

National Solar Heating and Cooling Program Australia

1. PROGRAM STRUCTURE

The Australian Government's policy relating to renewable energy is outlined in the white paper 'Securing Australia's Energy Future'¹

The White paper states

'Renewable energy will play an important part in Australia's long-term greenhouse response, and the Australian Government will continue its extensive and effective support for these technologies. The Mandatory Renewable Energy Target will continue to 2020, providing incentives for over \$2 billion in renewable energy investment. Renewable energy will also continue to be an important focus of Australia's innovation effort, including through national research priorities and CSIRO's Energy Transformed flagship.

In addition, the Australian Government will provide \$134 million to address specific barriers impeding the uptake of renewable energy:

- \$100 million over seven years, comprising \$50 million new funding and \$50 million from the Commercial Ready Programme, will be allocated to promote strategic development of renewable energy technologies, systems and processes that have commercial potential.
- \$20 million will be provided to support development of advanced electricity storage technologies, including batteries, electro-mechanical and chemical storage. Important renewable energy technologies, including wind and solar, produce electricity intermittently, which can reduce their attractiveness and ability to contribute to the electricity system. Breakthroughs in storage could rapidly accelerate renewable energy use, and Australia has technological leadership in some storage technologies.
- \$14 million will be used to develop and install systems to provide accurate long-range forecasts for wind output. This will facilitate greater penetration of wind in energy markets and allow for more strategic planning of new wind farms.

In addition to this funding dedicated specifically to renewable energy, the Australian Government is introducing significant new measures to promote low-emissions technology more generally.

- The new \$500 million Low Emissions Technology Development Fund will provide support for demonstrating new low-emissions technologies with significant long-term abatement potential. This will include those renewable technologies that can demonstrate the potential for wide uptake.
- \$75 million allocated to Solar Cities trials will directly support focused uptake of solar electricity and hot water as well as energy efficiency and efficient

¹ http://www.dpmc.gov.au/publications/energy_future/overview/19_renewable.htm

pricing signals. This will include trialing of more effective energy market signals.

- The Australian Government will also work with states and territories to identify and overcome energy market rules that provide impediments to the uptake of smaller-scale local generation (distributed generation), including renewable energy sources.
- \$230 million was also included for the Australian Greenhouse Office to continue support for greenhouse technology projects under programmes such as the Remote Renewable Power Generation and Greenhouse Gas Abatement programmes.’

The Department of Environment and Heritage is responsible for the national program which is administered through their Agency the Australian Greenhouse Office which is responsible for solar energy technologies - both research & development and market activities.

As well as the Federal Department of Environment and Heritage most States have a support program for renewable energy technologies and markets. These state programs are managed by state based agencies or departments. These include :

- The New South Wales Department of Energy Utilities and Sustainability,²
- Sustainability Victoria³
- Sustainable Energy Development Office of West Australia⁴
- Energy Division of the Department for Transport, Energy and Infrastructure South Australia⁵ ; and
- The Queensland Environment Protection Agency⁶

² www.deus.nsw.gov.au

³ www.sustainability.vic.gov.au

⁴ www.sedo.wa.gov.au

⁵ <http://www.sustainable.energy.sa.gov.au>

⁶ <http://www.epa.qld.gov.au>

2. FUNDING

The funding provided directly to renewable energy developments by the Department of Environment and Heritage is set out in Table 1 below

	YEAR 2003		YEAR 2004	
	AU\$ (thousands)	US\$ (thousands)	AU\$ (thousands)	US\$ (thousands)
ACTIVE SOLAR	800	520	670	436
PASSIVE SOLAR	24	15.6	0	0
PHOTOVOLTAICS	22,547	14,656	18,431	11,980
HIGH TEMPERATURE SOLAR THERMAL	0	0	0	0
WIND ENERGY	7,260	4,719	2256	1,466
BIOENERGY	1,359	883	2708	1,760
GEO THERMAL	275	178		0
OTHER (Hydro, Wave, Storage and unspecified)	4,507	2930	4736	3,078
TOTAL (ALL RENEWABLE ENERGY)	36,772	23,902	28,801	18,720

Department of Environment and Heritage figures only

In addition to funding provided directly to renewable energy developments by the Department of Environment and Heritage the Mandatory Renewable Energy Target (MRET) provides additional market support to renewable technologies that generates, or in the case of solar water heaters, displaces electricity. This support is provided through tradeable Renewable Energy Certificates (RECs). Each REC represents the generation of 1MWh of renewable electricity. For solar water heaters the RECs are allocated on a deeming basis that represents the electricity saved by installing a solar water heater.

