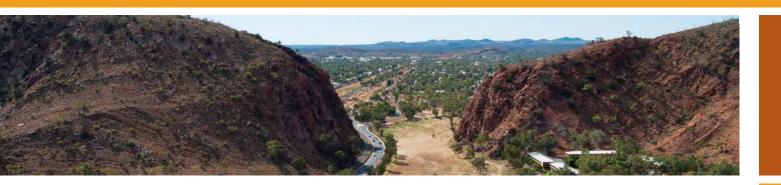








RoadMap to a desertSMART Town 2013-18



A Vision for a Sustainable Resilient Alice Springs.

An initiative of desertSMART COOLmob



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Advisory Committee

Peter Somerville (DLPE), Steve Sawyer (PWC), Andrew Broffman (Tangentyere Design), Sue Dugdale (Sue Dugdale and Associates), Greg Buxton (ASTC), Mike Rowell (ASTC), Jade Kudrenko (ASTC), Glenn Marshall (ALEC), Mike Crowe (DKA) and Jimmy Cocking (ALEC).

Interviewees

Energy

Alice Solar City - Sam Latz Power and Water Corporation - Trevor Horman Power and Water Corporation - Steve Sawyer Epuron - Donna Bolton Ogden Power - Reid Ogden

Water

DLPE - Anne Pye Alice Water Smart - Liz Locksley Power and Water Corporation - Rod Randall Power and Water Corporation - Lee Morgan Formerly NRETAS - John Childs Centrefarm - Graham Ride Centre for Appropriate Technology - Steve Purvis, Robyn Grey-Gardiner

Waste

ASTC - Rainer Laan Territory Metals - Stuart Prichard CDU - Rachael O'Leary Russ Driver - Gemma Atkins Coles - Sarah Vivian IGA Larapinta - Mike Harvey Red Cross - Marg Reilly

Built Environment and Planning

Brendan Meney Architects - Brendan Meney
Sue Dugdale and Associates - Sue Dugdale
Territory Housing - Lisa Joy
NT Shelter - David Havercroft
Sitzlers - Trevor Jacobs
UDAP - Steve Thorne
Tangentyere Design - Andrew Broffman
CAAHC - Sue McGregor
NT Council of Social Services - Jonathan Pilbrow

Food

Coles - Sarah Vivian IGA Larapinta - Mike Harvey Territory Lettuce - Moe McCosker Rocky Hill Grapes - Richie Hayes

Transport

Transport Hall of Fame - Liz Martin
ASBus - Simon Appleyard
Centre for Appropriate Technology - Bruno Spandonide

Cross sectoral

Ninti One - Fran Kilgariff Tangentyere - Michael Klerck ASTC - Mike Rowell

Special thanks must go to Liz Locksley and Julia Perdevich for their voluntary and much valued contributions towards the writing and framing of the final RoadMap document.

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Photo courtesy of Desert Knowledge Australia

Acronyms and Abbreviations

ALEC	Arid Lands Environment Centre	DLPE	The Northern Territory Government
ARENA	The Australia Renewable Energy Agency		Department of Lands, Planning and the Environment
ASBus	Alice Springs Bus	DLRM	The Northern Territory Government
ASTC	Alice Springs Town Council		Department of Land Resource Management
AZRI	The Northern Territory Department of Primary Industries Arid Zone Research Institute	DoH	The Northern Territory Government Department of Department of Health
BCA	The Building Code of Australia	DoT	The Northern Territory Government
CAT	Centre for Appropriate Technology		Department of Department of Transport
CBD	Central Business District	DSCM	DesertSMART COOLmob
CEFC	Clean Energy Finance Corporation	EAC	The Alice Springs Town Council Environmental Advisory Committee
CO2	Carbon Dioxide	FAR	Floor Area Ratio
CRC-LCL	Cooperative Research Centre for Low Carbon Living	GRP	Gross Regional Product
CRC-RED	Cooperative Research Centre for Remote	GJ	Giga Joule
	Economic Participation	kL	kilolitre
CSIRO	Commonwealth Science and Innovation	kW	kilowatt
	Research Organisation	kWh	kilowatt hour
DBERD	The Northern Territory Government Department of Business Enterprise and	ML	megalitre
	Regional Development	NT	The Northern Territory
DCIS	The Northern Territory Government Department of Corporate and	NTCOSS	The Northern Territory Council of Social Services
	Information Services	NT CMO	The Northern Territory Government Chief
DCM	The Northern Territory Government Department of the Chief Minister		Ministers Office
DIVA	•	PV	Photovoltaic
DKA	Desert Knowledge Australia	PWC	Power and Water Corporation
		t	tonne



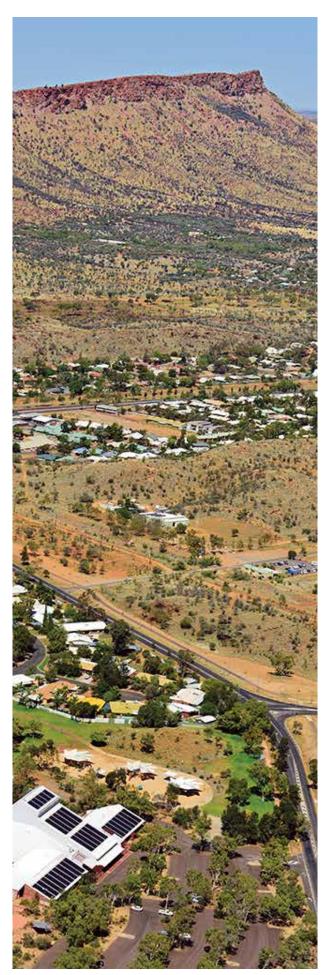


Photo courtesy of Alice Springs Town Council

Executive Summary

As one of the most remote and arid regional centres in Australia, Alice Springs faces a number of key barriers and limitations to its development. Yet, at the same time, there are many opportunities for increasing the resilience and sustainability of the town. The RoadMap to a desertSMART Town project and the RoadMap to a desertSMART Town 2013-18 report seek to outline these opportunities and the actions required to capitalise on them across the six areas of: energy, water, waste, built environment and planning, food, and transport. In doing so, it is hoped the RoadMap will make a significant contribution towards laying out the direction needed to make Alice Springs a more desert smart town.

The key strategies for achieving sustainability in the energy sector include maximising the transition to renewable energy and increasing energy efficiency. Good progress has been made in each of these areas already. However, there is much room for improvement with renewable energy providing just 3% of Alice Springs overall average annual energy generation. Currently, Alice Springs' world-class solar resource, the success of Alice Solar City and rising fuel prices provide a strong incentive to invest more in solar (or photovoltaic PV) technology. Despite challenges associated with existing grid infrastructure and high levels of PV penetration, there is still considerable scope for increasing the percentage of power supplied by solar in Alice Springs and using other renewable sources for power generation. There is also a significant opportunity to replace aging PWC energy generation infrastructure with appropriate renewable technologies.

Water efficiency is a key strategy for improving the sustainable use of water. Increasing water efficiency in Alice Springs has the ability to: a) reduce the rate of drawdown of the aquifer, b) reduce electricity costs associated with pumping water from the aquifer and c) defer costly water infrastructure upgrades. As Power and Water Corporation currently sell water at less than the cost of its delivery, saving water will increase the Power and Water Corporation's profitability. Incorporating water efficient practices into the planning, delivery and management of Alice Springs' water resource is a prudent economic and environmental strategy.

The economic triggers for increased investment in waste management in Alice Springs are complicated, and with volatile commodity prices, including those for carbon emissions, it is difficult to predict the future. The small volumes of waste produced in Alice Springs and the long distances to existing recycling facilities are ongoing barriers to shipping recyclable waste away for processing. However, opportunities may exist for improving local services and reducing freight costs through the development of local waste recovery schemes (such as food recovery for mulching and composting, plastic sorting and re-processing or paper). The recently completed ASTC Regional Waste Management Facility has increased the landfill sites capacity for waste sorting and recycling. There is potential to expand the facility's services even further and improve access to recycling services.

The Built Environment and Planning sector in Alice Springs is driven by the fact that it is a small town with a large services sector and government presence. Improving the performance of buildings, suburbs and public spaces to create positive environmental, social and economic outcomes is a key path to supporting sustainability in the Built Environment sector. However, this will require long-term retrofitting effort as much infrastructure is in place already. Developing appropriate policy and regulatory frameworks to remove barriers and incentivise desirable planning and construction outcomes is pivotal to this effort.

At present Alice Springs' **food** systems are highly dependent on food shipped in over long distances from interstate. Although up until the 1970s Alice Springs produced a high proportion of the fresh fruit and vegetables required by the town, there is currently very little locally grown horticultural produce available in the Alice Springs market and no locally produced meat. In the long-term, global food prices are trending upwards and agricultural production in arid regions will be seen as one part of the global solution. There are currently 32 sites across Central Australia identified as suitable sites for horticultural development. However, lack of investment to date and a complicated approvals framework has hampered development of many of these sites.

Overall, there is relatively little information available on the state of the Alice Springs **transport** sector (particularly quantitative data on freight). Although there is scope for improving transport within Alice Springs, by far the biggest challenge is to develop strategies that reduce the reliance of the town on long haul freight and reduce the impact of these freight systems on the environment. Better information would enable the development of more informed strategies to make our transport sector more sustainable.



Photo courtesy of Alice Springs Town Council

Introduction

Alice Springs is a unique town with a unique set of challenges. As one of the most remote and arid regional centres in Australia, it faces a number of key barriers and limitations to its development. However, these limitations also present unique opportunities for innovation and trialling of technologies and approaches not possible elsewhere. For instance, a small isolated energy grid means we can more readily trial innovative solutions to transition from a highly centralised grid system towards being able to cope with high penetration of distributed renewable energy generation. Similarly, a harsh desert environment gives us real incentives to use our non-renewable water resource productively. Likewise, the huge distances separating us from other urban centres provide incentives to improve the resource recovery from our waste stream.

This spirit of innovation is what drives the *RoadMap to a desertSMART Town* project. Now in its second iteration, and following in the footsteps of the 2005 *RoadMap*, the *RoadMap to a desertSMART Town 2013-18* seeks to lay out a blueprint for making Alice Springs a more resilient and vibrant desert smart town. A town that uses resources cleverly, doing more with less. A town that has a strong, localized economy and a well articulated desert identity. A town that is moving towards a more sustainable, resilient future and that is seen globally as the model of a desert smart town.

The RoadMap to a desertSMART Town 2013-18 seeks to be a bold and visionary document, outlining a vision for a more sustainable Alice Springs. But at the same time, being a roadmap, it also seeks to be practical and achievable, and provide a realistic set of recommendations for reaching this vision.

In order to meet these competing needs, the RoadMap sets out two timeframes for targets.

- 2018: The 5 year timeframe focuses on what can be achieved and measured within the current context (economic, social, institutional and climatic). It seeks to be very practical and is intended to be evaluated after 5 years, just as the 2005 RoadMap was in 2013.
- 2033: The 20 year timeframe is bold and visionary. It focuses on what we will need to achieve in order to change our current context. The targets associated with it are more aspirational, and intended to frame the long-term direction, rather than to be evaluated closely in 20 years time.



Photo courtesy of Alice Water Smart

How the RoadMap works

Each chapter of the *RoadMap to a desertSMART Town* 2013-18 focuses on one of the six components of a sustainable town. They are

- Energy
- Water
- Waste
- Built Environment
- Food
- Transport

Each of these chapters has the following structure:

- Vision for 2033
- Definitions and Characteristics of a desertSMART Town
- Benefits over Business as Usual
- Alice Springs' Unique Selling Proposition
- Progress Indicators
- Current Situation and Opportunities
- · Aims and Actions

The structure of each chapter aims to unpack what we aspire to and how we can get there.



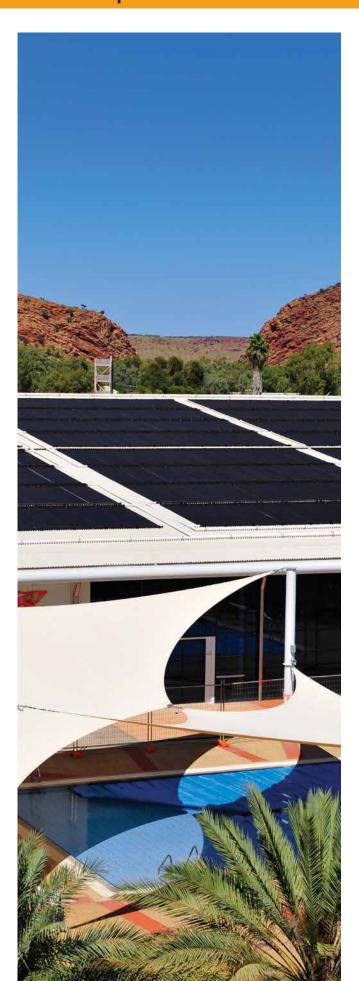


Photo courtesy of Alice Springs Town Council

Developing the RoadMap

The RoadMap to a desertSMART Town 2013-18 was developed between November 2012 and August 2013, by desertSMART COOLmob in partnership with Desert Knowledge Australia.

An Advisory Committee was established to provide advice and oversight to desertSMART COOLmob in developing the *RoadMap* (see Acknowledgements for details).

The RoadMap to a desertSMART Town 2013-18 project incorporates input from 114 different contributors through interviews, surveys and public consultation feedback sessions.

Interviews: 45 interviews were undertaken with key stakeholders in each of the 6 sectors (from a total of 89 interviews requested).

Online Surveys: There were 13 responses to an online survey via the desertSMART COOLmob website.

Public Consultation: Once a draft RoadMap was developed it was put out to several rounds of public consultation for feedback and recommendations.

In addition, significant secondary research (primarily internet based research) was undertaken to develop each chapter both before and after the consultation process.

The first draft containing the initial unedited 193 recommendations was presented for public consultation at two events:

- 1) A forum of local businesses hosted by Desert Knowledge Australia (12 June 2013).
- A community forum open to the public hosted by desertSMART COOLmob (13 June 2013).

The second draft incorporated feedback from these events, and from the advisory committee, and included additional background research. This draft, with an edited 97 recommendations, was again put to public consultation at the desertSMART Ecofair (11 August 2013).

The final set of 92 recommendations were selected through a two-step process. Firstly, the recommendations were grouped into higher level visions and more concrete actions, with actions being organised accordingly.

Secondly, all visions and actions were tested against a set of criteria to be included in the final *RoadMap*. The first criteria was that each vision or action must be SMART, defined as follows:

Specific: One output per action, or one goal per vision.

Measurable: The completion of each action must be able to be verified.

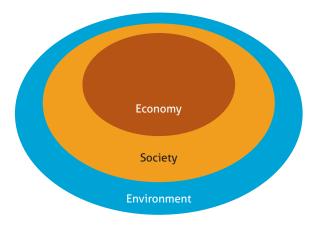
Attainable: Either the action/vision is within ALEC's ability to influence, or there is a reasonable chance that the most likely lead organisation will actually undertake it. An action/vision may be included where these two criteria are not met if there is evidence of very strong community support for the idea.

Relevant: All visions must contribute to the goal of making their sector more sustainable and resilient. All actions must logically contribute to the vision they sit under.

Time bound: All actions are assumed to be within 5 years unless specified otherwise. All visions are assumed to be non-time bound unless stated otherwise.

Ensuring that visions (and some actions) were in fact **visionary** was a key criterion for selecting recommendation. This was defined by the question: Does the action/vision seek to lay out a bold long term vision for the town?

The contribution that each vision/action makes to the **sustainability** of its sector and of Alice Springs as a whole was the third selection criterion used, defined by the question: does the action contribute to the environmental, economic and social wellbeing of the town without undermining the resources needed to support this wellbeing in ongoing way? The *RoadMap* to a desertSMART Town adheres to the 'nested rings' model of relating economic, social and environmental sustainability to each other (see diagram). This implies that all three types of sustainability must be met for a vision/action to be considered sustainable.



Whether the action/vision contributes to building resilience in Alice Springs is the final section criterion used. This can be decided by answering two key questions.

- 1) Does the action build resilience by directly increasing Alice Springs ability to survive and recover from shocks and stresses?
- 2) Does the action build resilience by adhering to the principle of multifunction - that is that each action supports multiple outcomes and that each outcome is supported by multiple actions?

