreational opportunities. Fresh and coastal wetlands are being degraded more quickly than any other ecosystem. Excessive nutrient loading from land based activities such as use of fertiliser is becoming a growing threat[25,26].

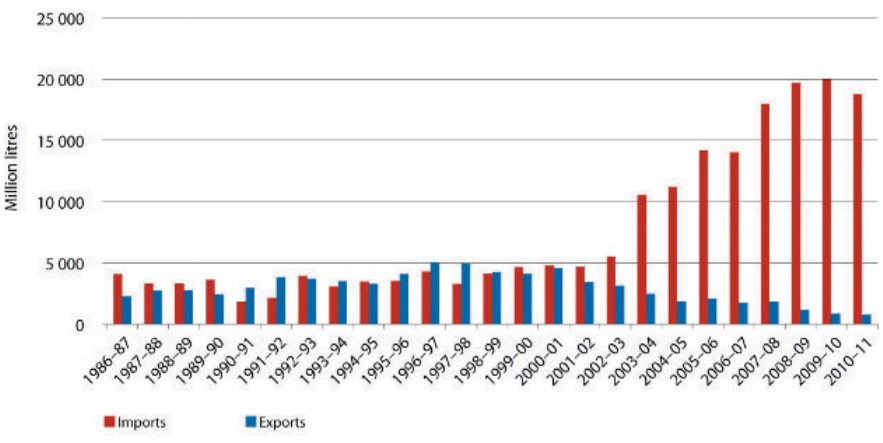
Although there has been progress in meeting the Millennium Development Goals of access to clean water supplies and sanitation, 20% of the global population still lacks access to safe drinking water[27]. By 2025 it is estimated that two out of every three people will live in water-stressed areas. As the majority of global water consumption is used for agriculture, this will have a negative impact on global food security.

Energy

According to the World Energy Authority we are not on a sustainable path to meet the projected 30% increase in global energy demand. Current energy production relies heavily on the burning of fossil fuels, whose emissions are a major contributor to climate change. In the future OECD (Organisation for Economic Cooperation and Development www.oecd.org) countries are likely to shift towards renewables and natural gas but fossil fuels are likely to dominate the energy mix. Water needs for energy production (extraction, transport and processing and growing bio fuels) is projected to grow at twice the rate of energy demand, reflecting the predicted shift towards more water intensive power generation. Globally we are failing to deploy energy efficiency technologies at the scale and rate necessary and we continue to prioritise fuel subsidies to fossil fuels over those to renewables. In 2011 global fossil fuel subsidies were $523 billion, up almost 30% on 2010 and six times more than subsidies to renewables. Current levels of energy production still leave nearly 1.3 billion people without access to electricity and 2.6 billion to clean cooking facilities[28].

Australia is heavily reliant on fossil fuels, making up approximately 96% of Australia's primary energy consumption and 90% of electricity generation in 2010–11. The transport sector is the largest end user of energy in Australia, consuming over a third of final energy. Australia imports most of its oil, and its reliance is increasing as oil consumption grows.

Australian import and export of refined petroleum products, 1986–87 to 2010–11 (ML)



Website of the Department of Resources, Energy and Tourism.

Peak Oil

In 1956 M. King Hubbert, correctly predicted that oil output in 48 states of America would peak by around 1970. The concept of peak oil was born.

Just as the industrial revolution was built on cheap coal, our post second world war economy has been built on cheap oil. We import goods from all over the world, our transportation system, fertilisers, and pharmaceuticals and so the list goes on, are dependent on cheap oil.

Transitioning to a less oil-dependent future will require major changes in the operation of our economy. When will the global production of oil be outstripped by demand? Has it already happened? Both sides contest the answers to these questions. But most commentators can agree that the era of cheap oil is, or is about to be over.

Feeling peaky: The economic impact of high oil prices, The Economist, April 2012 www.economist.com/node

This leaves us vulnerable to oil shocks, from disruption to distribution and dwindling capacity as global demand increases. In Australia we have remained insulated from rising oil prices due to the moderating effects of a strong Australian dollar. Recently Western Australia has seen increases in electricity prices, yet prices are relatively low in comparison to many OECD economies[29,30].

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[9] Millennium Ecosystem Assessment, 2005. Ecosystems and Human Well-being: Desertification Synthesis.

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