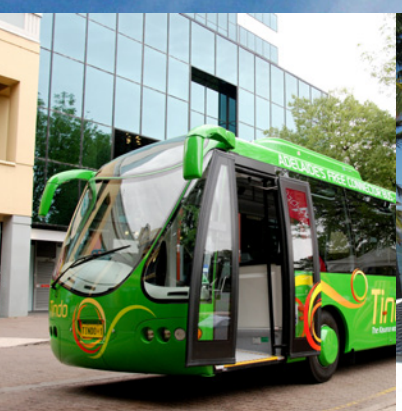
Australian Government

Department of Climate Change
and Energy Efficiency

solar cities

CATALYST FOR CHANGE

Background Paper – October 2011



FOREWORD

The consensus among the scientific community is clear—our climate is changing and human activity is causing that change. The longer we delay action, the greater the costs—economically, socially and environmentally.

The Government is committed to delivering a comprehensive policy and that is exactly what we have put forward in the Clean Energy Future Plan.

A carbon price is the key component of this plan and will do the heavy lifting in driving the decoupling of the production of pollution from production of prosperity. And a carbon price will drive this change most efficiently and at lowest cost.

The carbon price will create incentives to reduce pollution, and stimulate investment in low emissions technologies and processes. Over time, it will transform the most carbon intensive sectors of the economy, create new industries and ensure we stay competitive in a carbon constrained world. High pollution choices will become more expensive and low pollution choices more attractive. That is why when this government talks about its climate change policy, we talk about an economic transformation and a fundamental economic reform.

Investment in renewable energy is crucial to this transformation, and early investment and research will ensure that mature renewable energy technologies and industries can play their role on the road to a clean energy future.

Investment in energy efficiency is also central to this transformation. Improving the efficiency with which we use energy will deliver benefits to every corner of the country—it is a means of improving the productivity of the economy as well as one of the most cost effective ways of reducing carbon pollution. It also helps to reduce pressure on household budgets and can improve comfort in the home.

Through the Solar Cities program the Government has been partnering with the community and industry to trial a range of products and services under real-world conditions in seven 'Solar Cities' across Australia.

I am pleased to present this first paper in a series of publications to be released on the Solar Cities program and its findings.

The Hon. Mark Dreyfus QC MP

Parliamentary Secretary for Climate Change and Energy Efficiency

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Overview

The Solar Cities program was launched in 2004 to showcase sustainable energy models that help consumers and retailers to monitor their energy use and use energy more wisely.

This innovative Australian Government program has been conducting trials of business models and energy solutions since 2007 to inform public policy. Trials are being conducted in seven Solar Cities around Australia: Adelaide, Bankstown, Townsville, Central Victoria, Alice Springs, Moreland and Perth (Figure 1).

The seven Solar Cities were selected because of their diverse cultural, climatic and lifestyle characteristics. Successful elements of the trials have the potential for replication around Australia.

Recognising the need to transform Australia's energy future, successive governments have strongly supported the Solar Cities program. Over the past four years, the program has been gathering data and lessons from a unique mix of solar technologies and energy-efficiency initiatives. The initiatives have included solar technologies, such as photovoltaic (PV) and solar thermal technologies, cost-reflective pricing, load management, smart meters, in-house displays and energy audits of large grid-connected urban sites.

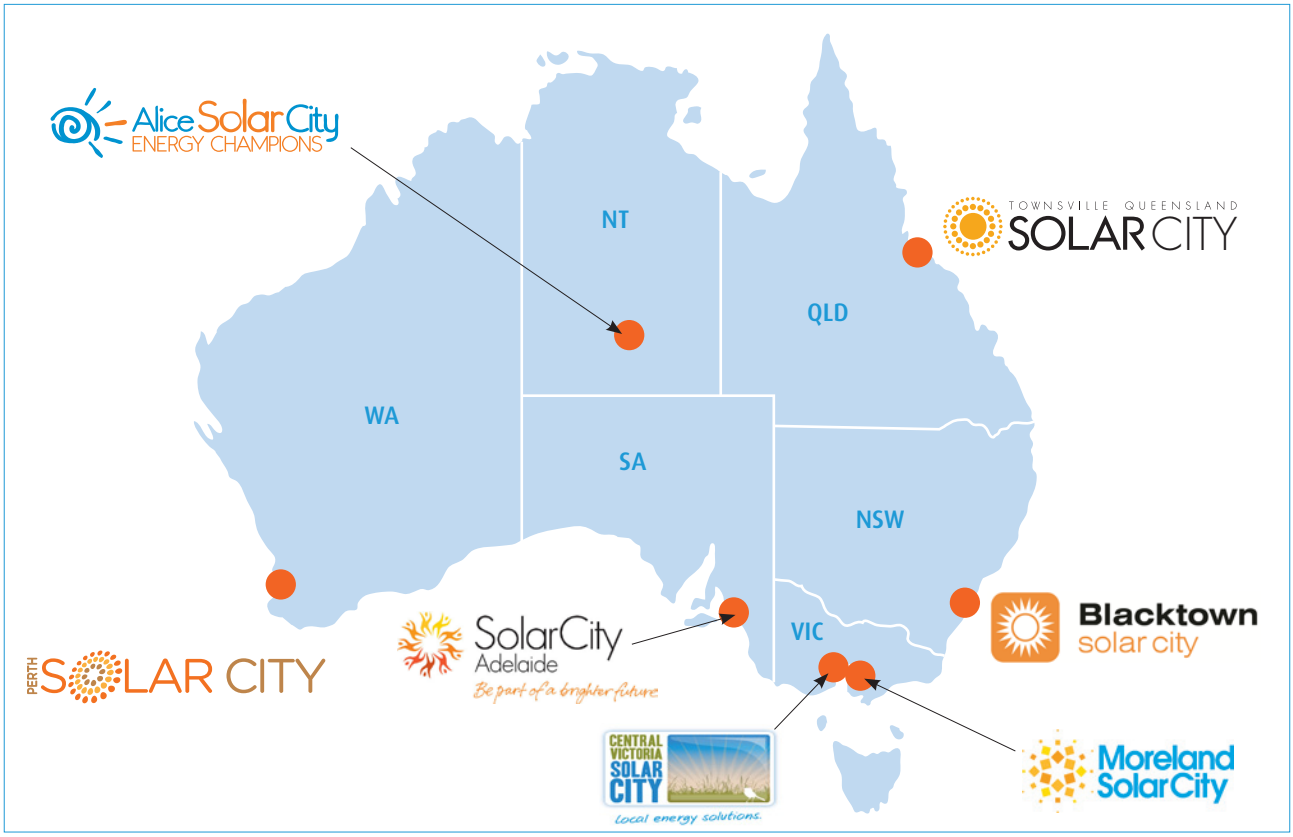
Today, we are poised to reap the benefits of those trials as we move to transform our economy to a Clean Energy Future.