Limitations

This document brings together the expertise and experience of local Alice Springs people and organisations working in the fields of water, energy, waste management, built environment, food and transport to make recommendations for a better way forward. However, this document is not intended to be an exhaustive report into the status of Alice Springs, nor is it a comprehensive State of the Environment Report for Alice Springs. Furthermore, Alice Springs faces a number of social issues that the desertSMART COOLmob and ALEC did not feel it could legitimately comment on, particularly with regards to cross-cultural relations within the town. These issues are touched on at key points (such as public housing and Indigenous food security) but the RoadMap does not address these issues in detail.

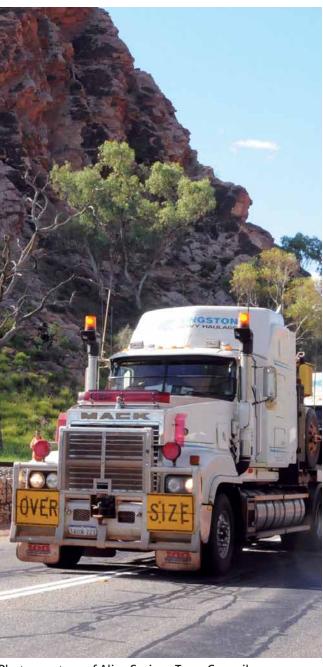


Photo courtesy of Alice Springs Town Council

Energy

Vision for 2033: In 2033, Alice Springs is internationally recognised as a solar smart town that runs on 100% renewable energy. We have a diverse electricity market with a mix of energy service providers, utility scale power stations, community and individually owned power generation. All residents in Alice Springs can afford electricity for basic needs. We enjoy the same energy service - hot showers and cold beers - for less energy input. We achieved this through enormous gains in energy efficiency and generating clean renewable electricity locally. When we look back to 2013, we are amazed at the large amount of energy we once used for such little benefit.



Photo courtesy of Alice Springs Town Council

ENERGY INTENSITY

Energy intensity measures the average amount of energy consumed to produce a unit of GDP. It is an economic measure of how efficiently energy is used.³

Definition and Characteristics of a solar smart Alice Springs

- High energy efficiency and productivity levels mean we achieve the same energy services (such as hot showers and cold beers) for less energy input.
- 100% of electricity is generated from clean, renewable resources such as solar.
- A high percentage of electricity users generate their own electricity, either through systems located on their own property or from a community facility.
- Most electricity is generated close to where is used. Connected micro-grids (see box text), with smart technology matching supply and demand over a wider area.
- All residents in Alice Springs can afford electricity for basic needs such as refrigeration and medical equipment, cooking, sanitation and thermal comfort, including those on low incomes or in a vulnerable situation e.g. due to health or age.

Benefits over Business as Usual

- Developing an internationally recognised solar smart profile will attract investment.
- Sourcing energy supplies and services from within Alice Springs means less reliance on imported fuels, expertise and equipment.
- Using renewable energy means reduced carbon and other pollution from fossil fuels and reduced exposure to rising fuel prices.
- It also means greater resilience to extreme weather events and supply chain shocks.
- Distributed generation means less power is lost as it is transported through wires.
- The new energy market will mean greater market diversity and choice for customers.

WHAT IS A MICRO-GRID?

Major utilities increasingly face the challenge of providing base-load power to populations who are generating some of their own energy through distributed means, such as rooftop solar.

One solution being proposed is that of high penetration micro-grids, defined by Creyts and Maurer¹ as, "small, self-balancing networks that have the ability to break apart from the larger grid for autonomous operation and then seamlessly re-combine to function as part of the whole on demand", allowing for a flexible mix of distributed, shared and centralized energy generation and consumption.

Alice Springs' isolated and relatively small grid coupled with its world class solar resource make it a unique location to test such innovative technologies.

Alice Springs' Unique Selling Proposition

- We have a world class solar resources (300+ sunny days/year⁴).
- We have expertise, profile and excellent solar facilities established through Alice Solar City and Desert Knowledge Australia.
- There are numerous organisations with experience in installing and operating electricity and renewable energy systems in remote communities in Alice Springs.
- Alice Springs, as an international tourist destination, is well placed to host renewable energy conferences.
- There is significant local expertise in developing, installing and maintaining solar systems such as:

- Centre for Appropriate Technology, Power and Water Corporation, Uterne Power Station and other locally based solar and energy efficiency suppliers and installers.
- The significant population with below-average socioeconomic status presents a significant opportunity to address energy/fuel⁵ poverty and improve wellbeing.
- Alice Springs is a regional town in a very remote location with a stand-alone electricity network, providing an ideal test bed for innovation in technology, markets, business and public policy.



Photo courtesy of Alice Springs Town Council

Table 1: Progress indicators towards a solar smart Alice Springs

Progress indicators	Trend	Information availability (score out of 3)	Actual 2005	Actual 2013	Target 2018	Aspirational Goal 2033
Total electricity use (MWh)	Increasing ⁶	* *	216,000 ⁷ (2009)	230,215 ⁸ (2012)	230,000	150,000
Energy intensity (GJ/\$'000)	Decreasing	*	Est 8.01 ⁹	Est 7.36 ¹⁰ (2011)	15% Reduction	80% Reduction
Percentage non-renewable energy	Decreasing	* *	>99%	97%	80%	0%
Percentage renewable energy supply	Increasing	* *	<1%	3%11	20%	100%
Energy use per household (kWh per year)	Decreasing	*	8,500 (2007) ¹²	8,100 (2012) ¹³	7,500	4,000
Carbon footprint of electricity in Alice Springs (net tonne of CO ₂ equivalent/1000 properties)	Decreasing	*	149,904 ¹⁴	140,076 ¹⁵	100,000	0
Number of households considered to be in energy/ fuel poverty	Unknown	Zero	Unknown	Unknown	Unknown	Zero

- * * = readily available on the internet, in high profile locations
- * * = available on the internet, not in high profile locations
- # = not available on the internet or required calculations based on a variety of online sources

Current Situation and Opportunities

	Current status at 2013	Opportunities
International profile and specialist expertise	 Alice Springs has a national profile and expertise established though Alice Solar City. However, there is currently no commitment to fund any plans to build on Alice Solar City expertise. There is specialist expertise available locally through organisations such as Charles Darwin University, Batchelor 	 Develop a promotional strategy to market Alice Springs as a world class location for investment in renewable energy, energy efficiency and energy services. Establish a clear legacy plan for Alice Solar City and Alice Water Smart. Develop and implement the next wave
Energy sources	 College, Ninti One, CAT and CAT Projects. We have a world class solar resource of 300 sunny days per year, and 7.4 kWh/m²/day¹6. This solar resource is currently underutilised with only 3%¹7 of total power generation from solar. High use of fossil fuels for electricity generation (95% natural gas, 2% diesel). A vast majority (97%) of Alice Springs' electricity is generated at dual-fuel Owen Springs Power Station and the older Ron Goodin Power Station, both owned by Power and Water Corporation. Natural gas is now supplied from the Timor Sea Black Tip Field. Previously supplied from Palm Valley, 130 km west of Alice Springs. We have several key iconic solar generation plants such as the 1 MW Uterne Power Station. 	 of key iconic solar projects. Promote the potential of Alice Springs' solar resources. Expand the use of Alice Springs' solar resources through government, private and community owned solar generation. Invest in growing local skills, expertise and businesses that can aid Alice Springs' transition to a 100% solar smart town. Investigate other viable renewable energy sources to support solar (such as biomass).
Energy productivity	 There is limited public information about energy productivity and the market available. A significant investment has been made in educating the public regarding personal opportunities to improve energy productivity through Alice Solar City and desertSMART COOLmob energy efficiency programs. 	 Improve productivity of electricity use through energy efficiency, supply demand matching and behavior change. Improve availability of information about energy productivity.
Factors influencing electricity demand	 The extreme climate drives high demand for heating and cooling. Much of the building stock has poor passive design, hence the increased need for electricity for heating and cooling. There is widespread use of inefficient technologies such as old style electric hot water systems and pool pumps. Water pumping for public water supply is a significant user of electricity. Electricity is comparatively cheap compared to elsewhere in Australia. 	 Improve passive design of new buildings and retrofit existing stock. Incentivise the replacement of inefficient equipment and technologies such as electric hot water systems. Review business models, electricity tariffs and pricing to give stronger incentives for energy efficiency and productivity (e.g.: cost-reflective tariffs and more competitive markets).

	Current status at 2013	Opportunities		
Electricity network characteristics	 Currently, electricity is predominantly provided by utility scale centralised power generation. Significant cost are built into current infrastructure, as electricity is generated away from where it is used and transported over the network of poles and wires. There is a risk of higher electricity demand and higher peak loads if extreme weather events become more extreme and prolonged due to climate change. Increasingly distributed energy generation (such as rooftop solar PV) presents a challenge for energy provider's business models and network management capabilities. Alice Springs has a stand-alone electricity network (no grid interconnection for import/export of electricity). 	Explore and implement new models for electricity generation and distribution (poles and wires) that respond to trends the towards: • Increasingly distributed energy generation. • Growth of smart grid technology. • Rising fossil fuels prices. • Falling capital prices and low operating costs for renewable energy. • Growth in electric vehicles. This could include looking at increased smart metering, use of smart grids and testing high penetration microgrid technologies.		
Market characteristics	 Most electricity assets are owned by a large, government owned utility (Power and Water Corporation). As power supply in Alice Springs is a loss making venture for Power and Water Corporation, there is a business case for investing in energy efficiency. Low levels (less than 10%18) of Alice Springs electricity users generate their own electricity. Growth of small scale solar generation is challenging traditional business model for pricing network access. Power generation replies on natural gas and diesel, hence costs are vulnerable to potential hikes in world fuel prices. 	 Explore and implement new models for electricity markets that: Operate effectively in a more decentralised, diversified and competitive electricity market. Provide customers with energy services rather than commodity electricity. Encourage market diversity and customer choice. 		
Social equity and energy poverty	 There is limited public information about energy poverty, indeed there appears to be no agreed definition for energy poverty in the Northern Territory. The existence of large populations with below average socio-economic status suggests potential for energy poverty. Nationally recognised expertise has been developed in installing small-scale PV systems in Indigenous communities through Bushlight (CAT). Bushlight will close June 30 2014. 	 Research to be undertaken to define, measure and better understand energy/fuel poverty in Alice Springs and the NT. Form partnerships between stakeholders to directly address energy poverty – particularly if cost-reflective tariff policies are pursued. 		

Aims and Actions

Aim: 100% of Alice Springs' power supply is generated by renewable sources by 2033.

Actions:

- Work with PWC to establish a program to phase in renewable energy as the source for 20 % of power generation by 2018 (ahead of the current mandatory Renewable Energy Target).¹⁹
- 2. Research options that create incentives for establishing an electricity system that is 100% renewable (including addressing grid upgrades and network pricing issues).
- Develop and implement a phased project plan for the installation of 1 MW community owned solar systems by 2018 and up to 5 MW by 2033 (either through large stand-alone installation or dispersed roof top generation models) to give full community access to renewable energy.
- Make use of market-based mechanisms, to ensure that by 2018 Alice Springs remains a national leader for uptake of rooftop PV systems.

Potential Partners: PWC, NT CMO, NT DoCM, ASTC, ALEC, CAT Projects, community investors.

Aim: Alice Springs homes and businesses are the most energy savvy customers in Australia.

Actions:

- Publish and monitor progress towards sector targets for the residential and commercial sectors, including targets for renewable energy generation, energy efficiency/productivity and energy poverty.
- 6. Deliver world class services to Alice Springs on how to be energy smart at home and at work (including information, audits and hardware rebates) to build on the success of the Alice Solar City program. This could either be through private businesses, grant funded programs or a solar energy/energy efficiency trust within the town.
- 7. Develop new look electricity and water bills that help customers make more informed choices about electricity and water use (possibly through a public competition).

Potential Partners: ASTC, PWC, ALEC, private sector and community service providers.



Photo courtesy of Desert Knowledge Australia

Aim: Develop a solar smart promotion plan for Alice Springs that integrates with other elements of the desertSMART Road Map.

Actions:

- 8. Establish a solar smart leadership team in Alice Springs, integrated with the other elements of the desertSMART RoadMap.
- Continue the successes of Alice Solar City by identifying and promoting local ambassadors and champions, with key roles in promoting Alice Springs as a solar smart town, both locally and further afield based on their sphere of influence.
- 10. Build solar smart concepts into the existing promotions by NT Tourism by promoting Alice Springs as the most solar smart tourist destination in the world and as a venue for renewable energy industry conferences.
- 11. Continue to promote past projects that are completed such as Alice Solar City iconic projects.
- 12. Maintain and grow relationships with specialist researchers and investors in renewable energy, for example ARENA, Clean Energy Finance Corporation, Cooperative Research Centre for Low Carbon Living and Ninti One.

Potential Partners: NT DoCM, Tourism NT, Tourism Central Australia, PWC, ASTC, ARENA, CEFC, Ninti One, local community and business leaders, businesses and organisations, local media services.

Aim: An energy smart government sector in Alice Springs.

Actions:

13. The Territory Government develops and publishes energy efficiency and in-house renewable energy targets with a supporting action plan for Government facilities in Alice Springs.

Potential Partners: NT DCM, DCIS, ASTC, PWC, energy sector service providers.

Aim: Alice Springs' first smart grid trial.

Actions:

- 14. Trial smart grid technologies in Alice Springs, with full implementation of smart metering by 2018 (building on existing Alice Solar City smart metering trials).
- 15. Establish a high penetration micro-grid test/research centre in a suburb of Alice Springs.

Potential Partners: NT Government, PWC, private sector providers.

Aim: Alice Springs trials new financing mechanisms for energy services.

Actions:

- Develop cost-reflective electricity tariffs that encourage energy productivity and self-generation of electricity whilst ensuring appropriate pricing of grid back-up services.
- 17. Create bundled energy services and new business models. For example: 'food cooling services' could include bundled products for a capped monthly price covering a financing package, an energy efficient fridge, electricity, and maintenance services.
- 18. Establish Property Assessed Clean Energy financing (implemented in NSW and Victoria as Environmental Upgrade Agreements).²⁰
- Trial market-based incentives for energy efficiency such as the NSW Energy Savings Scheme, or Victoria's VEET.

Potential Partners: Participating homes, businesses and non-residential facilities, NT DCM, NT Treasury, PWC, private sector providers.

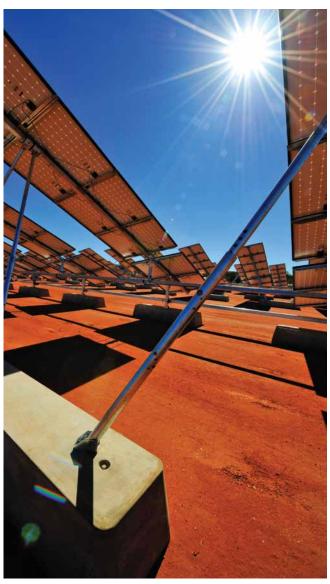


Photo courtesy of Alice Springs Town Council

Water

Vision for 2033: In 2033, Alice Springs is water smart. We are a world leader in water efficiency. A water services market makes sure we use our non-renewable fossil water efficiently whilst maintaining our access to lush parks and ovals. We achieved this through enormous gains in water productivity and recycling water locally. When we look back to 2013 we are amazed at the large amount of water we once used for such little benefit.



Photo courtesy of Alice Water Smart

WATER PRODUCTIVITY

The ratio of goods and services produced [compared to] the volume of water required for their production; measures the efficient use of water.²³

Definition and Characteristics of a water smart Alice Springs

- High levels of water efficiency and productivity, with residents, government and industry using water more productively for their own benefit.
- High levels of household and utility level water recycling.
- Zero carbon emissions from water pumping for municipal water supply.
- High quality information is available to the public about the status of the town's water supply.
- Individuals have access to accurate information about their water usage.
- Alice Springs is recognised among other arid towns as a leader in water efficiency and innovation.

Benefits over Business as Usual

- Increasing water efficiency will extend the life of Alice Springs' non-renewable water supply and defer the need for costly capital upgrades in water extraction infrastructure.
- Less water being pumped means reduced carbon emissions associated with pumping water for our municipal water supply.
- Reduced costs to Power and Water Corporation.
- Reduced exposure to the rising cost of fossil fuels required to pump water.
- Reduced impact of salinity through ineffective irrigation.
- Facilitate the development of other industries (such as horticulture) through water efficiency savings.