Figure 1 illustrates that deemed RECs from the installation of solar water heaters contribute 21% of the certificates created from April 2001 until the end of 2004. The only technology that provided more certificates was hydro-electricity.

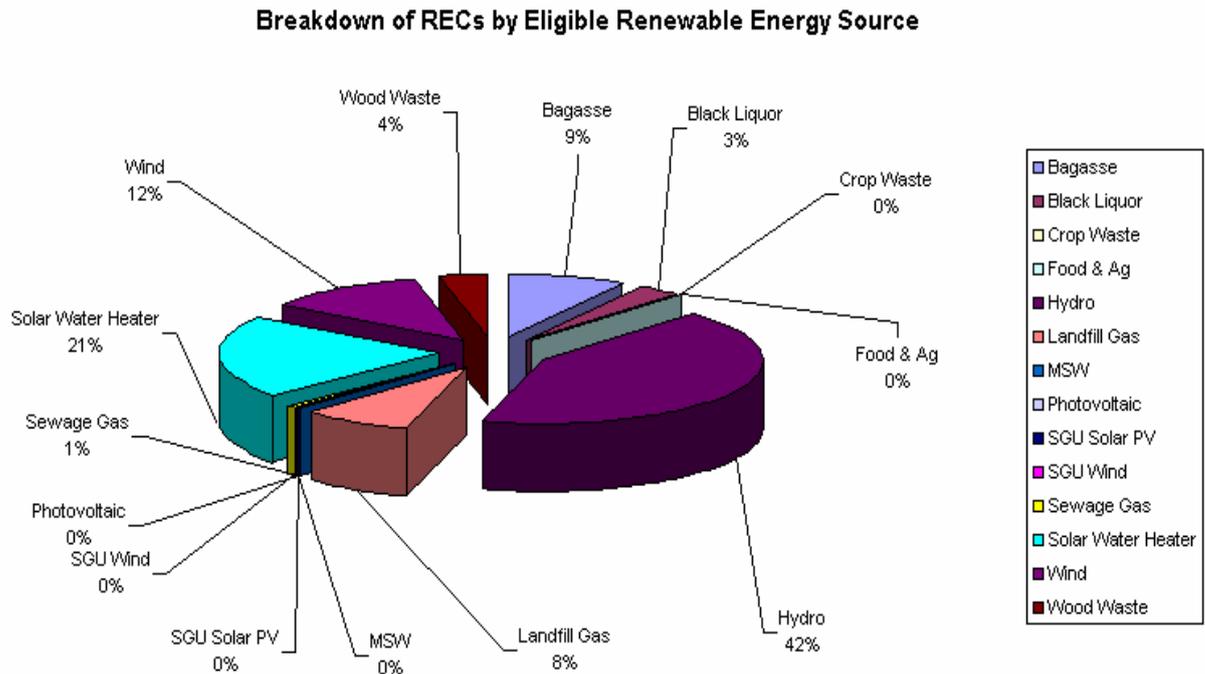


Figure 1 Breakdown of RECs from eligible sources to 31 December 2004 ⁷

Some States provide support for solar water heaters by offering a subsidy for their installation. It is estimated that the MRET and the state subsidies provide an additional approximately AU\$30 million per annum.

The trend for direct support in recent years is declining although the additional indirect market support from MRET has increased since it was instituted in 2001. The reduction in support during 2005 was due to substantial drop in price of RECs and the reduction or cessation of some state subsidy schemes.

3. RD&D PROGRAM

‘Australia's relatively small size in the global economy means it cannot be a leader in all technologies. An assessment of strategic interests identified the following broad categories of energy technologies:

- market leaders- technologies with strategic importance for Australia that international efforts will not adequately address, or in which Australia has a clear technology advantage
- fast followers- technologies where Australia has a strategic interest but where domestic efforts should focus on supplementing international developments, adapting technologies to suit Australian needs and, adopting these technologies quickly when available
- reserve- technologies in which Australia has a lesser strategic interest at this stage, but which may become more important in the future

Table 2: Technology assessments

⁷ Office of Renewable Energy Regulator

Market leader	Fast follower	Reserve
Play a leading role in international R&D efforts.	Strongly position Australia to follow international developments quickly.	Position Australia to monitor international developments and follow as needed.
Energy supply technologies		
Advanced brown coal	Advanced black coal	Hydrogen
Geosequestration	Natural gas	Tidal
Hot dry rocks	Wind	Large-scale hydro
Photovoltaics	Biomass	Nuclear
Remote area power systems	Wave	
Coal mining and extraction		
Energy demand technologies		
Solid Oxide Fuel Cells	Intelligent transport systems	Other fuel cells
	Energy efficiency	
	Advanced conventional vehicles	
	Hybrid electric vehicles	

These assessments provide a strategic backdrop when assessing innovation priorities for energy. They do not override the need for research excellence. As there are many individual components within technologies, niche opportunities in all areas of energy-related innovation will continue to be pursued.