With the Government's recent announcement of its comprehensive long-term plan for tackling climate change, there is an opportunity to use the data and lessons from the trials to design and implement new complementary measures ahead of an emissions trading scheme. The results of the trials have the potential to assist governments, householders, businesses and industries to identify effective action that will minimise both emissions and costs and provide a valuable educational resource for schools, colleges and universities.

The trials will also strengthen the Government's ability to:

- fast track research and Australian innovation
- support low-income households respond to potential energy price rises
- assist householders and businesses to generate additional cost savings through behaviour change
- establish the market conditions that will deliver new and cost-effective sustainable energy options.

Figure 1: The seven Solar Cities



This paper in context

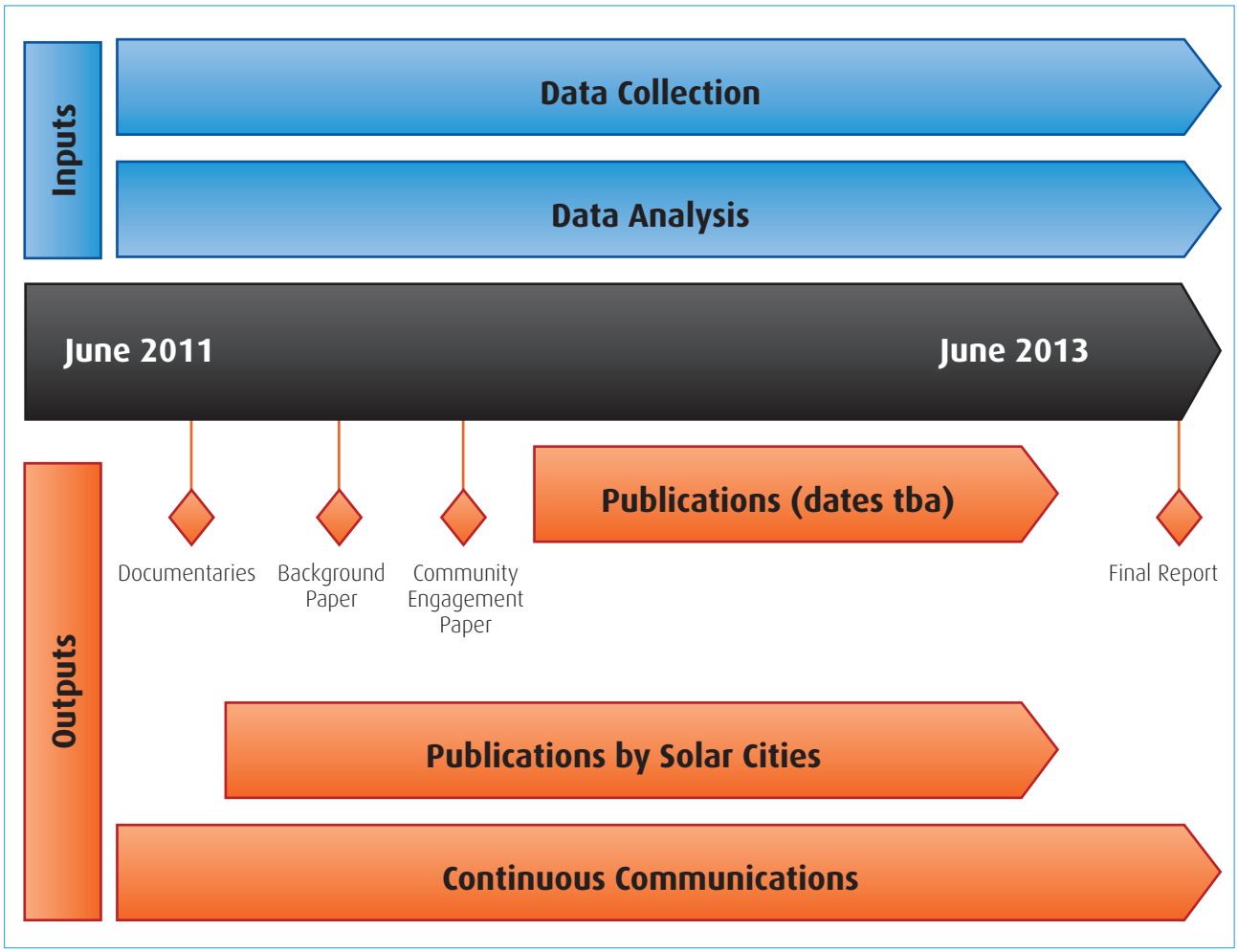
This paper is a background for future publications on results from the Solar Cities program. It sets the context by providing general information on the Solar Cities, the differences between them, the focus of their trials, the data being collected, and current trial results.