Alice Springs' Unique Selling Proposition

- Alice Springs has considerable expertise and momentum in the field of water through the Alice Water Smart project (2010-2012), including an extensive data set on water usage patterns.
- Its isolation and reliance on a single water source make it an ideal place to test new ways of improving water efficiency.
- There is the opportunity to make considerable water efficiency savings with minimal investment. For example identifying and reducing on-lot leaks.
- As the cost to Power and Water Corporation to provide water is significantly greater than their earnings from water sales, there is a huge economic incentive to save water. Hence, water savings through efficiency are a win-win proposition, both environmentally and economically.
- Alice Springs' strong identity as an iconic outback town provides an opportunity for the tourism industry to capitalise on water smart branding.

WATER AS A SERVICE NOT A PRODUCT

In the 1970s, Amory Lovins coined the phrase "the soft path for energy"²¹ to denote an alternative approach to meeting human energy needs by recognising energy as a means to an end (such as light, warmth, and cooking). Expanding on this theme, Peter Gleik and others have coined the term "the soft path for water" to describe a comprehensive water management system that matches water services to needs rather than continually seek to expand supply.

"The soft path requires governments, communities and private companies to collaborate to meet water-related needs, rather than merely to supply water.... This contrasts with the unshakeable belief of most policy-makers that large, centralized water systems are the only way to meet unrelenting growth in demand, and that such demand is an inevitable outcome of growth in population and gross domestic product (GDP)."²²

Alice Springs has already made significant steps towards becoming water smart. Seeing water as a means to an end, a service not a product, could be the next big change we need to make to become truly water smart.

Table 2: Progress indicators towards a water smart Alice Springs

Progress indicators	Trend	Information availability (score out of 3)	Actual 2005	Actual 2013	Target 2018	Aspirational Goal 2033
Annual Water consumption Total (ML)	Increasing	**	9,335 ²⁴	9,500 ²⁵ (2012)	6,800	4,000
Average annual household water consumption (kL)	Decreasing	* *	532 ²⁶ (2009)	470.31 ²⁷	400	250
Water productivity (\$M GRP/Million Litres)	Increasing	*	\$0.370 ²⁸ (2006)	\$0.304 ²⁹ (2012)	\$0.250	\$0.100
Water recycling (ML/annum)	Increasing ³⁰	* *	870 ³¹	707 ³²	1000	2000
Carbon footprint of water use (net tonne of CO2 equivalent/ 1000 properties)	Decreasing	*	831 ³³ (2008)	704 ³⁴ (2012)	500	Zero
Percentage of properties with on-lot leaks	Unknown	*	Unknown	35.7% ³⁵	25%	15%

- * * = readily available on the internet, in high profile locations
- * * = available on the internet, not in high profile locations
- = not available on the internet or required calculations based on a variety of online sources

Current Situation and Opportunities

	Current status at 2013	Opportunities
Information available to the public about Alice Springs' water use	 There is some information available to the public via National Performance Reporting and through PWC Annual reports. However, very little of this information is designed for public consumption or aimed at encouraging more informed use of water by residents, government and industry. 	 Improve public access to information about Alice Springs' water use including: Efficient water use compared to actual water use. Comparisons with equivalent arid zone regional towns. Data about water use annually, including aquifer drawdown etc. Cost and timing of any required infrastructure upgrades.
Water efficient practices	 There has been significant investment in water efficiency though Alice Water Smart and the Alice Water Smart Guide. Some sectors of the Alice Springs community have embraced the Alice Water Smart message and made changes to reduce their usage. 	 Develop an ongoing water efficiency program to build on the successes of Alice Water Smart. This program should support local businesses and programs providing water efficiency services.
Factors influencing water use	 Alice Springs has: Hot, dry summers with very high evaporation levels. Many local residents are not aware of their water use. A relatively low cost of water compared with other Australian locales. Many large residential blocks with ensuing large gardens. A high population turnover resulting in many people who may not accustomed to using water wisely in the arid zone. 	 Improve public awareness of how to be water smart in Alice Springs with the aim of reducing the town's water use to international best practice levels without compromising key lifestyle features. Set the cost of water to consumers at closer to its true value (i.e. costreflective tariffs).
Market characteristics	 Typical household and business water use is significantly higher than the national average. Water is supplied by one government owned water provider (Power and Water Corporation) that also owns all water infrastructure. 	Trial market-based approaches to incentivise water efficiency, such as packaging water services or opening the market to other providers.
International profile and specialist expertise	 Currently, Alice Springs doesn't have an international profile around water efficiency. Specialist expertise around water efficiency and water recycling has been built through the Alice Water Smart project. 	Establish Alice Springs as a water smart town and promote accordingly. This would continue to build local knowledge of water smart practices and technologies.

Aims and Actions

Aim: Alice Springs homes and businesses are some of the most water savvy in the arid zone. Actions:

- Continue the rollout of the Alice Water Smart Guide³⁶ so that its six recommendations become commonplace water use practices in the homes and businesses in Alice Springs.
- Deliver a world class service on residential and business water efficiency (including information, audits, hardware rebates etc), to build on the success of the Alice Water Smart Project. This could be delivered through private businesses, grant funded programs or a water efficiency trust within the town.
- Publish and monitor the progress towards sector targets for the residential and commercial sectors, including targets for overall water consumption, water efficiency/productivity and water poverty.
- 4. Expand water conservation schools programs, including the ongoing funding for a water efficiency program coordinator/administrator.
- Promote low water use gardens and provide support for water efficient garden upkeep and upgrades, with a particular focus on efficient, seasonal automatic scheduling of irrigation.
- Increase residents' and businesses' awareness of water leaks, including their ability to identify and respond to them.
- 7. Ensure each high use customer has an account or case manager to follow up on metering and billing discrepancies and provide more regular billing information to them.
- 8. Develop new look water bills that help customers make more informed choices about water use (possibly through a public design competition).

Potential Partners: PWC, ASTC, ALEC, DLRM, private sector and community service providers.

Aim: Alice Springs is a world leader in water recycling at residential, business and utility level. Actions:

- Further expand the use of recycled water in Alice Springs (including funding for further infrastructure establishment and upgrades) towards a target of 50% of our water being recycled for re-use by 2033.
- Encourage the uptake of appropriate and effective residential grey water systems through revised regulations, distributing a list of approved models/ materials/practices, and promotion.

Potential Partners: PWC, DLRM, ASTC, DoH, ALEC, private sector.

Aim: Alice Springs trials new financing mechanisms for water services.

Actions:

- 11. Establish a cost-reflective price structure for water use to reward low water users and financially drive more productive water use.
- 12. Develop new business models around bundled water services. For example: 'water efficient landscaping services' could include bundled products for a capped monthly price covering a financing package, water efficient landscaping and plants, water, and maintenance services.

Potential Partners: PWC, NTCMO, DBERD, NT Treasury



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Aim: Residents have access to detailed, accurate and accessible information about local water use, cost of supply and current infrastructure. Actions:

- 13. Make available to the community of Alice Springs details of the financial statements for water supply in Alice Springs, including the marginal cost of supply, and the expected timing and estimated costs of capital investment (based on projected trends).
- 14. Create a regular (at least annual) water supply and bore health report for the Alice Springs public. This could be either for online publication or displayed in a prominent public location.

Potential Partners: PWC, ALEC, ASTC, DLRM.

Aim: That leaks are no more than 4% of Alice Springs' total water usage. Actions:

- 15. Initiate a routine annual residential leak check (on-lot leaks) program for all Alice Springs water customers. This program could be either as an extension of the meter reading service or as a separate contract.
- 16. Continue to identify and reduce leaks in water delivery infrastructure towards best practice levels.
- 17. Review policies and procedures for reverse readings of water meters to ensure bills accurately reflect water usage so increases in water usage due to leaks, or changes in garden irrigation regimes are promptly noted.

Potential Partners: PWC, ALEC, private sector

Aim: The Northern Territory and local government model smart and efficient water use.

Actions:

- 18. Develop water efficiency targets and supporting action plans for all Government facilities in Alice Springs.
- 19. The ASTC continues to build on and promote their water efficient parks and ovals program.

Potential Partners: NT DCM, NT Treasury, ASTC, PWC.



Photo courtesy of Alice Water Smart

Waste

Vision for 2033: By 2033, Alice Springs is recognized as a model for resource recovery and waste management in remote and isolated locations with at least 50% of general waste being recycled and 100% of food and garden waste produced by the town being composted or mulched for local re-use. Residents are actively reducing their waste through recycling and the Alice Springs Regional Waste Management Facility provides a world's best practice model for innovative resource recovery in a constrained remote/regional setting. We will look back and be amazed at the volume of re-useable resources that we once put into landfill.

IMPORT REPLACEMENT AND RESOURCE RECOVERY

Replacing imports with local production has been seen since the mid 20th century as a key to invigorating the economic growth of nations and more recently cities. In the words of its most famous and most controversial proponent Jane Jacobs "Economic life develops by grace of innovating; it expands by grace of import-replacement."³⁷

Resource recovery – the active recovery of valuable resources from waste products – and the development of product life cycle analysis has also developed into a major area of industry innovation over the same time period.

For a town like Alice Springs, bringing together resource recovery and import replacement, lead by an import replacement strategy, could provide innovative ways forward in developing and expanding the local economy.

Definition and characteristics of a waste smart Alice Springs

- High levels of resource recovery for re-use within the town, lowering both waste produced and reliance on imported goods.
- 100% of green waste and food waste produced within the town is recycled for re-use within the town.
- Easily re-processed resources are recovered from the waste stream, re-processed and re-used within the town (e.g.: tyres and shredded rubber products or crushed glass products).
- High value resources are recovered from the waste stream and shipped to processing centres in Adelaide, Darwin and other locations.
- Households recycle high volumes of waste and make informed in purchasing choices that reduce their nonrecyclable waste.
- Resource recovery is a thriving industry within the town, with local businesses, supermarkets, the restaurant and accommodation sectors and government all accessing the services of small-tomedium resource recovery businesses with links to the major capitals. This is led by a local resource recovery and import replacement strategy developed by a coalition of local businesses, investors, NTG and ASTC.

Benefits over Business as Usual

- Reduced waste into landfill will mean reduced cost burden placed on the community to manage waste and recycling.
- Increased economic output from a burgeoning new waste recovery and re-use industry will directly support the development of the local manufacturing industry.
- Reduced dependence on long haul freight for bringing in commodities and shipping waste out for recycling.
- Reduced exposure of the landfill owner/operator to any possible future prices placed on greenhouse gas emissions, land use or relocation.



Photo courtesy of Alice Springs Town Council

Alice Springs' Unique Selling Proposition

Alice Springs has:

- An economic imperative to trial creative waste recovery, recycling and import replacement options due to the significant cost and environmental pressures of transporting materials to be recycled long distances to markets.
- A new waste management facility with increased capacity for waste sorting. This opens up opportunities to trial more recycling and re-use of these resources, both within the town, and by shipping to major capitals cities for processing.
- A history of resource recovery by small business (especially of scrap metal and glass) which shows an entrepreneurial spirit within this sector in the town.

Table 3: Progress indicators towards a waste smart Alice Springs

Progress indicators	Trend	Information availability (score out of 3)	Actual 2005	Actual 2013	Target 2018	Aspirational Goal 2033
Total waste over weigh bridge (t)	Increasing ³⁸	**	35,650 ³⁹ (2006)	Est. 39,534 ⁴⁰	42,000	50,000
Percentage of waste recycled	Increasing	* *	Est 0.6%	11.69%41	25%	50%
Percentage of food waste removed from waste stream	Unknown	unknown	Unknown	Unknown	33%	100%
Percentage of green waste removed from waste stream at the ASWMF	Increasing	*	Unknown	Est 90%	100%	100%
Total annual waste per household (kg)	Unknown	***	842 (2006-7) ⁴²	Unknown ⁴³	700	400
Waste related CO₂ emissions (net tonne of CO₂ equivalent/ 1000 properties)	Increasing 44	*	15,180 ⁴⁵	Est. 20,000 ⁴⁶	18,000	10,000

- * * = readily available on the internet, in high profile locations
- * * = available on the internet, not in high profile locations
- = not available on the internet or required calculations based on a variety of online sources



Current Situation and Opportunities

	Current status at 2013	Opportunities
Household Waste	 The average NT household produces 842 kg of waste annually⁴⁷ including municipal solid waste, commercial & industrial, and demolition waste. Nationally, Australian's produce an average of 2080 kg of waste per household per annum.⁴⁸ The average Alice Springs household is estimated to produce 886 kg of waste annually, 75% of which is estimated to be recyclable.⁴⁹ There are currently no kerbside recycling services available in Alice Springs. 	 Provide up-to-date information about recycling service in town for residents and businesses. Promote household and commercial waste minimisation as the cheapest way of making savings towards waste productivity (much like energy and water efficiency). A cost-benefit analysis of kerbside recycling should be reviewed in light of new, creative methods of pay-byweight kerbside collection successfully being used in places such as Ireland.⁵⁰
Landfill	 Alice Springs Regional Waste Management Facility received an estimated 58,514 tonnes of waste in 2012/13, about 12% of which was recycled (such as cement, green waste into mulch, ferrous and nonferrous metals). A new waste management facility was completed in late 2013 and has improved the capacity to sort waste for recycling. The landfill has a lifespan of 15 years at current usage rates. Council is in negotiations to acquire more land to expand the landfill and extend its lifespan to 40 years.⁵¹ 	 Build on the investment in a new waste transfer station by exploring options to better sort, collect, transport or recycle waste on site (e.g.: plastic bundling, rubber shredding or hydrocarbon recovery). Establish links with other remote towns and cities around the world to collaboratively tackle issues of remoteness in recycling and resource use. Research the possibility of using waste from Alice Springs landfill as a source of biomass energy generation. Continue to ensure that the ASTC's Rediscovery Centre (previously know as the Tip Shop) is well used, effective and economically sustainable.
Food & Compostable Waste	 29% of household waste in Alice Springs is estimated to be compostable. ⁵² Although Alice Springs' gardening culture means that composting is most likely very popular, exact figures are unknown. Most of Alice Springs' commercial green/food waste goes to landfill. A recent report showed that 20% of the Alice Springs businesses surveyed report some form of green waste reuse and/or composting, but this is likely exaggerated. ⁵³ ASTC currently recycles approximately 57 tonnes of green waste annually into composted mulch that is sold at the Waste Management Facility. ⁵⁴ Coles' national arrangement with Second Bite to redistribute edible food waste from their stores has been trialled in Alice Springs with some good results. Other supermarkets are yet to replicate this model. 	 Promote household composting as the most cost-effective way of removing food from the household waste stream. Provide waste composting services on a commercial basis to local businesses in Alice Springs (such as supermarkets, hotels and restaurants). Ensure edible food waste from supermarkets and restaurants is being recovered and distributed to needy groups within the town. Designate a list of approved composting toilet models, parts and suppliers in order to streamline the approvals process for Alice Springs residents.



Photo courtesy of Alice Springs Town Council

	Current status at 2013	Opportunities
Green house gas emissions	Green house gas emissions from landfill are primarily due to food/green waste breaking down in mixed waste, producing methane.	Promote all possible means of removing food waste from the mixed waste stream (see Food and Compostable Waste).
	 This was estimated to be equivalent to 11,480 tonnes CO₂ in 2009.⁵⁵ The politically uncertain future of pricing on carbon emissions is a significant disincentive for further action in this area. 	Explore cost-effectiveness and appropriateness of burning methane and/or solid waste from ASTC landfill to reduce greenhouse gas emissions.
Commercial recycling	 Alice Springs has a long history of resource recovery, particularly of scrap metals, with numerous scrap metal yards located throughout town and south of the Gap. However, low volumes of waste, long distances to recycling centres and fluctuating commodity prices act as a disincentive to further develop this sector. The NT Container Deposit Scheme is currently being managed by Envirobank, and has recycled 90,000 containers per day in the early stages of operation in 2013.⁵⁶ This is compared to a daily average of 68,000 containers per operating day under the ASTC managed scheme in 2010.⁵⁷ ASTC's glass crushing machine (which predates the container deposit scheme) is still in use, creating road base and gravel products. In addition, a further 40 tonnes of paper and cardboard is recycled monthly by Cleanaway. 	 Continue to promote Container Deposit Scheme to businesses and residents through better opening hours and incentives / rewards for volumes recycled etc. Develop a strategy to lead the use of creative, local resource recovery businesses as a means of import replacement.