The Australian Government will also continue to engage actively with the rest of the world, and the government will undertake a major review of these agreements with a view to identifying opportunities to better coordinate and strengthen our engagement with the international community.’⁸

The Solar Cities program⁹ is a major Federal Government initiative that is to be undertaken by consortia across Australia. Consortia have been shortlisted and final selection will be in 2006. The program is designed to evaluate the demand management benefits of renewable electricity and it will also support other renewable and energy efficiency technologies that can impact on electricity demand.

The Australian Government will provide \$75 million to fund major trials of a sustainable energy future for urban Australia. These Solar Cities trials will provide a living model of how solar energy, energy efficiency and responsive market signals can deliver economic and environmental benefits in an integrated package. The program will provide funding to support significant penetration of solar technologies and energy efficiency in urban areas. The Federal Government plans to subsidise specific technologies and facilitate their incorporation into existing and new residential and commercial buildings. The Federal Government will also engage with

⁸ http://www.dpmc.gov.au/publications/energy_future/overview/19_renewable.htm

⁹ http://www.dpmc.gov.au/publications/energy_future/factsheets/factsheet_4.htm

state and local governments to introduce improved market signals that appropriately reward technologies and behaviours aimed to reduce system-wide energy costs.

As a form of distributed generation, solar energy can reduce the need for transmission and distribution. Peak output from solar energy often coincides with peaks in demand for electricity - generally hot days with high air conditioner usage. Wholesale prices for electricity in these periods can be 100 times the average.

Asia-Pacific Partnership on Clean Development and Climate

On 12 January 2006 Ministers from Australia, China, India, Japan, Republic of Korea and the United States launched the Asia-Pacific Partnership on Clean Development and Climate. The partnership Work Plan that outlines a model of private-public taskforces to address climate change, energy security and air pollution. The partnership aims to promote the deployment of clean technologies by technological development.

The two taskforces that are relevant to the renewables program are the Renewable Energy and Distributed Generation Task Force and the Buildings and Appliances Task Force

Renewable Energy and Distributed Generation Task Force

Chair: Republic of Korea

Co-chair: Australia

Renewable energy technologies, such as hydro (large and mini), solar, geothermal, wind and tidal can deliver power with virtually zero emissions. Distributed generation (including landfill waste methane-based generation) also has the potential to significantly reduce emissions and promote greater cost and network efficiencies. The wide scale deployment of renewable energy and distributed generation technologies increases the diversity of energy supply, and can contribute to improving energy security and reducing fuel risks, particularly in remote and fringe-of-grid areas. These energy sources and distributed generation technologies, which are ideally suited to mid-sized and smaller scale applications can also assist in alleviating poverty by improving access to energy services, as well as increasing job opportunities and improving air quality and public health.

The emerging nature of many renewable energy technologies means that there can be market and technical impediments to their uptake, such as cost-competitiveness, awareness of technology options, intermittency and the need for electricity storage.

Work is currently being undertaken by many members of the Partnership to address these barriers to increase the wide-scale uptake of renewable energy. However, advances in technology design, system planning and grid operations are demonstrating the financial viability of distributed utility applications. In addition, alternative fuels, such as biodiesel and ethanol, also can potentially offer significant environmental benefits in the future. Similarly these alternatives are also on the pathway to becoming cost competitive and for deployment on a large-scale. The Task Force will focus on the most promising technologies and applications, particularly

rural, remote and peri-urban applications, where renewable energy and distributed generation applications can be cost competitive.

Objectives

- Facilitate the demonstration and deployment of renewable energy and distributed generation technologies in Partnership countries.
- Identify country development needs and the opportunities to deploy renewable energy and distributed generation technologies, systems and practices, and the enabling environments needed to support wide-spread deployment, including in rural, remote and peri-urban applications.
- Enumerate financial and engineering benefits of distributed energy systems that contribute to the economic development and climate goals of the Partnership.
- Promote further collaboration between Partnership members on research, development and implementation of renewable energy technologies including supporting measures such as renewable resource identification, wind forecasting and energy storage technologies.
- Support cooperative projects to deploy renewable and distributed generation technologies to support rural and peri-urban economic development and poverty alleviation.
- Identify potential projects that would enable Partners to assess the applicability of renewable energy and distributed generation to their specific requirements.