Data from the trials are coming online progressively, and the Department of Climate Change and Energy Efficiency (the Department) is keen to provide access to emerging results. Later publications are likely to cover such topics as:

- energy consumption
- demand management
- the takeup of PV technology
- smart metering.

A final report will consolidate data analysis and other findings. The proposed dissemination strategy is shown in Figure 2.

Figure 2: Dissemination strategy



The program

The Solar Cities assist target area households and businesses by:

- conducting home energy assessments
- installing low-emissions technologies, such as solar PV and solar hot water units, smart meters and in-home displays
- offering cost-reflective pricing to establish appropriate price signals and reward energy efficiency
- tailoring financing packages to encourage solar power generation
- providing tips and information on how to reduce energy bills.

Some cities have also commissioned highly visible large-scale 'iconic' PV installations, which not only make public spaces more enjoyable for the community, but also demonstrate the ingenuity of the technologies and their benefits as sustainable alternative energy sources.

Through these practical trials across Australia, governments, industry, businesses and residents are working together to change the way we think about energy and how we use it.

With the information collected from the Solar Cities trials:

- consumers and businesses will understand their energy use better and be rewarded with lower energy bills for managing energy wisely
- electricity companies will be able to gauge cost savings in servicing peak electricity demand periods and investing in infrastructure, and build new client relationships
- industries will be able to test new sustainable energy options in a low-risk environment, strengthen their corporate citizenship and improve their market position
- governments will be able to base future energy and climate change policy on better information about the environmental and economic costs and benefits of the various energy options
- teachers and students will have access to real-world trials, working technologies and hard data to deepen their understanding of the way energy is used and saved
- successful, sustainable long-term strategies can be replicated in other Australian towns and cities, showcasing the nation's ingenuity to the rest of the world.

***SMART METERS** can supply better information about how and when electricity is being used. This is expected to help households better understand their electricity consumption and take energy-efficiency actions.*

The data

A central feature of the Solar Cities program is a database that will hold valuable information collected by the seven Solar Cities during the trials. The data will include household demographics, types of domestic appliances, the characteristics of rooftop PV systems, and household energy consumption (at half-hourly intervals). Analysis of the data will help to identify the types of energy-efficiency measures that reduce energy consumption and increase household savings on energy bills (Figure 3).

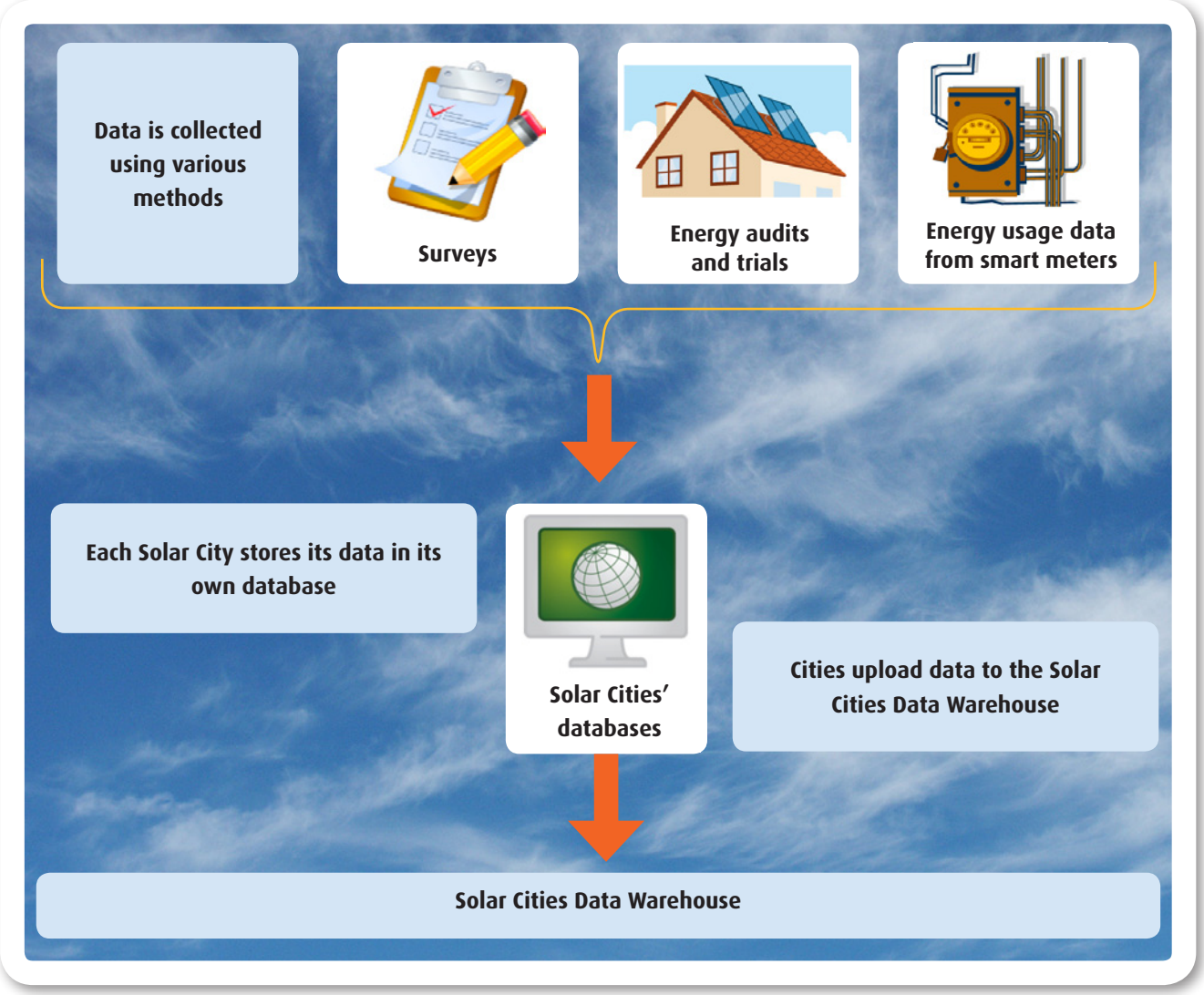
The seven Solar Cities also contribute by monitoring and evaluating other qualitative and quantitative variables.