Aims and Actions

Aim: 100% of food and green waste is removed from the waste stream and used productively. Actions:

- 1. Improve existing green waste processing operations at the Alice Springs Regional Waste Management Facility to incorporate food waste processing and produce commercial quality compost for sale.
- 2. Expand existing food waste recovery and redistribution initiatives to more supermarkets.
- 3. Initiate a campaign to increase household composting, with the possibility of subsidised compost bins, incentives or competitions.
- Establish a commercial non-edible food waste composting service to service food providing businesses such as supermarkets, hotels and restaurants.

Potential Partners: ASTC, food sellers (supermarkets, hotels, restaurants), Second Bite/Oz Harvest/Food Bank etc, local entrepreneurs, welfare agencies (such as Australian Red Cross, Anglicare), ALEC, the waste industry.

Aim: Alice Springs homes and businesses are the most waste savvy consumers in Australia.

Actions:

- 5. Provide waste and resource recovery education to Alice Springs residents and businesses, including raising awareness of waste minimisation, as well as re-use and recycling options.
- Strengthen existing supports to waste management businesses (such as NT Eco Biz and similar) to reduce waste and move to purchasing sustainable low impact materials.

Potential Partners: ASTC, NT Government, Eco-Biz, desertSMART COOLmob, ALEC.

Aim: Local and Territory level governments lead the way in innovative and effective waste management and service provision to residents and local businesses.

Actions:

- Improve the monitoring and evaluation to better report to the public on the waste and resource recovery activities in Alice Springs. Possible items to report upon include amount recycled (metal), composted (green waste) and re-used (crushed glass).
- 8. Explore an alliance with other towns from across the world who face similar recycling issues (such as remoteness and low volumes recycled) to develop creative solutions.
- Explore innovative solutions to providing kerbside collection of recyclables. For example pay-bykilogram system (as in Ireland) or developing a network of well-promoted drop-off points.

10. Ensure the Regional Waste Management Facility's transfer station and The Rediscovery Centre is managed in an innovative and economically sustainable manner and is recycling increasing volumes of waste by 2018.

Potential Partners: ASTC, ASTC EAC, NT Government, ALEC, research institutes (such as CSIRO and Batchelor), CRC-RED.

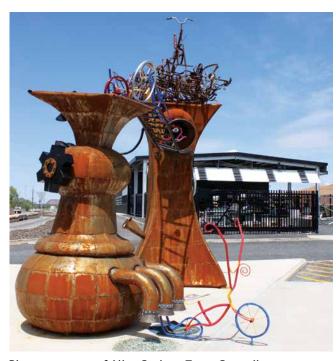


Photo courtesy of Alice Springs Town Council

Aim: Local waste management businesses are at the cutting edge of profitably recycling and recovering waste as resources for re-use within local Alice Springs industry.

Actions:

- Develop an import replacement strategy to support local businesses to re-use existing local resources (for instance crushed glass, composted food waste and recycled plastic products).
- 12. Continue to refine the Container Deposit legislation to ensure the efficient and profitable operation of this scheme for local operators, as well as its accessibility for the public, and effectiveness in terms of volume of containers recycled.
- 13. Review NT Government regulations around composting toilets and develop a short list of acceptable off-the-shelf models or approved building techniques.
- 14. Establish a recycling incentive scheme to better support local businesses who divert waste away from landfill and who engage in import replacement activities (for example low interest business loans or incentives based on the amount of waste diverted).

Potential Partners: DBERD, NT DoCM, ASTC, Chamber of Commerce, local entrepreneurs/business sector, DLPE, CAT.

Built Environment

Vision for 2033: By 2033, Alice Springs has a vibrant, accessible, safe CBD with the design of buildings and public spaces reflecting design principles that are appropriate to the harsh arid environment and that build cohesion amongst an increasingly diverse community. Residential areas are increasingly high density in nature, with new designs and retrofits leading to a more energy/water efficient, accessible and mixed use housing stock. We will look back and be amazed at how unsuited to Alice Springs' unique natural and social environment our homes, workplaces and public spaces were.

Definition and Characteristics of a design smart Alice Springs

- Workplaces and homes are well suited to perform to a high standard in the harsh Central Australian climate.
- Buildings are designed to be highly water and energy efficient. By designing buildings well ahead of national energy and water efficiency standards, human comfort is maintained whilst energy and water consumption is reduced.
- Increasingly high density of development reduces the cost of transport, service and utility provision and makes Alice Springs a more pedestrian-friendly town.
- High public amenity of public and community spaces, through development of continuous shade paths, active street fronts, and public spaces suited to use by a diverse community.
- Mixed use developments (developments including residential, social and commercial uses) are situated in suitable locations to maximise the amenity of these developments and minimise the risk of the creation of suburban ghettos.



Photo courtesy of Alice Springs Town Council

Benefits over Business as Usual

- Increasing energy and water efficiency of workplaces and residences make significant savings on utility costs whilst maintaining human comfort.
- Designing and retrofitting public housing for energy/ water efficiency and social outcomes provides opportunity for significant cost saving and increased human comfort in the public housing sector.
- Higher public amenity of public and community spaces increases the desirability of Alice Springs as a residential and tourist location.
- Increased tree canopy shade targets will reduce the energy demand for cooling in adjacent buildings⁵⁸, and increase pedestrian comfort.
- Higher density development, combined with mixed use residential/commercial/social land use in appropriate locations, will reduce costs of service, utility and transport provision, and reduce transport related emissions.



Photo courtesy of Alice Springs Town Council

Alice Springs' Unique Selling Proposition

- Alice Springs has a strong incentive for innovative solutions to improve human comfort in homes, buildings and
 public places due to its harsh environment, coupled with the high costs of construction and living.
- Alice Springs' iconic landscapes and international reputation as a tourism destination make it a perfect location to showcase innovative designs for sustainable living in the arid environment.
- Alice Springs has an exceptional pool of locally-based architectural design firms with in-depth knowledge of local
 climatic, social and economic conditions. As such, we are well placed to engage the expertise needed to develop
 solutions to improve our built environment.

Table 4: Progress indicators towards a design smart Alice Springs

Progress indicators	Trend	Information availability (score out of 3)	Actual 2005	Actual 2013	Target 2018	Aspirational Goal 2033
Average floor space of new NT homes (m²)	Increasing	**	188 (2001) ⁵⁹	233.6 (2009) ⁶⁰	200	150
Floor area to block size ratio	Increasing	*	Unknown	0.25 (2011)61	0.26	0.30
Percentage tree canopy coverage	Increasing ⁶²	Unknown	Unknown	Unknown	20%	30%
Percentage of public housing unoccupied	Unknown	₩ 63	Unknown	Est. 12% ⁶⁴	10%	5%
Average energy consumption of public housing as a percentage of the Alice Springs average ⁶⁵	Unknown	* *	Unknown	+55% ⁶⁶	+25%	-25%
Average water consumption of public housing as a percentage of the Alice Springs average	Unknown	* *	Unknown	+ 6% ⁶⁷	-10%	-50%

- * * = readily available on the internet, in high profile locations
- * * = available on the internet, not in high profile locations
- = not available on the internet or required calculations based on a variety of online sources

HERITAGE ARID ZONE ARCHITECTURE

Alice Springs has a long history of using innovative design to adapt homes and buildings to the harsh desert climate.

Adelaide House (Alice Springs' first hospital) incorporated an innovative ventilation system to pull cool air up from the cellar for resident's comfort. Similarly, several buildings in the town centre designed by architect Beni Burnett incorporate innovative design elements for comfort in the heat. Local architect Brendan Meney explains, "The difference Burnett made was that he understood that if the thermal mass was exposed to the radiant heat, then you've got a big problem. As an architect when I first came here and saw Burnett's houses they made a lot of sense," ('Searching for Beni' ABC Radio, 2006).

Nearly a century on, there is still a lot we can learn from some of Alice Springs' earliest buildings and their smart designs for the arid zone.

Current Situation and Opportunities

	Current status at 2013	Opportunities
Town Planning	 64.1% of dwellings in 2011 were separate houses (national average 75.3%), indicating a higher than average level of residential population density.⁶⁸ Population turnover is a significant social and planning challenge. Net population turnover between 2006 and 2011 was 63.3%.⁶⁹ Alice Springs turns over the equivalent of its entire population (25,186 in 2011) every 8-9 years.⁷⁰ Growing floor space per resident and floor area to block size ratios (FAR) will likely see a reduction in private outdoor space and may lead to an increased demand for spaces zoned for community use. 	 Continue to create higher density developments in the CBD and throughout the suburbs, via infill of empty land and zoning appropriate areas for higher density development. The recent appointment of an NT Government architect, could present an opportunity if they advocate for higher design values, including sustainability. The Alice Springs Urban Design Audit (2009) outlines a number of opportunities for improving urban amenity in and around the CBD.⁷¹
Public Spaces	 Actual tree canopy coverage of Alice Spring is not known. Photographic evidence shows Alice Springs has significantly increased tree canopy coverage over the last 50 years.⁷² Recent redevelopments of the Todd Mall have increased the public amenity 	 Tree canopy and continuous shade targets for high use areas of the CBD and suburbs could be set to increase public amenity and energy efficiency of adjacent buildings. Proposed further development in Todd Mall represents an opportunity
	of that space, although further plans remain controversial, particularly related to proposed building heights and the effect on public spaces.	to incorporate mixed use development and improve public amenity in the CBD region.



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	Current status at 2013	Opportunities
Legislative/ regulatory framework	 The NT Planning Scheme is predominantly about the function of places, not the quality of places. Currently the NT Planning Scheme and the ASTC Subdivision Guidelines are seen as controversial, and potentially a barrier to quality development and the creation of a sustainable Alice Springs. NT adoption of the energy provisions of the National Construction Code is currently several years behind the national standard, with new houses only requiring 5 star performance compared to 6 stars nationally. 	 A review of the NT Planning Scheme and ASTC Subdivision Guidelines would present opportunities for better development and design and bring controls into line with community expectations. The NT should adopt the current energy provisions of the National Construction Code for commercial buildings to raise minimum standards and drive better, more arid appropriate construction.
Residential	 11,018 dwellings in Alice Springs with an average of 2.6 people living in each dwelling (2011)⁷³, across 6,422 land parcels zoned for dwellings.⁷⁴ The lack of incentive for landlords and tenants to invest in energy and water saving upgrades (termed the 'split incentive' phenomenon⁷⁵) remains a barrier to achieving energy and water efficient rental stock. Housing is expensive in Alice Springs. Median house prices were \$440,000 and \$351,000 for units in May 2013.⁷⁶ Median weekly rent is \$300, compared to a national average of \$285.⁷⁷ Approvals for new dwellings across the NT have steadily grown since 2009, and reached a total of 552 for the March quarter.⁷⁸ However, the high cost of imported construction materials also makes the building industry less profitable and housing more expensive. 	 Environmental Upgrade Agreements (EUAs) could be established to address the split incentive and drive retrofits of existing residential and commercial buildings. Exploring the use of 'import replacement' strategies (as per the Waste Management chapter), could begin to address the high cost associated with freighting in construction materials. Establishing mandatory reporting on energy, thermal and water efficiency performance of buildings at sale and rental would drive investment in improving these efficiencies.

	Current status at 2013	Opportunities
New developments	 Between 2001 and 2009 the average floor space of new homes in the NT rose faster than the national average. Whilst the NT average floor space of 233.6 m² in 2009 was still lower than the national average for this period (248 m² in 2009), this is still significantly higher than national average floor space for new homes in other comparable countries. Yo Many new developments are stalling before completion, leading to a risk of more opportunistic and poorly designed development. New housing developments are increasingly dense, with a shift towards smaller single dwelling allotment sizes, the construction of a second dwelling on allotments currently zoned for single dwellings, and an increase in medium and high density residential developments. In response to increasing construction costs, there has been a shift toward factory built and prefabricated dwellings. 	 New developments should continue the trend of higher density, but be prioritized as urban infill, closer to the CBD to increase pedestrian traffic and the general liveability of the town. Current developments such as Kilgariff, could include demonstrations of good solar passive and environmentally high performing houses (for instance a sustainable demonstration street). Minimum targets for new development could be considered for the inclusion of mixed use residences – either inclusion of social housing or commercial use sites where appropriate. Trends already contributing towards higher urban density should be encouraged and where necessary incentivised. Research into prefabricated buildings appropriate for Central Australia's climate should be undertaken, with a view to cornering the growing market in prefabricated homes.
Public Housing	 This is a high demand, very costly and highly political sector in Alice Springs. NT Department of Housing currently manages 831 dwellings for welfare tenants. AD Most of these dwellings were constructed in the 60s, 70s, and 80s, designed to meet the needs of working nuclear families, but often poorly designed for arid environments. Today, tenants are predominantly Aboriginal families, which are typically extended rather than nuclear and with many young children. As a result much of the housing is unsuitable for this use. May we water than the average of 55% more electricity than the average Alice Springs home and 6% more water than the average Alice Springs home. So All new NT Department of Housing dwellings are NT building code compliant, with some new sites such as Albrecht Street making use of sustainability strategies such as rainwater harvesting and irrigation. So Territory Housing dwelling numbers are currently decreasing, with government looking to non-government entities to provide social and affordable housing. 	Investment in public housing through Real Housing and National Rental Affordability Scheme (NRAS) presents an opportunity for creating a substantial new stock of well-designed public housing. The following factors should be considered: • Energy and water efficiency, particularly as utility prices rise. • Site orientation and solar passive design. • Ability to be replicated and ease of maintenance. • Flexible designs that can suit a more diverse group of prospective tenants, from singles up to extended family groups. • Designing for good health, employment and other outcomes, either through location, access to local services or site design features.

Current status at 2013

the national average.

Arid-zone appropriate design

- Much of Alice Springs' residential stock is poorly designed for the extremes of heat and dry experienced here, particularly due to poor orientation and materials used. This directly contributes to Alice Springs' average residential energy and water consumption being above
- Climate change is predicted to increase average daytime and night-time temperatures, increase the number of days over 32°C and increase the intensity of rains⁸⁷ which may increase the risk of flood for dwellings in the flood zone.
- Existing housing stock will struggle to provide human comfort with rising temperatures.
 Combined with rising energy prices, this will lead to an increased cost burden of cooling inefficient houses.
- These changes will prompt architects and developers to prioritise site orientation, solar passive design and drainage.
- Good examples of design for the arid environment include the Green Well Building on Bath St, heritage houses designed by architect Reni Burnett in Hartley St and Sturt Tce and the Desert Knowledge Precinct south of the Gap.
- Short timelines in the commercial construction sector lead to poor design and limited usability.

Opportunities

- Government is a big driver of demand and standards in the building and construction sector. The NT and Federal governments should seek to drive innovation by investing in high performance buildings for their own use (e.g. the Green Well Building) and lift minimum standards by establishing performance standards on all NT Government leased buildings.
- Opportunities also exist for developing an economic niche around natural building materials such as rammed earth.
- Single skin 190 mm block work that used to be a major form of construction for local dwellings no longer meets the Building Code of Australia (BCA) Section J energy requirements.⁸⁸ This has resulted in less use for this locally manufactured item and an opportunity to develop a new version of the block that meets the current BCA.



Les Hansen House 2014 (©2014 desertSMART COOLmob). Inset: Les Hansen House circa 1940 (Photo courtesy of Australian National Trust, NT)

Aims and Actions

Aim: Alice Springs CBD is a vibrant, accessible, and well designed, multi-purpose activity hub. Actions:

- Work towards the NT Government developing a suite of guidelines, planning controls and incentives for any further CBD development, promoting higher public amenity, active street fronts and mixed use zoning (commercial, residential, social housing etc.).
- Work towards businesses with empty premises being able to lease them out at peppercorn rent to artists and/ or community groups to encourage economic and community activity.
- Develop a strategy to reduce the parking footprint in the CBD, promoting limited use of multi-storey parking, whilst still providing adequate parking for tourist trade (such as coaches and grey nomads).
- 4. Set tree canopy targets for high use areas of Alice Springs (such as the CBD, community use zoned spaces and medium density residential areas).
- Include a new requirement in the NT Planning Scheme requiring all new CBD developments to shade the adjacent footpath, with a view to providing continuous paths of shade around the CBD.