Buildings and Appliances Task Force

Chair: Republic of Korea

Co-chair: United States of America

Reducing our use of energy for buildings and appliances decreases the demand for primary energy and is a key means to deliver better economic performance, increase energy security and reduce greenhouse gas and air pollutant emissions. Partner countries have recognised for some time the importance of cooperating on energy efficiency for buildings and appliances, and have already taken a range of bilateral and other collaborative actions in this area. As the Partners represent a majority of the world's manufacturing capacity for a diverse range of appliances, we have the potential to drive significant regional and global improvements in energy efficiency in this sector.

The Partners will demonstrate technologies, enhance and exchange skills relating to energy efficiency auditing, share experiences and policies on best practices with regard to standards and codes, as well as labelling schemes for buildings, building materials and appliances

Objectives

- Use cooperative mechanisms to support the further uptake of increasingly more energy efficient appliances, recognizing that extensive cooperative action is already occurring between Partner countries.
- Promote best practice and demonstrate technologies and building design principles to increase energy efficiency in building materials and in new and existing buildings.

- Support the integration of appropriate mechanisms to increase the uptake of energy efficient buildings and appliances into broader national efforts that support sustainable development, increase energy security and reduce environmental impacts.
- Systematically identify and respond to the range of barriers that limit the implementation of end-use energy efficiency practices and technologies.

Industry involvement

Industry involvement is encouraged widely and in many cases research and market programs are carried out by industry and government partnerships.

One such example of industry involvement in market development mechanisms is the building energy and sustainability label developed by the Green Building Council of Australia

The Green Building Council of Australia¹⁰ is a government - industry partnership. Launched in October 2002, its establishment was another major step forward to sustainability in Australia's built environment.

The Green Building Council of Australia's mission is to define and develop a sustainable property industry in Australia and to drive the adoption of green building practices through market-based solutions.

The Council's objective is to promote sustainable development and the transition of the property industry to implementing green building programs, technologies, design practice and operations.

A key achievement of the Green Building Council is the development of green star - a national, voluntary rating system that evaluates the environmental performance of buildings, by measuring various environmental factors including energy and water efficiency, occupant health and well-being, and resource conservation.

State activities

There are a number of activities undertaken at the state level to support renewable energy markets. For example both New South Wales (NSW) and Victoria have instigated regulations that require more sustainable building fabric and promote the use of solar water heating in the new housing market.

BASIX¹¹ is a NSW Government initiative that ensures new homes are designed and built to use less potable water and produce fewer greenhouse gas emissions. The BASIX online tool allows the user to select from a range of options in order to meet specified energy and water reduction targets.

Each development application for a residential dwelling in New South Wales must be submitted with a BASIX Certificate.

The 5 Star standard¹² for all new homes in Victoria came into full effect from 1 July 2005, after a 12 month transition period. The 5 star standard makes it compulsory for new houses to have:

¹⁰ www.gbcaus.org

¹¹ www.basix.nsw.gov.au/information/about.jsp

¹² <http://www.5starhouse.vic.gov.au/>

- 5 Star energy rating for the building fabric, plus
- A rainwater tank for toilet flushing or a solar hot water system-

Additionally Queensland has a similar sustainable housing program, while South Australia has sustainable water heating requirement and West Australia is planning to use the NSW BASIX programme.

4. OTHER GOVERNMENT SUPPORT ACTIVITIES

Information and Capacity Building

Solar House Day¹³ is a program that is undertaken by the Australian and New Zealand Solar Energy Society, the local affiliate of ISES, with the support of the Department of Environment and Heritage. It provides the opportunity for interested persons to visit a range of solar houses in their local area and to discuss solar housing features with the occupants and designers.

There are also opportunities for the building and consulting industry to investigate solar opportunities in new and refurbished commercial and community buildings through programs such as the Victorian Solar Innovation Initiative and the Commercial building Energy Innovation Initiative that operate in the state of Victoria.

Standards and certification.

Solar water heating standards support the inclusion of solar water heaters in the Mandatory renewable energy target certificate-trading scheme. Solar water heaters are 'deemed' to provide ongoing electricity savings over a 10 year period after they are installed. Consequently, the calculation of average savings for each model of solar water heater and the suitability of design and construction methods must be evaluated and accredited using Australian standards.