By the end of the program, data will have been drawn from some:

- 7,700 kilowatts (kW) of PV (specifications, financing, cost, location, output)
- 23,000 smart meters (consumption at 30 minute intervals)
- 16,000 energy assessments (demographics, site details, energy-efficiency measures, tariff information, pre/post-audit energy consumption, temperature readings, water-saving measures).

Once this data has been received, verified and analysed, the Department can deliver evidence-based results to inform future industry energy activities and government policy decisions. The Solar Cities themselves are also monitoring and evaluating key qualitative and quantitative variables that will contribute to the body of information being collected.

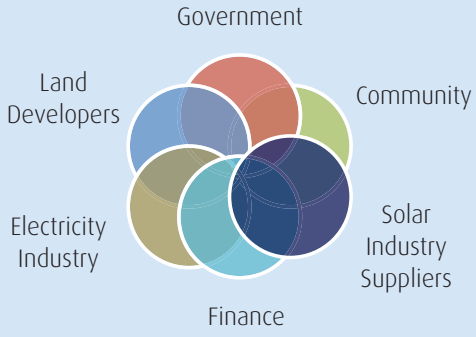
Figure 3: Solar Cities data collection



The delivery

The Solar Cities trials are being delivered under a 'consortium' model involving partnerships between local and state governments, community groups, industries and businesses. This makes Solar Cities distinctive as a government program—it is delivered almost entirely by commercial enterprises that are pursuing a common business outcome. Figure 4 shows the composition of each Solar City consortium. Table 1 lists the consortiums and their members.

Figure 4: The Solar Cities consortium model



The lead consortium member oversees the project and manages its implementation. The lead member is responsible for preparing and submitting progress reports to the Australian Government every three months, contributing to annual reviews and completing annual financial acquittals.

In its mid-term review of the Solar Cities program, the Wyld Group[1] found that several Solar Cities' adoption of 'champions' had been particularly successful in driving community interest in the program and its products. Some consortiums included electricity distributors as consortium members—another key success factor.

The Solar Cities consortiums recognise that each of their members has different business goals and marketing requirements. Each member is free to market and endorse its own products and services and maximise its commercial opportunities under the umbrella of the Solar Cities brand.

In this way, the Solar Cities program promotes a ready market for products and services such as solar hot water heaters, PV equipment, smart meters, in-home displays and pricing and finance products. That market development can be replicated elsewhere.

TABLE 1: CONSORTIUM MEMBER

City	Lead consortium member	Other consortium members
Adelaide	Origin Energy	BP Solar ANZ Bank Delfin Lend Lease Big Switch Projects City of Salisbury
Alice Springs	Alice Springs Town Council	Northern Territory Government Power and Water Corporation Desert Knowledge Cooperative Research Centre Tangentyere Town Council Arid Lands Environment Centre Northern Territory Chamber of Commerce and Industry
Blacktown	BP Solar	Blacktown City Council ANZ Banking Group Endeavour Energy (formerly part of Integral Energy) Big Switch Projects Landcom Development Corporation
Central Victoria	Sustainable Regional Australia (Zero Net Emissions Co.)	Bendigo and Adelaide Bank Central Victorian Greenhouse Alliance Origin Energy Powercor Sustainability Victoria
Moreland	Moreland Energy Foundation	Moreland City Council Brotherhood of St Laurence Sustainability Victoria
Townsville	Ergon Energy	Delfin Lend Lease Honeycomb Investment Group (HIG) Pty Ltd Townsville City Council Cafalo Pty Ltd
Perth	Western Power	Botanic Gardens and Parks Authority Mojarra (formerly EcoSmart) Eastern Metropolitan Regional Council Prospero Productions Solahart SunPower Synergy

1 Wyld Group, *Mid-Term Review of the Solar Cities Program, Final Report*, 2010 (www.climatechange.gov.au/en/government/programs-and-rebates/solar-cities/publications-resources/mid-term-review-solar-cities.aspx).