Potential Partners: NT CMO, NT Treasury, NT DCIS, NT DLPE, NT Government Architect, NT Chamber of Commerce, ASTC, property owners in the CBD, community groups, artists, etc.

Aim: Residential population density increases steadily over time.

Actions:

- Increase urban density through urban infill and by expanding areas covered by medium density zoning, particularly within walking distance of the town centre and the suburban centres.
- 7. Review the town plan requirement for 2 car spaces per dwelling, (especially for CBD residences and 'granny flats') to facilitate higher density urban infill.

Potential Partners: NT DLPE, ASTC, property developers.

Aim: Alice Springs has a housing strategy that promotes environmental outcomes and builds social cohesion.

Actions:

- 8. Adopt a policy that all new public housing is: a) 6 star rated under an appropriate rating scheme (such as Green Star or National Australian Built Environment Rating System NABERS⁸⁹) to minimise energy and water costs for future tenants and b) in mixed development settings to reduce social dysfunction.
- Amend NT legislation to ensure that: a) a minimum 15% of any residential subdivision on Crown land be directed to social and affordable housing and b) there are progressive minimum standards for energy and water efficiency and thermal performance for all new buildings.

10. Undertake a retrofitting program of Territory Housing dwellings to improve energy efficiency and water efficiency through the provision of ceiling insulation, ceiling fans, leak checks and education for behavioural change.

Potential Partners: NT Department of Housing, NT Treasury, DSCM, ALEC, social housing providers, NT Shelter, NTCOSS, local architects.

Aim: Alice Springs has planning processes and legislative frameworks that effectively facilitate urban sustainability.

Actions:

- 11. Adopt best practice standards for government funded (all level of government) building works (for example National Australian Built Environment Rating System (NABERS).90
- 12. Review government tender selection processes to ensure policies designed to favour quality local tenders are fully implemented. This would shift the emphasis from price-based selection and would result in a strengthened local economy and promotion of more appropriate design.
- 13. Review relevant sections of the NT Planning Scheme to include specific provisions for appropriate subdivision and lot design in a desert environment.
- 14. Establish as standard practice the provision of energy (including energy consumption estimates) and water ratings for houses going on the market (such as Green Star or NABERS).
- 15. Adopt the National Construction Code (NCA 2010 Section J) in full in order to improve building energy efficiencies.

Potential Partners: NT DLPE, NT DCIS, NT CMO, ASTC, local architects, ALEC, NT Real Estate Institute, Real Estate Agents.

Aim: Sustainable building practices are encouraged in Alice Springs.

Actions:

16. A consortium of DKA, NT Government, ALEC, Chamber of Commerce and the Institute of Architects to establish a local sustainable design forum (one off or bi-annually) to bringing together architects, planners, construction companies, and social housing groups to look at and promote sustainable building design.

Potential Partners: DLPE, DKA, ALEC, Chamber of Commence, the Institute of Architects.

Food

Vision for 2033: By 2033, Alice Springs has a thriving local horticultural industry that supplies 50% of local fresh produce using sustainable production techniques appropriate to the arid zone. Local small-medium scale agricultural and food processing industries make up at least 20% of businesses, and are supported by a strong demand for local food and widespread recognition of Central Australia as a unique food tourism region. We will look back and marvel at how dependent we were on distant parts of the country and the world for our food supply.



Photo courtesy of Food for Alice

Definition and Characteristics of a food smart Alice Springs

- A high percentage of food sold and consumed is locally produced, keeping money spent on food within the local economy and reducing transport costs and pollution.
- A range of producers from large scale commercial, to small and micro scale intensive producers to community/backyard level are engaged in food production and processing.
- Local producers are widely recognized for trialling and uptake of sustainable production techniques appropriate to an arid environment.
- In particular, recycled waste water is used to support the local horticultural industry, providing a high quality, reliable resource to these businesses.
- Local producers are able to exploit niche areas of competitive advantage (high sunlight hours, long growing seasons, early harvests) to effectively offset disadvantages (such as distance to markets and comparatively small volumes produced).

- Species well adapted to the climate (such as acacias, bush tomatoes and citrus) and pest species (such as camels and rabbits) are targeted for commercial and local consumption, with profit and environmental management outcomes as a result.
- Local producers, tourist operators and restaurant businesses are able to successfully promote Central Australia as a food tourism region, profiling bush foods, local produce, local processed products and local businesses in the process.
- There is a high level of community engagement and interest in food production, as well as a demand for local produce, both through commercial producers and backyard/community garden level production.

Benefits over Business as Usual

- A growing local food production, processing, handling and food tourism sector would be a significant gain for the local economy.
- Money spent on food by local consumers is increasingly kept within the local economy, directly benefiting local producers, processors and related businesses.
- Transport costs and related emissions are reduced.
- Local producers having access to a variety of markets creates diversified livelihoods, leaving them less vulnerable to climate or economic shocks.
- Progressive and flexible legislation and regulatory/ licensing frameworks allow for investment and innovation in the food sector, whilst still preserving important environmental, cultural and community assets.

Alice Springs' Unique Selling Proposition

- Alice Springs has a high number of sunlight hours, long growing seasons, light frosts and early harvests present opportunities for growers to sell to national markets outside of peak season for higher prices (e.g.: grapes, citrus and dates).
- The large underground water resources and the availability of recycled waste water present an opportunity for arid zone appropriate, sustainable horticultural production enterprises to be established.
- Distance to Alice Springs from national food production and supply points, combined with a long term trend in rising fuel prices is an incentive to establish more small scale, intensive horticultural/ food enterprises for the local market.
- Central Australia's feral camel problem remains a potentially highly valuable and under developed (if problematic) market opportunity.
- Due to our iconic landscapes, access to local bush foods (such as wattle seed and bush tomato) Alice Springs is well placed for the creation of a local food tourism region, along the lines of (although on a smaller scale than) the Barossa Valley or the Hunter Valley.



Photo courtesy of Food for Alice

ARID ZONE AGRICULTURE

In an age of increasing water stress and desertification, water efficient agricultural production in deserts and arid areas is increasingly being seen as a potential solution, both nationally and internationally.

Proposed solutions range from high tech hydroponics style production in poly-tunnels to use of recycled water, to innovative, biological techniques for building soil and adapting crops to extremes of climate.

Interestingly, each of these techniques have been trialed and proved successful in Alice Springs at Territory Lettuce's hydroponics site, AZRI and at Max Emery's innovative organic bush tomato farm at Rainbow Valley.

In an age where "food is the new oil and land is the new gold"⁹¹, Alice Springs could be considering it's existing competitive advantages in the area of arid zone agricultural production.

Table 5: Progress indicators towards a food smart Alice Springs

Progress indicators	Trend	Information availability (score out of 3)	Actual 2005	Actual 2013	Target 2018	Aspirational Goal 2033
Average cost of Alice Springs supermarket food basket price	Increasing	***	\$408 ⁹²	\$485 ⁹³	\$510 ⁹⁴	\$600
Population to imported food ratio (pallets per person per week).95	Unknown	*	Unknown	Est. 0.8 ⁹⁶	0.7	0.4
Percentage of businesses in ASTC LGA engaged in the agriculture sector	Increasing	***	0% (2007) ⁹⁷	0.7% (2010) ⁹⁸	2%	5%
Percentage of businesses in ASTC Region engaged in the agriculture, forestry and fishing sectors	Steady ⁹⁹	**	3.8% (2003-7) ¹⁰⁰	3.9% (2007-11) ¹⁰¹	5%	10%
Percentage contribution to Gross Regional Product (GRP) by agriculture forestry and fishing sectors	Increasing	* *	1.6% (2006/7) ¹⁰²	2.2% (2011) ¹⁰³	4%	10%
ML of recycled water used per year to support agricultural production	Steady	*	0	0	300	1,000
Number of food producing community/school gardens	Unknown	*	Unknown	11 ¹⁰⁴	20	40
Number of businesses labelling local food as local	Unknown	* *	Unknown	3 ¹⁰⁵	10	25

- * * = readily available on the internet, in high profile locations
- * = available on the internet, not in high profile locations
- * = not available on the internet or required calculations based on a variety of online sources

Current Situation and Opportunities

	Current status at 2013	Opportunities
Livestock	 Central Australian graziers sell between 40,000 and 140,000 head of cattle annually.¹⁰⁶ Currently all livestock from the Central Australia region are trucked to meat processing plants in Adelaide and Victoria to be processed, or trucked to Darwin for live export, as there are no commercial meat processing plants in operations in Alice Springs or the Central Australian region.¹⁰⁷ This lack of functioning abattoir in Central Australia is a key barrier to accessing locally produced meat. Cattle production makes up over 50% of the NT's agriculture sector. This industry will likely remain the mainstay of NT agriculture, as 44% of NT landmass is currently under pastoral lease.¹⁰⁸ Climate change is predicted to reduce cattle production in the NT by an estimated 19.5% by 2020.¹⁰⁹ Other livestock (such as goats and camel) only makes up 4% of the agriculture sector. 	 Diversifying livelihoods for pastoralists, and diversifying use of pastoral land, could protect local producers from economic and environmental shocks whilst growing local horticultural industries. The re-establishment of local abattoirs could facilitate greater availability of local beef, as well as camel and other meats. Explore innovative production techniques in the arid zone (such as the Alan Savory herd management method or appropriate equivalent). The growing demand for food (especially meat) in Asia, presents significant opportunities for the cattle industry.



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	Current status at 2013	Opportunities
Horticulture	 Despite a growing horticulture sector in the NT and a strong history of horticultural production from WWII to the 1970s¹¹⁰, horticulture in Alice Springs and Central Australia remains underdeveloped. 32 sites have been identified for horticultural development in Central Australia, but remain undeveloped due to lack of investment.¹¹¹ Only a handful of local producers in the Alice Springs district such as Territory Lettuce (production hydroponics) and Desert Garden Produce (organic bush tomatoes) represent good examples of successful arid zone horticultural businesses. Lack of clear process around approval of horticultural licenses and water leases on pastoral land is a significant barrier to further growth in the industry. The high salt content of aquifers from the Alice Springs town basin continues to limit the use of this water for horticultural production. Cost of labour is a barrier for many existing producers. Bush foods are a highly valuable Central Australian niche crop, but remain underdeveloped. 	 A vibrant local horticultural industry could be viable near Alice Springs where: A reliable recycled water source is available. Approval processes are clarified and streamlined. Clear terms of investment are provided (particularly where public-private partnerships are concerned). Such developments should capitalise on existing examples of innovative, arid zone production techniques, and should be scaled and located appropriately, for example: Near Alice Springs – micro or small-scale, primarily targeting the Alice Springs market. More remote locations – medium to large-scale, targeting NT and national markets.
Markets & Transport	 High transport costs contribute to higher food costs, but may also eventually drive development of local production. Small production volumes, long distance to markets and high standards for quality, quantity and consistent supply demanded by retailers disadvantage local producers. The relatively small consumption levels in the NT, and transport systems that focus on Adelaide, discourage producers supplying direct to NT markets. 	 Support existing producers to engage in consortium agreements with interstate producers to ensure viable access to national markets. Undertake research to identify food transport options to support an emerging local production industry. Exploit niche opportunities where harvests take place in national off seasons (grapes, citrus), international off seasons (pistachios, dates) or for unique crops (bush tomatoes).



Photo courtesy of Food for Alice

	Current status at 2013	Opportunities
Retail	 The Alice Springs retail food market is dominated by the two major supermarkets, which bring in 82% of supermarket sold goods. 112 Alice Springs is consistently the cheapest regional centre in the NT for supermarket food prices. 113 The cost of freight is seen as a significant issue for retailers, but appears to be outweighed by the complications of stocking local produce. 114 Growing migrant populations are driving change in demand in supermarkets. Restaurants catering to the tourist trade are consistently more likely to label food as 'local' than supermarkets. Labelling of local produce within existing stores is known to increase purchases. 115 	 Establish a local food producers markets either at the existing markets or elsewhere. Develop a campaign promoting central Australia as a unique food tourism region. This campaign should be developed in partnership with restaurants, caterers, hotels, tourist operators, food producers and community groups. Develop a local food labelling system to capitalise on the consumer preference for local food and encourage the emergence of a local food market.
Community/School Gardens	 Six schools, four community services and one public site have food producing gardens in Alice Springs. The strong history of backyard food gardening in Alice Springs continues; however, fruit wastage is significant, due in part to high turnover of residents and persistent fruit fly problems in older suburbs. Many community gardens on remote communities have failed over the years due a variety of factors including the cycle of short-term support, poor governance and lack of sufficient community engagement.¹¹⁶ 	 Make information required to allow easy set-up of further community/school gardens more readily available. Despite many recent failures of community gardens in Central Australia, there still exists opportunities to gain the intended nutritional, educational, therapeutic and social benefits attributed to them. However, ongoing support such as follow-up training, design and governance is required to achieve these outcomes.

Aims and Actions

Aim: The local food production industry meets half of Alice Springs' fresh food needs by 2033 using farming techniques appropriate to the arid zone.

Actions:

- Work with the business community and government to identify innovative and cost effective initiatives to support local enterprise development in the food sector.
- 2. Establish local food business forums to encourage more information sharing within the food sector in Alice Springs.
- 3. Establish a process to make available viable parcels of land for small-scale horticulture near Alice Springs (e.g.: south of Heavitree Gap).
- Continue investment in research into arid horticultural systems and innovative use of pastoral land.
- 5. Provide commercially viable access to recycled water for horticultural endeavours in Alice Springs, and particularly south of Heavitree Gap.
- 6. Continue efforts to clarify and streamline the approvals process for horticultural enterprises around Alice Springs (especially relating to land and water licenses) to facilitate investment in this sector.
- 7. Undertake viability studies towards the re-establishment of abattoirs in the Alice Springs region, with a particular view to supplying the local Alice Springs market.

Potential Partners: NT Chamber of Commerce, DBERD, NT CMO, ASTC, Centrefarm, NT Cattlemen's Association.



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Aim: Alice Springs residents strongly support local food producers.

Actions:

- 8. Develop an 'Eat Local' campaign to drive demand for locally produced food with real incentives to help local retailers stock and label local food.
- Community sector and local producers to work toward establishing a farmers' market selling fresh local produce. Possible locations could be either at existing Alice Springs markets or at the Alice Springs Community Garden.
- 10. A consortium of NT Tourism, restaurants, tourism sector and local producers to develop a strategy for promoting Alice Springs as a vibrant and unique food tourism region.

Potential Partners: NT Chamber of Commerce, DBERD, NT CMO, ASTC, food retailers, community groups, NT Tourism, Tourism Central Australia, food services businesses such as restaurants, caterers and hotels, Food for Alice, local producers.

Aim: Community food and urban food production initiatives are thriving in Alice Springs by 2018.

Actions:

- 11. Document processes already undertaken by community groups in developing existing community gardens to support and provide guidelines and policies for the further development of community gardens.
- 12. Community groups to support the development of four community food gardens in Alice Springs in Northside, Eastside, Gillen/The Gap and Larapinta by 2018.
- Review council Verge Development Policy to incorporate the planting of bush foods and fruit trees on verges.

Potential Partners: ASTC, community groups, schools, community service centres, ALEC, Alice Springs Community Garden.

Transport

Vision for 2033: By 2033, Alice Spring is a model for using sustainable transport both within the town and further afield. The town has infrastructure to support up to 100% sustainable transport around Alice Springs whilst also showing how a small, remote town can strategically utilise long haul transport and reduce its greenhouse footprint. Investment in cycling and pedestrian infrastructure, electric car infrastructure and research into movements of people in and out of town has enabled innovation in this sphere and transport related emissions have been halved since 2013. We will look back and be amazed at how readily we accepted the high expense and pollution associated with our daily transport needs.



Photo courtesy of Alice Springs Town Council

Definition and characteristics of a transport smart Alice Springs

- World class sustainable transport infrastructure makes travelling around town by foot, bicycle, electric car or bus a straightforward and accessible choice for all residents.
- A high percentage of Alice Springs residents incorporate active transport (such as cycling and walking) into their daily routine.
- Schools, employers and government proactively support active transport.
- Accurate information about what is transported in and out of town is utilised to reduce the volume and impact of long haul transport.
- Alice Springs has successfully increased the supply of locally produced products to reduce reliance on long haul transport.