The progress

Large-scale solar

A wide variety of exciting iconic PV systems have been installed in prominent locations around many of the Solar Cities, demonstrating the possibilities and benefits of solar energy generation to commercial enterprises and the general public. They include:

- the world's first solar electric bus, 'Tindo', which is powered by a 50 kW PV system in Adelaide
- Australia's largest roof-mounted solar system (at the time of installation)—a 305 kW PV system at Crowne Plaza in Alice Springs
- Australia's largest tracking solar power system—a 969 kW PV system at Uterne solar farm in Alice Springs
- two 300 kW PV parks in Bendigo and Ballarat
- Western Australia's largest solar site—eight solar-powered buildings at Perth Zoo, including the elephant and reptile enclosures.

Product rollout

A wide variety of technologies, products and strategies have been rolled out in different marketing, community and educational contexts that test long-term behavioural change.

The product rollout, which was the first stage of the Solar Cities trials, is coming to a close. The Solar Cities are now sharpening their focus on ongoing monitoring and data collection.

The cities and their trials

The main aim of the Solar Cities program is to trial different strategies to increase the takeup of solar and energy-efficiency measures and technologies. The best strategies can be replicated around Australia and will be self sustaining.

By providing easier access to information and technologies, Solar Cities helps the community and businesses focus on making better choices that will reduce energy consumption, save costs and reduce greenhouse gas emissions.

Different cities face different challenges, so each project or activity mix reflects the characteristics and priorities of the host city, such as its location, demographics, economic influences and infrastructure needs. For example, the cities use different feed-in tariffs, which create different incentives and market conditions for PV installations.

Consequently, the projects are subtly different in the activities and products they roll out (see Table 2).

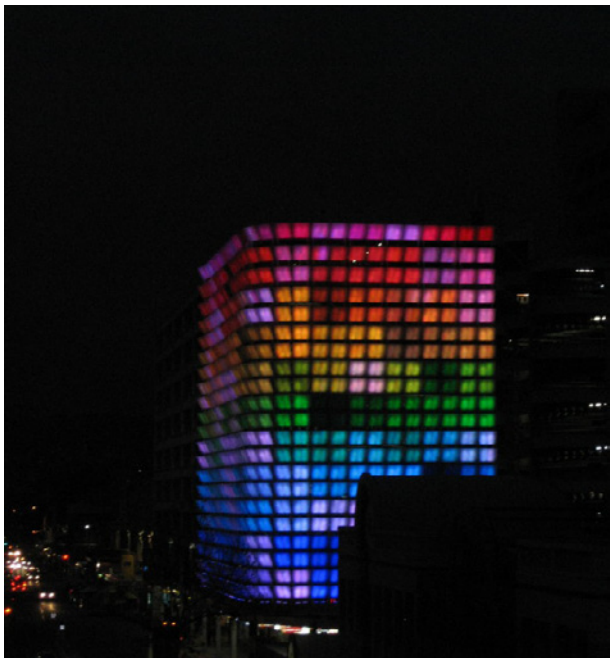
However, all seven Solar Cities are delivering consistent, comparable data to meet the program's objectives. They will continue to collect data and qualitative findings until June 2013.

***EACH SOLAR CITY** is trialling a unique combination of energy options, such as energy-efficiency measures for homes and businesses, the use of solar technologies, cost-reflective pricing trials to reward people who use energy wisely, and community education about better energy use.*

TABLE 2: SOLAR CITY ACTIVITIES

Activity	Adelaide	Alice Springs	Blacktown	Central Victoria	Moreland	Perth	Townsville
Smart meters	✓	✓	✓	✓		✓	✓
Residential PV	✓	✓	✓	✓		✓	✓
Business PV	✓	✓	✓				✓
Iconic PV	✓	✓	✓	✓		✓	✓
Residential energy efficiency	✓	✓	✓	✓	✓	✓	✓
Business energy efficiency	✓	✓	✓	✓	✓		✓
Cost-reflective pricing	✓	✓	✓	✓		✓	✓
Urban development	✓				✓		✓
Community engagement	✓	✓	✓	✓	✓	✓	✓
Finance packages	✓		✓	✓			
Smart grid						✓	
Monitoring and reporting	✓	✓	✓	✓	✓	✓	✓
Co-generation					✓		
Solar hot water	✓	✓	✓	✓		✓	✓
Energy display shopfront		✓			✓		✓

ADELAIDE temperate climate—peak electricity supply challenges—high electricity cost



Adelaide, Australia's first Solar City, has a high proportion of sunny days throughout the year, peak electricity supply challenges, and relatively high electricity costs. Those factors made Adelaide an ideal location for testing a wide range of ways to reduce energy use.

A key feature of Adelaide Solar City is its highly visible and innovative iconic buildings, which enhance public enjoyment of the city while showcasing the commercial benefits of sustainable distributed energy generation. The buildings also use signage and interactive electronic public displays to demonstrate the energy and cost savings potential of solar technologies.

For example, the Rundle Street Lantern wraps around a multistorey car park in the central restaurant and shopping district of the city, providing a unique landmark during the day and a spectacular and sustainable light display after sunset. 'Tindo', the world's first solar-powered electric bus, ferries passengers around the city each day, and advertises its energy, cost and greenhouse gas savings on a real-time display erected in a prominent position at the central ticket office. A 50 kW PV system has been installed on the Detroit Diesel building as part of a wider commercial sustainability showcase site in Adelaide's newest industrial estate.

SolarCity Adelaide

Be part of a brighter future

Another important feature of Adelaide Solar City is a smart metering and communication platform that was developed as part of the program. The program gives participating customers online access to data on their energy consumption and carbon emissions. An in-home display of energy-related content (including weather reports) has also been developed to help customers manage their electricity use better.

In late 2011, Adelaide Solar City will launch its *Home Assist Program*. The program provides home energy assessments and financial counselling to new arrivals and others living in some of the more socioeconomically disadvantaged areas of Adelaide.

TABLE 3: SA SOLAR FEED-IN SCHEME

Commenced	**1 July 2008**
Status	In operation
Tariff model	Net
Rate July 2008 – October 2011 October 2011 – present	 44c/kWh 22c/kWh
Cap	100 MW

ALICE SPRINGS arid climate—highest concentration of solar—international tourist destination

Alice Springs is ideally placed to host a Solar Cities trial. It is in an arid environment, has some of the highest solar radiation rates in Australia, and is a key international tourist destination with a rich natural and cultural heritage. It has a developing solar industry and shows strong community support for the project and other sustainability initiatives. Alice Solar City's four large-scale iconic projects, which maximise the potential of these natural and economic benefits, are centrepieces of the trial.

Around half of Alice Springs households already use solar hot water systems, which demonstrates a strong interest in energy-efficiency products and technological solutions.

Alice Solar City is a highly visible project that promotes large PV systems. With around 1.5 megawatts (MW) of generation capacity from its iconic solar systems and more than 300 homes and businesses with rooftop PV, it has the largest concentration of solar energy of all the Solar Cities.

The integration of the systems into major community structures in the town demonstrates the viability of large-scale renewable technology and its role in reducing our reliance on fossil fuels.

Alice Solar City also provides a comprehensive range of energy-efficiency incentives to residential customers via a voucher system. It is the only Solar City consortium led by a local government body, making it a truly grassroots community project.

Alice Solar City
ENERGY CHAMPIONS

***ALICE SOLAR CITY** has supported and encouraged the development of major projects in and around Alice Springs. It hopes that these iconic PV installations will play a critical role in its strategy to become a leader in solar technology.*

TABLE 4: NT SOLAR BUYBACK PROGRAM

Status	In operation
Tariff model	Gross
Rate	from 1 July 2011
Residential	19.77c/kWh
Residential elevated buyback trial	52.08c/kWh
Commercial	23.00c/kWh
Commercial time-of-use	
Peak	29.43c/kWh
Off-peak	16.57c/kWh
Cap	$5 per day

BLACKTOWN young, diverse demographic—high growth—peak electricity supply challenges

Blacktown has a young, diverse and growing population and has experienced high growth in energy demand. Its vibrant and expanding population is actively engaged with and committed to energy-efficiency and solar projects. Growing energy requirements and peak electricity supply concerns, driven by high penetration of air conditioners, made it an obvious choice to host a Solar City trial.

By employing solar power, smart meters, energy efficiency and new approaches to electricity pricing and financing, the project provides cost-effective energy solutions and encourages Blacktown residents and businesses to reduce energy use and household costs. The project is trialling a variety of packages, using measures and offers that are accessible to all segments of the community.

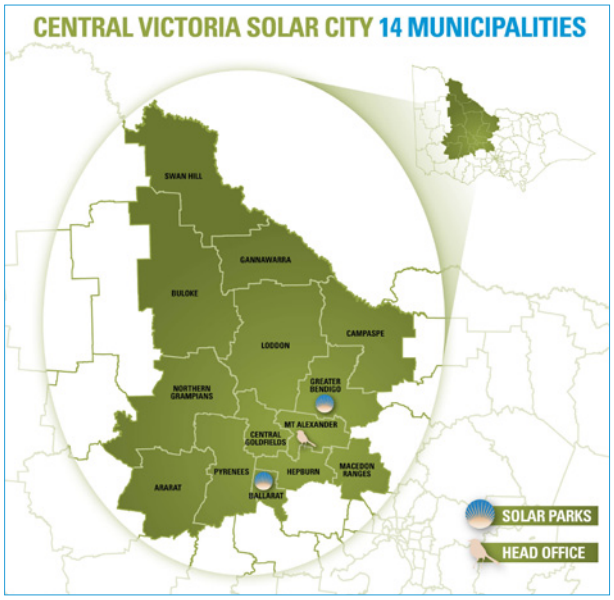
Endeavour Energy (formerly Integral Energy) commercialised its Thermoswitch pool timer as part of the Blacktown Solar City project. The pool pump operations trial reduced peak demand by over 20% by using a pool timer that switches off pool pumps early in the morning and/or at night.

Blacktown solar city

TABLE 9: NSW SOLAR BONUS SCHEME

Commenced	**1 January 2010**
Status	Discontinued 28 April 2011
Tariff model	Gross
Rate November 2008 – October 2011	60c/kWh
October 2011 – present	20c/kWh

CENTRAL VICTORIA regional—large climatic variation—distinct electricity demand patterns



The Central Victorian region covers 14 municipalities and has a diverse population of around 350,000. The Solar City area has 14 zonal substations, some of which peak in summer and some in winter.