- Species well adapted to the climate (such as acacias, bush tomatoes and citrus) and pest species (such as camels and rabbits) are targeted for commercial and local consumption, with profit and environmental management outcomes as a result.
- Local producers, tourist operators and restaurant businesses are able to successfully promote Central Australia as a food tourism region, profiling bush foods, local produce, locally processed products and local businesses in the process.
- There is a high level of community engagement and interest in food production, as well as a demand for local produce, both through commercial producers and backyard/community garden level production.

Benefits over Business as Usual

- Reduced traffic congestion, noise and pollution in Alice Springs.
- Health benefits of active transport (mental and physical).
- Reduced transport costs (through lower use of fuel) for Alice residents.
- Benefits to the tourism industry from improved pedestrian and cyclist infrastructure.
- Reduced reliance on long haul transport will reduce Alice Springs' vulnerability to oil price fluctuations.
- Reduced carbon footprint and pollution from Alice Springs (from both the town itself and via transport related emissions).
- An effective import replacement strategy will strengthen the local economy and has the potential to create jobs.

SOLAR TRANSPORT IN ALICE SPRINGS

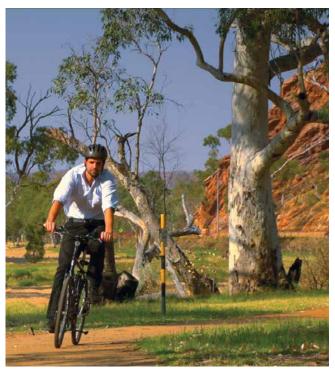
Increasing global oil prices and growing emissions from vehicles have been driving innovation in the transport sector for decades. Whilst a family car powered by panels on its own roof seems unlikely to ever be possible with current technology, a number of other creative options do exist opportunities, Alice Springs is well placed to lead development in, given our high solar potential.

Alice Springs Architect Brendan Meney outlined in 2007 a vision for a network of solar powered recharge stations across town for electric bikes, electric golf carts and 'mini-moke' style light vehicles. Adelaide's solar powered electric Tindo Bus has shown solar powered public transport is very possible, and recent development in electric hybrid engines may soon make electric cars suitable for outback travel as well.

Solar transport is rapidly emerging, and Alice Springs is well placed to be a leader if we are ready to take the initiative.

Alice Springs' Unique Selling Proposition

- The Alice Springs township is small and flat and the majority of residents live within 5km of the central activity district. This creates considerable opportunities for promoting active transport options.
- Alice Springs already has a strong cycling culture, with the highest cycling to work rate (5.4%) and an above average walking to work rate (7.5%) compared to similar sized regional towns in Australia.¹¹⁷
- Alice Springs already hosts a mountain bike enduro and a local bicycle film festival. Both present opportunities to capitalise on existing support for cycling.
- There are already almost 50 km of cycling paths in Alice Springs.
- The relative absence of a food production or manufacturing industry in Alice Springs makes it an excellent case study for import replacement aimed at reducing the impacts of freight.
- Alice Springs is ideally positioned to trial successful strategies for reducing reliance on fossil fuelled freight options to other similarly remote towns and communities in Australia.
- Alice Springs' world class solar resource presents the opportunity for including solar in the mix of transport options. For instance, electric cars could potentially lead to massively reduced carbon emissions for personal transport.



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Table 6: Progress indicators towards a transport smart Alice Springs

Progress indicators	Trend	Information availability (score out of 3)	Actual 2005	Actual 2013	Target 2018	Aspirational Goal 2033
Percentage of people using foot, bicycle, bus or electric car to get to work	Unknown	* * *	Unknown	Foot 7.5% Bike 5.4% Bus 4.5% ¹¹⁸	Foot 8.5% Bike 7.0% Bus 5.5%	Foot 15% Bike 16.2% Bus 9%
Transport emissions per capita within town	Unknown	-	Unknown	Unknown	Reduce by 10% of 2013 levels	Reduce by 75% of 2013 levels
Transport emissions per capita via freight	Unknown	-	Unknown	Unknown	Reduce by 10% of 2013 levels	Reduce by 75% of 2013 levels
Tonnes of freight transported to Alice Springs annually	Unknown	*	Unknown	Unknown ¹¹⁹	Data collected and published	Reduced by 50% of 2018 levels.

- * * * = readily available on the internet, in high profile locations
- * * = available on the internet, not in high profile locations
- * = not available on the internet or required calculations based on a variety of online sources



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Current Situation and Opportunities

	Current status at 2013	Opportunities			
Cycling infrastructure	 Alice Springs has a strong cycling culture, with the highest percentage of commuters using bicycle for any urban centre of comparable size across Australia.¹²⁰ 	 Establish Alice Springs as an Australian leader in promoting cycling as a viable, safe form of transport, not just a recreational activity. 			
	 There are 46.2 km of cycle paths in Alice Springs. There are no designated on-road cycle paths or bicycle lock up facilities, and few bike paths are lit at night. 	 Enhance existing infrastructure to improve cyclist safety, ensure key nodes around town are expediently linked and other key infrastructure developments such as lighting and signage are incorporated into a transition to a cycle smart town. Market easy bike access to key points around town to visitors. 			
Pedestrian infrastructure	 There are 51 km of footpaths in Alice Springs. The Todd Mall and CBD are well lit and have some shade; however, there is no continuous shade in place in the CBD. Across the town, most but not all footpaths are lit at night; however, few are shaded during summer. 	Redevelop Alice Springs as a town which values both commuting and recreational walkers. Footpaths link key nodes around Alice Springs effectively and promote increased uptake of walking as a viable, safe form of transport.			
Information availability regarding freight flows to and from town	 Very little information is publicly available about freight flows in Alice Springs. Annual NTG 'Weigh in Motion' reports are not published and publically available. 	 Research needs to be undertaken into the flow of goods and people into and out of the town. CO₂ emissions, vulnerability to climate change and rising fuel prices could also be explored. 			
Transport industry characteristics	 The transport sector is dominated by the trucking and rail industries. Air freight also forms a part of the freight picture. National freight movements influence how trucks move in and out of Alice Springs. There are some local trucking companies but the industry is dominated by larger companies. 	 Increase percentage of goods supplied locally and percentage of goods transported by train. An import replacement strategy for appropriate items could systematically reduce reliance on freight and strengthen the local economy. A niche market exists for freight companies who can demonstrate a commitment to reducing the greenhouse impacts of their business. 			

Aims and Actions

Aim: Alice Springs has sufficient infrastructure to support up to 100% sustainable transport around town.

Actions:

- Invest in improving and expanding cycle networks around Alice Springs (including south of the Gap) through designated on-road cycle paths, expedient alternative bike routes to encourage safe off-road bicycle commuting, bike racks, signage and bike lockup facilities. This would embed cycling as a viable and appealing form of transport around town.
- Launch a driver education campaign designed to improve acceptance of cycling as a legitimate form of transport and improve road safety outcomes (especially for children and young people).
- Improve public transport services including making more sheltered bus stops available, providing timetables at all bus stops, extending the bus service to all town camps, and increasing the number of services. This may increase usage of this service, particularly where it is likely to displace unnecessary car use.
- 4. Improve the pedestrian amenity of Alice Springs through careful consideration and construction of practical pedestrian friendly routes between suburban centres and the CBD to make walking an attractive and widely utilised form of transport around town.
- 5. Improve lighting for key pedestrian and cyclist routes to improve night-time safety.
- Make AS Bus services greenhouse friendly (consider electric/solar/biogas and/or the use of smaller or more fuel-efficient buses).

Potential Partners: NT DoT, ASTC, Alice Springs Cycling Club, ASBus, ALEC.

Aim: Alice Springs is recognised as a leader in reducing transport related greenhouse gas emissions.

Actions:

- 7. Undertake research to establish a dataset around how goods are transported to Alice Springs, estimated emissions from this haulage and recommendations as to how to minimise emissions while maintaining essential deliveries to town.
- Investigate ways to incentivise long haul transport options which are more greenhouse friendly (i.e. train).
- 9. Develop an import replacement strategy covering food, waste and the construction industry (as initial target industries) to reduce volumes of commodities being trucked to Alice Springs.

Potential Partners: NT Road Transport Association, Road Transport Hall of Fame, NT DoT, CAT, DSCM, DKA.

Aim: Residents of Alice Springs are seen as leaders in regional Australia for having some of the fastest uptake of sustainable transport options.

Actions:

- 10. Trial strategies to support increased use of electric vehicles, including solar electric public transport such as Adelaide's Tindo bus (such as establishing electric vehicle charging stations, free unlimited parking for electric vehicles, highly branding electric vehicles) and monitor impacts on the electricity grid.
- 11. Research how to build on Alice Springs' existing walking and cycling rates and implement recommended initiatives to increase uptake of these methods of active transport.

Potential Partners: NT Government, Tourism NT, Tourism Central Australia, PWC, ASTC, The Alice Springs Convention Centre, Peter Kittle Motor Company, The Road Transport Hall of Fame, Ogden Power.



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Appendix: Actions to Make Alice Springs a desertSMART Town

Energy

Aim: 100% of Alice Springs' power supply is generated by renewable sources by 2033.

Actions:

- Work with PWC to establish a program to phase in renewable energy as the source for 20 % of power generation by 2018 (ahead of the current mandatory Renewable Energy Target).¹²¹
- Research options that create incentives for establishing an electricity system that is 100% renewable (including addressing grid upgrades and network pricing issues).
- Develop and implement a phased project plan for the installation of 1 MW community owned solar systems by 2018 and up to 5 MW by 2033 (either through large stand-alone installation or dispersed roof top generation models) to give full community access to renewable energy.
- 4. Make use of market-based mechanisms, to ensure that by 2018 Alice Springs remains a national leader for uptake of rooftop PV systems.

Potential Partners: PWC, NT CMO, NT DoCM, ASTC, ALEC, CAT Projects, community investors.

Aim: Alice Springs homes and businesses are the most energy savvy customers in Australia. Actions:

- 5. Publish and monitor progress towards sector targets for the residential and commercial sectors, including targets for renewable energy generation, energy efficiency/productivity and energy poverty.
- 6. Deliver world class services to Alice Springs on how to be energy smart at home and at work (including information, audits and hardware rebates) to build on the success of the Alice Solar City program. This could either be through private businesses, grant funded programs or a solar energy/energy efficiency trust within the town.
- 7. Develop new look electricity and water bills that help customers make more informed choices about electricity and water use (possibly through a public competition).

Potential Partners: ASTC, PWC, ALEC, private sector and community service providers.

Aim: Develop a solar smart promotion plan for Alice Springs that integrates with other elements of the desertSMART Road Map.

Actions:

- 8. Establish a solar smart leadership team in Alice Springs, integrated with the other elements of the desertSMART Road Map.
- Continue the successes of Alice Solar City by identifying and promoting local ambassadors and champions, with key roles in promoting Alice Springs as a solar smart town, both locally and further afield based on their sphere of influence.
- 10. Build solar smart concepts into the existing promotions by NT Tourism by promoting Alice Springs as the most solar smart tourist destination in the world and as a venue for renewable energy industry conferences.
- Continue to promote past projects that are completed such as Alice Solar City iconic projects.
- 12. Maintain and grow relationships with specialist researchers and investors in renewable energy, for example ARENA, Clean Energy Finance Corporation, Cooperative Research Centre for Low Carbon Living and Ninti One.

Potential Partners: NT DoCM, Tourism NT, Tourism Central Australia, PWC, ASTC, ARENA, CEFC, Ninti One, local community and business leaders, businesses and organisations, local media services.

Aim: An energy smart government sector in Alice Springs.

Actions:

13. The Territory Government develops and publishes energy efficiency and in-house renewable energy targets with a supporting action plan for Government facilities in Alice Springs.

Potential Partners: NT DCM, DCIS, ASTC, PWC, energy sector service providers.

Aim: Alice Springs' first smart grid trial. Actions:

- Trial smart grid technologies in Alice Springs, with full implementation of smart metering by 2018 (building on existing Alice Solar City smart metering trials).
- 15. Establish a high penetration micro-grid test/research centre in a suburb of Alice Springs.

Potential Partners: NT Government, PWC, private sector providers.

Aim: Alice Springs trials new financing mechanisms for energy services.

Actions:

- Develop cost-reflective electricity tariffs that encourage energy productivity and self-generation of electricity whilst ensuring appropriate pricing of grid back-up services.
- 17. Create bundled energy services and new business models. For example: 'food cooling services' could include bundled products for a capped monthly price covering a financing package, an energy efficient fridge, electricity, maintenance services.
- 18. Establish Property Assessed Clean Energy financing (implemented in NSW and Victoria as Environmental Upgrade Agreements). 122
- 19. Trial market based incentives for energy efficiency such as the NSW Energy Savings Scheme, or Victoria's VEET.

Potential Partners: Participating homes, businesses and non-residential facilities, NT DCM, NT Treasury, PWC, private sector providers.

Water

Aim: Alice Springs homes and businesses are some of the most water savvy in the arid zone.

Actions:

- 20. Continue the rollout of the Alice Water Smart Guide¹²³ so that its six recommendations become commonplace water use practices in the homes and businesses in Alice Springs.
- 21. Deliver a world class service on residential and business water efficiency (including information, audits, hardware rebates etc.), to build on the success of the Alice Water Smart Project. This could be delivered through private businesses, grant funded programs or a water efficiency trust within the town.
- 22. Publish and monitor the progress towards sector targets for the residential and commercial sectors, including targets for overall water consumption, water efficiency/productivity and water poverty.
- 23. Expand school water conservation programs, including the ongoing funding for a water efficiency program coordinator/administrator.

- 24. Promote low water use gardens and provide support for water efficient garden upkeep and upgrades, with a particular focus on efficient, seasonal automatic scheduling of irrigation.
- 25. Increase residents' and businesses' awareness of water leaks, including their ability to identify and respond to them.
- 26. Ensure each high use customer has an account or case manager to follow up on metering and billing discrepancies and provide more regular billing information to them.
- 27. Develop new look water bills that help customers make more informed choices about water use (possibly through a public design competition).

Potential Partners: PWC, ASTC, ALEC, DLRM, private sector and community service providers.

Aim: Alice Springs is a world leader in water recycling at a residential, business and utility level. Actions:

- 28. Further expand the use of recycled water in Alice Springs (including funding for further infrastructure establishment and upgrades) towards a target of 50% of our water being recycled for re-use by 2033.
- 29. Encourage the uptake of appropriate and effective residential grey water systems through revised regulations, distributing a list of approved models/materials/practices, and promotion.

Potential Partners: PWC, DLRM, ASTC, DoH, ALEC, private sector.

Aim: Alice Springs trials new pricing mechanisms for water services.

Actions:

- 30. Establish a cost-reflective price structure for water use to reward low water users and financially drive more productive water use.
- 31. Develop new business models around bundled water services. For example: 'water efficient landscaping services' could include bundled products for a capped monthly price covering a financing package, water efficient landscaping and plants, water, and maintenance services.

Potential Partners: PWC, NTCMO, DBERD, NT Treasury.

Aim: Residents have access to detailed, accurate and accessible information about local water use, cost of supply and current infrastructure.

Actions:

32. Make available to the community of Alice Springs details of the financial statements for water supply in Alice Springs, including the marginal cost of supply, and the expected timing and estimated costs of capital investment (based on projected trends).

33. Create a regular (at least annual) water supply and bore health report for the Alice Springs public. This could be either for online publication or displayed in a prominent public location.

Potential Partners: PWC, ALEC, ASTC, DLRM.

Aim: That leaks are no more than 4% of Alice Springs' total water usage.

Actions:

- 34. Initiate a routine annual residential leak check (on-lot leaks) program for all Alice Springs water customers. This program could be either as an extension of the meter reading service or as a separate contract.
- 35. Continue to identify and reduce leaks in water delivery infrastructure towards best practice levels.
- 36. Review policies and procedures for reverse readings of water meters to ensure bills accurately reflect water usage so increases in water usage due to leaks, or changes in garden irrigation regimes are promptly noted.

Potential Partners: PWC, ALEC, private sector.

Aim: The Northern Territory and local government model smart and efficient water use.

Actions:

- 37. Develop water efficiency targets and supporting action plans for all Government facilities in Alice Springs.
- 38. The ASTC continues to build on and promote their water efficient parks and ovals program.

Potential Partners: DCM, NT Treasury, ASTC, PWC.

Waste

Actions:

Aim: 100% of food and green waste is removed from the waste stream and used productively.