Both Ballarat and Bendigo have distinct peak demand periods that would benefit from different demand deferral measures. Bendigo has a summer peak between noon and 6 pm. On a hot summer day, demand can increase by up to 70% more than on a mild summer day. This pattern lends itself to energy-efficiency measures that encourage behavioural change, such as time-of-use and critical peak pricing. In contrast, Ballarat's summer load is spread more evenly throughout the day, increasing gradually from 8 am to peak between 2 pm and 4 pm. This makes Ballarat more suited to a rollout of PV technology.

Two 300 kW solar parks in Ballarat and Bendigo are key components of the Central Victorian trials. The aim is to test new approaches in local medium-scale solar electricity generation. The parks differ in their design, construction methods, technologies and effectiveness.

Central Victoria Solar City is also trialling energy-efficiency measures and local energy generation in schools, hospitals and community centres. Two cost-reflective pricing tariffs, designed as part of its demand management trial, were identified as a moderate risk to consumer health. As a result, while guidelines for tariff providers were developed, the trial did not go ahead. Instead, the consortium recommended that national guidelines be adopted to monitor consumer protection.

Central Victoria Solar City's trials are being independently monitored and evaluated by the University of Ballarat. Early indications are that some level of feed-in tariff will be required to make medium-scale solar parks feasible.

TABLE 5: VICTORIA FEED-IN TARIFFS

Premium feed-in tariff*	
Commenced	1 November 2009
Status	In operation
Tariff model	Net
Rate	60c/kWh
Cap	100 MW
Eligibility	5 kW systems
Standard feed-in tariff	
Commenced	1 November 2009
Status	In operation
Tariff model	Net
Rate	1:1 current tariff rate
Eligibility	5–100 kW systems

* To be phased out on 30 September 2011 (no new applications after that date) and replaced with a new transitional tariff on 30 September 2011.

MORELAND inner city—culturally diverse—low income focus

Moreland is a culturally diverse inner city council area in Melbourne that is committed to achieving a carbon-neutral target by 2020. At the heart of the city is the suburb of Coburg, which has a civic centre and significant retail, transport and residential zones. Coburg is one of the principal activity centres identified in Melbourne's 2030 Vision, making it the focus of a major redevelopment and urban renewal initiative.

The project focuses on building an environmentally sustainable living city through the *Central Coburg 2020 Structure Plan*[1]. The plan promotes high-quality local lifestyles and facilities, including a sustainable transport hub, networks of public green spaces and sustainable buildings.

Moreland City Council, in conjunction with the Moreland Energy Foundation, is also developing a blueprint for a pilot carbon-neutral project that would see a cogeneration plant installed for the Fawkner Leisure Centre. If viable, the plant would reduce the council's dependency on coal-fired electricity generation and create a low-carbon energy supply to the precinct.

These infrastructure projects are supported by two key community engagement and behaviour change programs: *Warm Home Cool Home* and *Zero Carbon Moreland.*

Under the *Warm Home Cool Home Program,* the Moreland Energy Foundation is working with the Brotherhood of St Laurence to deliver education, training and free energy-efficiency retrofit services to low-income households. Early findings are that comfort levels can be significantly improved by providing simple energy-efficiency solutions, such as draught proofing, energy-efficient light bulbs, fans and clothes horses.

Moreland SolarCity

CO-GENERATION *uses decentralised power sources, which means it produces electricity near the point of use. Waste heat from the electricity generation process is captured and used on site, exported to neighbouring sites (as in district heating), or both.*

Zero Carbon Moreland is a public education and action campaign that supports residents, businesses and community groups to lower their emissions and insulate against rising electricity prices.

TABLE 6: VICTORIA FEED-IN TARIFFS

Premium feed-in tariff	
Commenced	1 November 2009
Status	In operation
Model	Net
Rate	60c/kWh
Cap	100 MW
Eligibility	5 kW systems
Standard feed-in tariff	
Commenced	1 November 2009
Status	In operation
Model	Net
Rate	1:1 current tariff rate
Eligibility	5–100 kW systems

1 Moreland City Council www.moreland.vic.gov.au/building-and-planning/structure-planning/central-coburg-2020-structure-plan.html

PERTH temperate climate—rapid growth—sustainable community focus

As the business and administrative centre of a resource-rich state, Perth has grown consistently faster than the national average. It experiences hot, dry summers and relatively cool and wet winters with long periods of sunshine. South-west Western Australia will be one of the Australian regions most affected by climate change: hotter and drier conditions are predicted.

Perth's economic growth has contributed to major growth in peak energy demand. Up to $60 million is spent annually on parts of Western Australia's energy infrastructure that service less than 60 hours of peak demand. The rate of solar PV installations in Perth has also grown exponentially: until recently, feed-in tariffs contributed to an average of more than 500 connection applications per month.

Perth Solar City engages all levels of government, businesses, not-for-profit organisations and community groups to address demand peaks and bring sustainable energy solutions to the Perth area. Large-scale iconic PV systems installed at Perth Zoo, the Central Institute of Technology and Midland Foundry have overcome many barriers to grid connection, which will benefit future projects in Western Australia and elsewhere.

PERTH SOLAR CITY

SMART GRIDS *use electronic sensors to monitor building performance and feed information back to consumers and network operators. They can also identify and resolve faults in the electricity grid, manage voltage and identify infrastructure requiring maintenance.*

The broad-reach *Collective Impact* and targeted *Living Smart* education campaigns have produced high referral rates for Perth Solar City products and changed the energy use of thousands of participants. Smart grid communication, control and data-handling infrastructure has been established and proven—99.8% of installed smart meters now report successfully.

Preliminary results from the trials are just beginning to emerge. Early participants in the *Living Smart* and home energy assessment trials are demonstrating an average energy consumption reduction of around 10%. Average reductions in peak demand of 20% were achieved in an air conditioner cycling trial, without any change in participants' reported comfort in the home.

TABLE 7: WA RESIDENTIAL NET FEED-IN TARIFF

Commenced	**1 August 2010**
Status	Discontinued 1 August 2011
Tariff model	Net
Rate August 2010 – May 2011	 40c/kWh
May 2011 – August 2011	20c/kWh
Cap	150 MW

TOWNSVILLE subtropical climate—electricity network expansion deferral project

As Queensland's largest regional city, and with a well-established council, business and community sustainability network, Townsville was considered to be well placed to become Australia's only 'tropical' Solar City.

Townsville Solar City is primarily an electricity network expansion deferral project for Magnetic Island, complemented by energy behaviour change campaigns, residential trials and commercial building refits in the Townsville central business district and surrounding area.

Two energy-efficient apartment complexes have been constructed on the mainland according to sustainable tropical design principles, and are being monitored to determine changes in residents' energy use. Townsville City Council has also established a comprehensive behavioural change campaign. Details of the campaign are now publicly available on the council's website.

Townsville Solar City is producing clear results. Peak demand on Magnetic Island has been reduced by 33% from business-as-usual levels in December, the island's busiest time of year. This means that $17 million of investment in an additional power transmission cable can be put off for at least eight years. Overall energy consumption during the financial year 2009–10 was 3% less than in the previous year. There has been a 27% reduction since the start of the project compared to business as usual projections.

Townsville Solar City has begun a peak demand reduction trial using time-of-use pricing. The trial tests whether rebates are effective in shifting customers' daily consumption outside the peak hours of 6–9 pm. Preliminary results are promising: 87% of participants have reduced their peak demand and there has been a 28% reduction in average peak time consumption.

TABLE 8: QUEENSLAND SOLAR BONUS SCHEME

Commenced	**1 July 2008**
Status	In operation
Tariff model	Net
Rate	44c/kWh
Cap	100 MW/year

Conclusion

The innovative Solar Cities Program aims to deliver data from a range of trials to inform future programs and policies. Analysis of the data will test the viability and effectiveness of future options for achieving long-term behaviour change and sustained reductions in energy consumption.

Because each of the seven Solar Cities faces different cultural, climatic and lifestyle conditions and energy supply challenges, the trials have the potential to deliver sustainable energy solutions for custom fitting to other cities and towns around Australia.

While quantitative results are 18 months away, early findings point to some useful lessons that will benefit the design of programs and policies aimed at delivering large-scale behavioural change.

This background paper paves the way for future reports on the findings of the program.

Want to know more about the Solar Cities?

To find out more about the Solar Cities program, visit www.climatechange.gov.au

For further information on your closest Solar City, visit the seven cities' websites:

ADELAIDE	www.adelaidesolarcity.com.au
ALICE SPRINGS	www.alicesolarcity.com.au
BLACKTOWN	www.blacktownsolarcity.com.au
CENTRAL VICTORIA	www.centralvictoriasolarcity.com.au
MORELAND	www.morelandsolarcity.org.au
PERTH	www.perthsolarcity.com.au
TOWNSVILLE	www.townsvillesolarcity.com.au

Glossary

Cogeneration: a high-efficiency energy system that produces electricity and heat from a single fuel source.

Community engagement: the process by which organisations build ongoing, permanent relationships with the public to achieve benefits for the community as a whole.

Consortium: an association or combination of businesses, financial institutions or investors that have joined forces to engage in a joint venture.

Cost-reflective pricing: a method of setting prices that reflects the full capital and operating costs of providing energy and ensures an adequate rate of return on investment.

Feed-in tariff models: gross feed-in tariffs pay for the total amount of electricity produced, regardless of consumption; net feed-in tariffs apply to the amount produced, less consumption.

Iconic PV: PV technology installed on well-known and highly visible public infrastructure to showcase renewable energy and sustainable living locally, nationally and internationally.

In-home display: a benchtop device that provides feedback on electrical or other energy use to encourage lower energy use; may also display the cost of energy used and estimates of greenhouse gas emissions.

Kilowatt (kW): 1,000 watts of electrical power.

Kilowatt hour (kWh): electrical power output of 1,000 watts for 1 hour.

Megawatt (MW): 1,000,000 watts of electrical power.

Photovoltaic (PV): technology that uses a device (usually a solar panel) to produce electric current when exposed to sunlight.

Smart grid: a technology that delivers electricity using digital technology that tracks power consumption with smart meters, allowing customers to monitor their energy consumption and make more informed choices.

Smart meter: a device that records electricity use and sends energy consumption information back to the electricity distributor via a telecommunications network; can record consumption information each half hour, enabling customers to see how their usage varies throughout the day.