- 39. Improve existing green waste processing operations at the Alice Springs Regional Waste Management Facility to incorporate food waste processing and produce commercial quality compost for sale.
- 40. Expand existing food waste recovery and redistribution initiatives to more supermarkets.
- 41. Initiate a campaign to increase household composting, with the possibility of subsidised compost bins, incentives or competitions.
- 42. Establish a commercial non-edible food waste composting service to service food providing businesses such as supermarkets, hotels and restaurants

Potential Partners: ASTC, food sellers (supermarkets, hotels, restaurants), Second Bite/Oz Harvest/Food Bank etc, local entrepreneurs, welfare agencies (such as Australian Red Cross, Anglicare), ALEC, the waste industry.

Aim: Alice Springs homes and businesses are the most waste savvy consumers in Australia. Actions:

- 43. Provide waste and resource recovery education to Alice Springs residents and businesses, including waste minimisation, re-use and recycling options.
- 44. Strengthen existing supports to waste management businesses (such as NT Eco Biz and similar) to reduce waste and move to purchasing sustainable low impact materials.

Potential Partners: ASTC, NT Government, Eco-Biz, desertSMART COOLmob, ALEC.

Aim: Local and Territory level governments lead the way in innovative and effective waste management and service provision to residents and local businesses.

Actions:

- 45. Improve the monitoring and evaluation of waste and resource recovery activities in Alice Springs. Possible items: to report upon include amount recycled (metal), composted (green waste) and re-used (crushed glass).
- 46. Explore an alliance with other towns from across the world who face similar recycling issues (such as remoteness and low volumes recycled) to develop creative solutions.
- 47. Explore innovative solutions to providing kerbside collection of recyclables. For example, pay by kilogram system (as in Ireland) or developing a network of well-promoted drop-off points.
- 48. Ensure the Regional Waste Management Facility's transfer station and The Rediscovery Centre is managed in an innovative and economically sustainable manner and is recycling increasing volumes of waste by 2018.

Potential Partners: ASTC, ASTC EAC, NT Government, ALEC, research institutes (such as CSIRO and Batchelor), CRC-RED.

Aim: Local waste management businesses are at the cutting edge of profitably recycling and recovering waste as resources for re-use within local Alice Springs industry.

Actions:

- 49. Develop an import replacement strategy to support local businesses to re-use existing local resources (for instance crushed glass, composted food waste and recycled plastic products).
- 50. Continue to refine the Container Deposit legislation to ensure the efficient and profitable operation of this scheme for local operators, as well as its accessibility for the public, and effectiveness in terms of volume of containers recycled.

- 51. Review NT Government regulations around composting toilets and develop a short list of acceptable off-the-shelf models or approved building techniques.
- 52. Establish a recycling incentive scheme to better support local businesses who divert waste away from landfill and who engage in import replacement activities (for example low interest business loans or incentives based on the amount of waste diverted).

Potential Partners: DBERD, NT DoCM, ASTC, Chamber of Commerce, local entrepreneurs/business sector, DLPE, CAT.

Built Environment

Aim: Alice Springs CBD is a vibrant, accessible, and well designed, multi-purpose activity hub.

- 53. Work towards NT Government developing a suite of guidelines, planning controls and incentives for any further CBD development, promoting higher public amenity, active street fronts and mixed use zoning (commercial, residential, social housing etc.).
- 54. Work towards businesses with empty premises being able to lease them out at peppercorn rent to artists and/ or community groups to encourage economic and community activity.
- 55. Develop a strategy to reduce the parking footprint in the CBD, promoting limited use of multi-storey parking, whilst still providing adequate parking for tourist trade (such as coaches and grey nomads).
- 56. Set tree canopy targets for high use areas of Alice Springs (such as the CBD, community use zoned spaces and medium density residential areas).
- 57. Include a new requirement in the NT Planning Scheme requiring all new CBD developments to shade the adjacent footpath, with a view to providing continuous paths of shade around the CBD.

Potential Partners: NT CMO, NT Treasury, NT DCIS, NT DLPE, NT Government Architect, NT Chamber of Commerce, ASTC, property owners in the CBD, community groups, artists, etc.

Aim: Residential population density increases steadily over time.

Actions:

- 58. Increase urban density through urban infill and by expanding areas covered by medium density zoning, particularly within walking distance of the town centre and the suburban centres.
- 59. Review the town plan requirement for 2 car spaces per dwelling, (especially for CBD residences and 'granny flats') to facilitate higher density urban infill.

Potential Partners: NT DLPE, ASTC, property developers.

Aim: Alice Springs has a housing strategy that promotes environmental outcomes and builds social cohesion.

Actions:

- 60. Adopt a policy that all new public housing is: a) 6 star rated under an appropriate rating scheme (such as Green Star or National Australian Built Environment Rating System NABERS¹²⁴) to minimise energy and water costs for future tenants and; b) in mixed development settings to reduce social dysfunction.
- 61. Amend NT legislation to ensure that: a) a minimum 15% of any residential subdivision on Crown land be directed to social and affordable housing and b) there are progressive minimum standards for energy and water efficiency and thermal performance for all new buildings.
- 62. Undertake a retrofitting program of Territory Housing dwellings to improve energy efficiency and water efficiency through the provision of ceiling insulation, ceiling fans, leak checks and education for behavioural change.

Potential Partners: NT Department of Housing, NT Treasury, DSCM, ALEC, social housing providers, NT Shelter, NTCOSS, local architects.

Aim: Alice Springs has planning processes and legislative frameworks that effectively facilitate urban sustainability.

Actions:

- 63. Adopt best practice standards for government funded (all level of government) building works (for example National Australian Built Environment Rating System (NABERS).¹²⁵
- 64. Review government tender selection processes to ensure policies designed to favour quality local tenders are fully implemented. This would shift the emphasis from price-based selection and would result in a strengthened local economy and promotion of more appropriate design.
- 65. Review relevant sections of the NT Planning Scheme to include specific provisions for appropriate subdivision and lot design in a desert environment.
- 66. Establish as standard practice the provision of energy (including energy consumption estimates) and water ratings for houses going on the market (such as Green Star or NABERS).
- 67. Adopt the National Construction Code (CCA 2010 Section J) in full in order to improve building energy efficiencies.

Potential Partners: NT DLPE, NT DCIS, NT CMO, ASTC, local architects, ALEC, NT Real Estate Institute, Real Estate Agents.

Aim: Mechanisms to incentivise sustainable building practices are in place in Alice Springs. Actions:

68. A consortium of DKA, NT Government, ALEC, Chamber of Commerce and the Institute of Architects to establish a local sustainable design forum (one off or bi-annually) to bringing together architects, planners, construction companies, and social housing groups to look at and promote sustainable building design.

Potential Partners: DLPE, DKA, ALEC, Chamber of Commence, the Institute of Architects.

Food

Aim: The local food production industry meets half of Alice Springs' fresh food needs by 2033 using farming techniques appropriate to the arid zone.

Actions:

- 69. Work with the business community and government to identify innovative and cost effective initiatives to support local enterprise development in the food sector.
- Establish local food business forums to encourage more information sharing within the food sector in Alice Springs.
- 71. Establish a process to make available viable parcels of land for small-scale horticulture near Alice Springs (e.g.: south of Heavitree Gap).
- 72. Continue investment in research into arid horticultural systems and innovative use of pastoral land.
- 73. Provide commercially viable access to recycled water for horticultural endeavours in Alice Springs, and particularly south of Heavitree Gap.
- 74. Continue efforts to clarify and streamline the approvals process for horticultural enterprises around Alice Springs (especially relating to land and water licenses) to facilitate investment in this sector.
- 75. Undertake viability studies towards the reestablishment of abattoirs in the Alice Springs region, with a particular view to supplying the local Alice Springs market.

Potential Partners: NT Chamber of Commerce, DBERD, NT CMO, ASTC, Centrefarm, NT Cattlemen's Association.

Aim: Alice Springs residents strongly support local food producers.

Actions:

- 76. Develop an Eat Local campaign to drive demand for locally produced food with real incentives to help local retailers stock and label local food.
- 77. Community sector and local producers to work toward establishing a farmers' market selling fresh local produce. Possible locations could be either at existing Alice Springs markets or at the Alice Springs Community Garden.

78. A consortium of NT Tourism, restaurants, tourism sector and local producers to develop a strategy for promoting Alice Springs as a vibrant and unique food tourism region.

Potential Partners: NT Chamber of Commerce, DBERD, NT CMO, ASTC, food retailers, community groups, NT Tourism, Tourism Central Australia, food services businesses such as restaurants, caterers and hotels, Food for Alice, local producers.

Aim: Community food and urban food production initiatives are thriving in Alice Springs by 2018. Actions:

- 79. Document processes already undertaken by community groups in developing existing community gardens to support and provide guidelines and policies for the further development of community gardens.
- 80. Community groups to support the development of four community food gardens in Alice Springs in Northside, Eastside, Gillen/The Gap and Larapinta by 2018.
- 81. Review council Verge Development Policy to incorporate the planting of bush foods and fruit trees on verges.

Potential Partners: ASTC, community groups, schools, community service centres, ALEC, Alice Springs Community Garden.

Transport

Aim: Alice Springs has sufficient infrastructure to support up to 100% sustainable transport around town.

Actions:

- 82. Invest in improving and expanding cycle networks around Alice Springs (including south of the Gap) through designated on-road cycle paths, expedient alternative bike routes to encourage safe off-road bicycle commuting, bike racks, signage and bike lockup facilities. This would embed cycling as a viable and appealing form of transport around town.
- 83. Launch a driver education campaign designed to improve acceptance of cycling as a legitimate form of transport and improve road safety outcomes (especially for children and young people).
- 84. Improve public transport services including: making more sheltered bus stops available; providing timetables at all bus stops; extending the bus service to all town camps; and increasing the number of services. This may increase usage of this service, particularly where it is likely to displace unnecessary car use.
- 85. Improve the pedestrian amenity of Alice Springs through careful consideration and construction of practical pedestrian friendly routes between suburban centres and the CBD to make walking an attractive and widely utilised form of transport around town.

- 86. Improve lighting for key pedestrian and cyclist routes to improve night-time safety.
- 87. Make AS Bus services greenhouse friendly (consider electric/solar/biogas and/or the use of smaller or more fuel-efficient buses).

Potential Partners: NT DoT, ASTC, Alice Springs Cycling Club, ASBus, ALEC.

Aim Alice Springs is recognised as a leader in reducing transport related greenhouse gas emissions.

Actions:

- 88. Undertake research to establish a data set around how goods are transported to Alice Springs, estimated emissions from this haulage and recommendations as to how to minimise emissions while maintaining essential deliveries to town.
- 89. Investigate ways to incentivise long haul transport options which are more greenhouse friendly (i.e. train).
- 90. Develop an import replacement strategy covering food, waste and the construction industry (as initial target industries) to reduce volumes of commodities being trucked to Alice Springs.

Potential Partners: NT Road Transport Association, Road Transport Hall of Fame, NT DoT, CAT, DSCM, DKA.

Aim: Residents of Alice Springs are seen as leaders in regional Australia for having some of the fastest uptake of sustainable transport options.

Actions:

- 91. Trial strategies to support increased use of electric vehicles, including solar electric public transport such as Adelaide's Tindo bus (such as establishing electric vehicle charging stations, free unlimited parking for electric vehicles, highly branding electric vehicles) and monitor impacts on the electricity grid.
- 92. Research how to build on Alice Springs' existing walking and cycling rates and implement recommended initiatives to increase uptake of these methods of active transport.

Potential Partners: NT Government, Tourism NT, Tourism Central Australia, PWC, ASTC, The Alice Springs Convention Centre, Peter Kittle Motor Company, The Road Transport Hall of Fame, Ogden Power.

Accommodating Notes

- 1) J. Creyts and E. Maurer, Microgrids and "Micro-municipalization". Do they threaten the traditional utility business model?, Rocky Mountain Institute, 23 July 2013. http://blog.rmi.org/blog_2013_07_23_microgrids_and_municipalization
- 2) Lovins, A. Amory's Angle: Three Major Energy Trends to Watch, Rocky Mountains Institute, 2013, http://www.rmi.org/summer_2013_esj_amorys_angle_three_major_energy_trends_main
- 3) Clean Energy Principles website, Glossary, http://www.cleanenergyprinciples.com/industry-resources/glossary/
- 4) Based on Bureau of Meteorology Alice Springs Airport Histotical data showing a mean of 63.5 cloudy days between 1954 and 2010, http://www.bom.gov.au/climate/averages/tables/cw_015590.shtml
- 5) No agreed definition yet exists for either energy poverty or fuel poverty in the NT. Some useful definitions could include a lack of access to modern energy services (as per the International Energy Agency http://www.iea.org/topics/energypoverty/) or when families are living below the poverty line and have higher than average energy costs (UK Government https://www.gov.uk/government/publications/fuel-poverty-a-framework-for-future-action)
- 6) Despite a long term trend of energy use decreasing between 2009–2012, PWC verbally report that from 2011 to 2012 there has been a slight downward trend in electricity generation (Sawyer, S. Email correspondence, 6 March 2013).
- 7) Engineers Australia, 2010, Northern Territory Infrastructure Report Card 2010, http://www.engineersaustralia.org.au/sites/default/files/shado/Infrastructure%20Report%20Cards/Northern/entire_report_final.pdf
- 8) Sawyer, S. Email correspondence, 6 March 2013
- 9) Calculation where: 76PJ consumed in the NT in 2003/04 (http://www.environment.gov.au/node/22253) and \$9.4 billion GSP for the NT in 2004/05 (ABS, 2005, Regional Statistics, Northern Territory, http://www.abs.gov.au/AUSSTATS/abs@.nsf/allprimarymainfeatures/2BF72BBF4AB2CB38CA2572120015F3A3?opendocument). Therefore:
 - = 76,000,000,000,000,000]÷\$9,494,000,000
 - = 8,005,055.80 J/\$
 - = 8,005,055,800]/\$1000
 - =8.01GJ/\$1000
- 10) Calculation where: 120PJ consumed in the NT in 2010/11 (BREE, 2013, Energy in Australia, http://bree.slicedlabs.com.au/sites/default/files/files/publications/energy-in-aust/bree-energyinaustralia-2013.pdf) and \$16 billion GDP for the NT in 2010/11 (NT DoB, 2012, Key Business Statistics, http://www.dob.nt.gov.au/business/economics/key-statistics/Documents/nt_key_stats_feb_2012.pdf). Therefore:
 - = 120,000,000,000,000,000]÷\$16,300,000,000
 - = 7,361,963.19]/\$
 - = 7,361,963,190]/\$1000
 - =7.36GJ/\$1000
- 11) Alice Solar City, Media Release, 24 April 2012, Araluen Solar System Completes Alice Solar City's Large Scale 'Iconic' Solar Program, http://www.alicesolarcity.com.au/sites/default/files/Media%20Release%20-%20 Araluen%20project%20completes%20large%20scale%20iconic%20program%2024%20April%202012_2.pdf
- 12) PWC 2007 data, sited at http://www.alicesolarcity.com.au/facts/solar
- 13) Sawyer, S. Email correspondence, 10 May 2013
- 14) Calculation: 694kg/MW CO2 emissions in 2008-9 (PWC Annual Report 2009) multiplied by 216,000MW generated in 2009 (Engineers Australia 2010 op. cit.).
- 15) Calculation: 612/MW CO2 emissions (NT wide) in 2011-12 (PWC Annual report 2012) multipled by 230,000MW generated in 2012 (Sawyer S., op.cit.)
- 16) The Australian Solar Radiation Handbook, 1994 referenced in Meeney B., 2007, Solar Transport Concept Discussion Paper (unpublished)
- 17) Alice Solar City, op. cit
- 18) Alice Solar City, ibid.
- 19) The Clean Energy Regulator website http://ret.cleanenergyregulator.gov.au/about-the-schemes
- 20) NSW Department of Environment and Heritage, 2014, http://www.environment.nsw.gov.au/sustainbus/eua.htm
- 21) Lovins, A. 1977, Soft Energy Paths: Towards a Durable Peace, Friends of the Earth International.
- 22) Gleick, P. H., 2002, Soft Water Paths, Nature, Volume 418, pg. 373, July 25, 2002, http://www.pacinst.org/topics/water_and_sustainability/soft_path/nature_07252002.pdf
- 23) Clean Energy Principles website, op. cit.

- 24) NRETAS, 2007, Alice Springs Water Resource Strategy 2006-15, http://lrm.nt.gov.au/__data/assets/pdf_file/0020/6635/aswr_strategy_vol1.pdf. Includes all Amadeus Basin Aquifers (ie: Roe Creek and Rocky Hill).
- 25) DLRM, 2013, Draft Alice Springs Water Allocation Plan, 2013-18, http://www.lrm.nt.gov.au/__data/assets/pdf_file/0004/146173/Draft-ASWAP_Release-for-Public-Comment.pdf. Includes all Amadeus Basin Aquifers (i.e.: Roe Creek and Rocky Hill).
- 26) Tickell, S, 2011, Review of the Alice Springs Water Strategy, Northern Territory Department of Natural Resources, Environment, The Arts and Sport Technical http://lrm.nt.gov.au/__data/assets/pdf_file/0016/120922/Tech-Review-of-Alice-Springs-Water-Strategy_FINAL.pdf
- 27) National Water Commission, 2013, National performance report 2011–12: urban water utilities, http://www.nwc.gov.au/publications/topic/nprs/urban-2011-2012
- 28) Calculation where: Alice Springs Gross Regional Product is \$1478M in 2006 (NTG, 2007, Alice Springs Economic Profile, www.nt.gov.au/d/Content/File/p/rd/Alice/AEPweb.pdf), and total urban water supplied in 2005-6 is 8858ML (National Water Commission, 2007, National performance report 2005-06: Major urban water utilities, http://archive.nwc.gov.au/__data/assets/pdf_file/0019/11458/0506-National-Performance-Report-MajorUrban-PUB.pdf). Therefore:
 - =\$1,478M ÷ 9335ML
 - =0.370\$M/ML
- 29) Calculation where: Alice Springs Gross Regional Product is \$2887M in 2012 (NTG, 2013, Alice Springs Economic Profile at a Glance 2013,
 - http://www.rdia.nt.gov.au/__data/assets/pdf_file/0011/152111/Alice_Springs_Economic_Profile_A4_FA.pdf and total reported groundwater use in 2012 is 9500ML (DLRM, 2013, op. cit.). Therefore:
 - = \$2887M ÷ 9500ML
 - =0.304\$M/ML
- 30) Despite decreasing when comparing 2007 to 2012, the overall year to year trend continues upwards. The decrease when comparing 2007 to 2012 is caused by a more that 50% drop in 2011 due to upgrade works taking place at the water Alice Springs recycling plant.
- 31) National Water Commission, 2013, National performance report 2011–12: urban water utilities, http://www.nwc.gov.au/publications/topic/nprs/urban-2011-2012
- 32) National Water Commission, 2013, National performance report 2011–12: urban water utilities, http://www.nwc.gov.au/publications/topic/nprs/urban-2011-2012
- 33) National Water Commission, 2013, National performance report 2011–12: urban water utilities, http://www.nwc.gov.au/publications/topic/nprs/urban-2011-2012
- 34) ibid
- 35) Alice Water Smart, 2013, Alice Water Smart Homes & Businesses Final Report, Part 3 Homes.
- 36) http://alicewatersmart.com.au/alicewatersmartguide
- 37) Jacobs, J., 1985, Cities and the Wealth of Nations: Principles of Economic Life 2nd ed, Vintage
- 38) Note, this is despite decreasing volumes in consecutive years between 2006-2009. Trends may be misleading here.
- 39) Tonkin, 2010, ASTC Landfill Management Plan Review Task 5 Landfill Gas Emissions Review in ASTC, 2012, Carbon Price and Council Landfill National Forum Report to Technical Services Committee, http://www.alicesprings.nt.gov.au/meetings/ 2012/20120612_COMM/16.__TS_Committee_Agenda_Ite_9.4_-_Carbon_Price_and_Council_Landfill_National_Forum.pdf
- 40) ibid.
- 41) ASTC, 2012, Waste Management Report to the ASCT Environmental Advisory Committee, 7 May 2012. Note: Waste recycled is defined by sorted recyclable waste actually taken off site for recycling. It does not included sorted, recyclable waste still on site at the ASTC Waste Management Facility. This figure may be unusually high in 2013 due to high volume of waste concrete being recycled as part of the process of constructing a new waste management facility at the ASTC landfill site.
- 42) EPHC, 2010, National Waste Report, http://www.scew.gov.au/system/files/resources/020c2577-eac9-0494-493c-d1ce2b4442e5/files/wastemgt-nat-waste-report-final-20-fullreport-201005-0.pdf
- 43) Due for release in early 2014.
- 44) The ongoing increasing trend in emissions may be due to historic stockpiles of compostable waste in the landfill, and therefore difficult to reverse by prevention alone. Note that fluctuating volumes of waste across the weighbridge do not affect this rising trend in emissions over time (Tonkin 2010, op. cit.).

- 45) Tonkin, 2010, ASTC Landfill Management Plan Review Task 5 Landfill Gas Emissions Review in ASTC, 2012, Carbon Price and Council Landfill National Forum Report to Technical Services Committee, http://www.alicesprings.nt.gov.au/meetings/2012/20120612_COMM/16.__TS_Committee_Agenda_Ite_9.4_-_Carbon_Price_and_Council_Landfill_National_Forum.pdf
- 46) Estimate provided by ASTC (pers. comm. Mike Rowell, 8 Dec 2013). A more accurate assessment of Alice Springs Regional Waste Management Facility greenhouse gas emissions will be released by ASTC in early 2014.
- 47) ABS, 2010, Waste Generation And Disposal, http://www.abs.gov.au/ausstats/abs@.nsf/0/392265C4C12E1E39CA25773700169C2E?opendocument
- 48) ibid.
- 49) O'Leary, R., 2009, Household Waste In Alice Springs, A Report on the Status of Household Waste in Alice Springs, Masters (Research) Student Charles Darwin University
- 50) http://www.cleanireland.ie/residential
- 51) Alice Springs Waste Management Facility, Report to the Alice Springs Town Council Environmental Advisory Committee, 7 May 2013.
- 52) O'Leary, R., 2009, op. cit.
- 53) O'Leary, R., 2012, Business Waste in Alice Springs
- 54) Calculation, where greebn waste recycled over a 9 month period in 2012/13 was 43.43tonnes (ASTC, 2012, op. cit.). Therefore
 - $= 43.32 \div 9$
 - = 4.81 tonnes (monthly average)
 - = 57.76 tonnes (annual estimate 2012/13)
- 55) Tonkin, 2010, op. cit.
- 56) https://www.envirobank.com.au/news/alice-springs-depot-now-open-business
- 57) Calculation, where total number of containers recycled for 2010 was 7,144,327 (Alice Springs Town Council "Seven Million Reasons for CDL" 6 July 2010, http://www.alicesprings.nt.gov.au/newsitem/90), operating 2 days per week. Therefore:
 - $= 7,144,327 \div (52 \times 2)$
 - = 68,695
- 58) http://www.sydneymedia.com.au/sydney-heading-for-a-cool-green-future/
- 59) ABS, 2010, Average Floor Area Of New Residential Dwellings, http://www.abs.gov.au/ausstats/abs@.nsf/featurearticlesbyCatalogue/8BB3F6B866BC35CECA2578A000153026?OpenDocument
- 60) ibid
- 61) Calculation where: average floor size of new blocks is 233.6m2 (ABS 2010, op.cit.) and average block size for Alice Springs is 927m2 (Pers. comms. Peter Sommerville (Manager Planning and Development, DLPE), 13 May 2013). Therefore:
 - $= 233.6 \div 927$
 - = 0.25199
- 62) Despite no quantifiable data available, photographic records (http://www.bonzle.com/c/a?a=p&p=688&d=pics&yr=2009 &cmd=sp&c=1&x=133.88362&y=-23.6974&&w=40000&mpsec=0) suggest that tree canopy coverage has increased over the last 50 years.
- 63) Data for 2013 is readily available through online news sources (see below). However data for previous years, and data indicating trends is not available.
- 64) Calculation where total public housing stock in Alice Springs is 831 residences, and an estimated 100 are unoccupied (http://www.abc.net.au/news/2013-10-22/worries-aired-over-vacant-alice-public-housing/5038250). Therefore:
 - $= 100 \div 831$
 - = 0.1204
- 65) Energy and water efficiency trends for private residential housing stock in Alice Springs are covered in the energy and water chapters respectively.
- 66) desertSMART COOLmob, 2013b, Energy and Water Efficiency Report for Anglicare Transitional Housing Residence, desertsmartcoolmob.org/wp-content/uploads//2013/10/131015_LIHs-Final-Report-PUBLIC.pdf
- 67) ibid
- 68) ABS 2011 Census, op. cit.
- 69) The Northern Institute, 2012, Alice According to You: A snapshot from the 2011 Census, CDU website: http://www.cdu.edu.au/sites/default/files/the-northern-institute/Alice%20according%20to%20you_FINAL.pdf
- 70) ABS 2011 Census, Quickstats report for Alice Springs LGA: http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/LGA70200?opendocument&navpos=220

- 71) Design Urban, Alice Springs Central Activity District Urban Design Audit, Melbourne, 2009
- 72) http://www.bonzle.com/c/a?a=p&p=688&d=pics&yr=2009&cmd=sp&c=1&x=133.88362&y=-23.6974&bw=40000&mpsec=0
- 73) ABS 2011 Census, op. cit.
- 74) Pers. comm. Peter Sommerville (Manager Planning and Development, DLPE), 13 May 2013.
- 75) The Split incentive is where all cost of investing in energy/water efficiency measures (purchase, installation, maintenance) falls to a landlord, while all benefits (reduced bills, increased human comfort) fall to a tenant. This acts as a serious disincentive for both parties to invest, and so creates a barrier to achieving energy/water efficiency upgrades in both residential and commercial rental/lease properties.
- 76) Australian Property Monitors, 12 Month Postcode Report for Alice Springs LGA (0870), generated 9 May 2013, http://www.homepriceguide.com.au/Products/ProductNew.aspx?ProductID=2&Audience=Buyers
- 77) ABS 2011 Census, Quickstats report for Australia, http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/0?opendocument&navpos=220
- 78) ABS, 2013, Building Approvals March Quarter 2013, http://www.ausstats.abs.gov.au/ausstats/meisubs.nsf/0/C40A77E6F89004C9CA257B5E001962B3/\$File/87310_march%202013.pdf
- 79) ABS, 2010, Average Floor Area Of New Residential Dwellings, http://www.abs.gov.au/ausstats/abs@.nsf/featurearticlesbyCatalogue/8BB3F6B866BC35CECA2578A000153026?OpenDocument
- 80) James, C., 2009, Australian homes are biggest in the world, Commsec Economic Insights, http://images.comsec.com.au/ipo/UploadedImages/craigjames3f6189175551497fada1a4769f74d09c.pdf
- 81) Chlanda, E., 20 January, 2012, Housing Crisis as 860 dwellings are in development, Alice Sprimngs News Online, www.alicespringsnews.com.au/2012/1/20/4272/
- 82) Joy, Lisa, Face-to-face interview conducted by Ella McHenry, July 4, 2013
- 83) ibid.
- 84) ibid.
- 85) desertSMART COOLmob, 2013b, Energy and Water Efficiency Report for Anglicare Transitional Housing Residence, desertsmartcoolmob.org/wp-content/uploads//2013/10/131015_LIHs-Final-Report-PUBLIC.pdf
- 86) ibid.
- 87) http://www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/northern-territory
- 88) Dugdale, S, email correspondence with Ella McHenry, June 6, 2013.
- 89) Australian Government Department of Industry, 2014, National Australian Built Environment Rating System http://ee.ret.gov.au/national-australian-built-environment-rating-system
- 90) ibid
- 91) Brown, L., 2012, Full Planet, Empty Plates: The New Geopolitics of Food Scarcity, W N Norton & Company
- 92) DoH, 2013, NT Market Basket Survey 2012, Northern Territory Government, Department of Health http://digitallibrary.health.nt.gov.au/prodjspui/bitstream/10137/560/2/NT%20MBS%20Report.pdf 93) ibid.
- 94) Assuming annual CPI index of 2.5%.
- 95) This is essentially a proxy indicator for the amount of imported food is consumed in Alice Springs. A decreasing number here would mean less food per person being imported into the town, with the assumption being that this food is being replaced by local food somehow. It is assumed that under normal circumstances that a decrease in this number would most likely not indicate overall that Alice Springs residents are consuming less food.
- 96) Calculation, where: Alice Springs supermarkets import 2245 pallets per week assuming conservative estimates for non-interviewed stores, and assuming 22 pallets per pan/truck/container (desertSMART COOLmob, 2013, the Alice Springs Food System DRAFT, not yet released to the public), and Alice Springs population for 2013 is assumed as 28,080 (DRDIA, 2013, Alice Springs Region Economic Profile At A Glance, Northern Territory Department of Community Services,
 - http://www.rdia.nt.gov.au/__data/assets/pdf_file/0011/152111/Alice_Springs_Economic_Profile_A4_FA.pdf). Therefore
 - $= 2245 \div 28,080$
 - = 0.799501 (pallets per person per week).
- 97) DBERD, 2008, Alice Springs Economic Profile, Northern Territory Government, Department of Business, Enterprise and Regional Development, http://www.nt.gov.au/d/Content/File/p/rd/Alice/AEPweb.pdf
- 98) ibid
- 99) Note that while the sector stayed steady as a percentage of the total number of businesses in the region, the sector itself grew by 20.1%, in line with the region as a whole (DRDIA, 2013).

- 100) DRDIA, 2013, op. cit.
- 101) ibid
- 102) ibid
- 103) ibid
- 104) Alice Springs community garden, Sadadeen Primary School, Braitling Primary School, Yirara College, Centralian Middle School, Alice Springs Steiner School, Ampe Kwekwe Mum's and Bub's Shelter, Purple House Dialysis Clinic, DASA, Yiperenye Public School, Gap Youth Centre.
- 105) Fresh in the Desert, Afghan Traders, Food for Alice.
- 106) Waybill database, 21 Feb 2013, Cattle Movement Statistics, Alice Springs Region, Department of Primary Industry and Fishing, Northern Territory, @ http://www.nt.gov.au/d/Primary_Industry/Content/File/biosecurity/LivestockIdMovement/Waybill_STATS_LiveCattle_NTRegions_Istate_REGIONS_History_AliceSprings.pdf
- 107) J. Willoughby, pers. comm., 10 October, 2013
- 108) NT Cattlemen's Association website: http://www.ntca.org.au/our_association/
- 109) DCCEE website:
 - http://www.climatechange.gov.au/climate-change/climate-science/climate-change-impacts/northern-territory
- 110) Chlanda, E., 18 February, 2012, After Darwin's bombing, the Army made the desert bloom, Alice Springs News Online,
 - http://www.alicespringsnews.com.au/2012/02/18/after-darwins-bombing-the-army-made-the-desert-bloom/
- 111) NRETAS, 2011, Identification of Potential Land for Long-term Sustainable Food Production, Stage 1: Identification of Soil and Water Resources
- 112) desertSMART COOLmob, 2013, op.cit.
- 113) DoH (2013), op. cit.
- 114) desertSMART COOLmob, 2013, op.cit.
- 115) ibid.
- 116) Warchivker, I., 2009, Scoping Study for the development of community farms/gardens in remote Aboriginal communities in Central Australia Stage 1, Centrefarm Aboriginal Horticulture Pty. Ltd., www.centrefarm.com
- 117) ABS 2011 Census, Quickstats report for Australia, http://www.censusdata.abs.gov.au/census_services/getproduct/census/2011/quickstat/0?opendocument&navpos=220 118) ibid
- 119) Some data exists (collected by NTG and also by desertSMART COOLmob as part of the Alice Springs Food Map project) but both sources remain unpublished, and so totals are unknown.
- 120) ABS 2011 Census, Quickstats report for Australia, op cit.
- 121) The Clean Energy Regulator website http://ret.cleanenergyregulator.gov.au/about-the-schemes
- 122) NSW Department of Environment and Heritage, 2014, http://www.environment.nsw.gov.au/sustainbus/eua.htm
- 123) http://alicewatersmart.com.au/alicewatersmartguide
- 124) Australian Government Department of Industry, 2014, National Australian Built Environment Rating System http://ee.ret.gov.au/national-australian-built-environment-rating-system
- 125) ibid

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