For residential construction there are a range of computer based tools that estimate the energy use impacts of the fabric to provide a means of calculating the acceptability of particular house designs against a regulated minimum performance level. The standard for consistency of computer modelling has been developed by the Australian Buildings Code Board as a precursor to a nation minimum requirement for domestic construction to become mandatory in May 2006.

Commercial building minimum energy performance standards will also be required as part of the Building Code of Australia from May 2006.

5. COMMERCIAL ACTIVITY

There are five manufacturers of solar water heaters that produce over 90% of the products sold in Australia. In addition, there are a number of smaller suppliers some of whom manufacture locally or import collectors.

¹³ www.solarhouseday.com

The sales of solar water heaters are shown in Figure 1. Sales have increased dramatically since 2001 due to the support of MRET and state based subsidies. However, the recent drop in REC price and reduction in state subsidies has considerably reduced the rate of increase in 2004 and 2005.

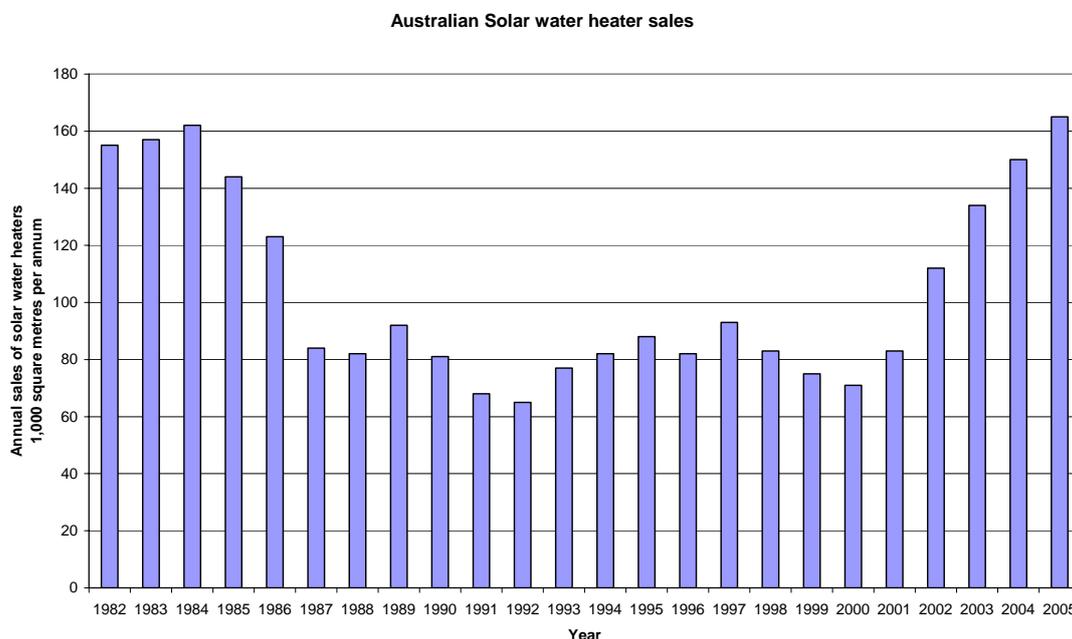


Figure 1 Australian solar water heater sales.

Utility involvement

Electricity retailers have recently reduced their support for sales of solar water heaters due to their ability to buy RECs at lower prices. However, the Solar Cities program will have support from a number of electricity retailers and distributors that will be involved in the trials to ascertain the benefits of solar and energy efficiency measure within discrete communities to assisting in the control of electricity demand.

6. OUTLOOK

The medium to long term outlook for solar energy building technologies and active solar technologies is positive over the next five years although it is expected that there will be some slowing of market uptake as subsidies reduce and supportive regulations are gradually implemented.

The Australian government's priority is energy market reform and resource development across the full range of energy technologies. There is a lower emphasis on solar technologies than on cleaner electricity production. Under the heading of "LOOKING FORWARD" the white paper¹⁴ states

"Although Australia's energy sector has delivered prosperity, security and sustainability, this cannot be taken for granted. To maintain this into the future, Australia must meet the c.

¹⁴ http://www.dpmc.gov.au/publications/energy_future/overview/20_forward.htm

The Australian Government, through the strategy in the Energy White Paper, responds to challenge of implementing policies that ensure the right investments are made at the right time to develop the nation's resources, meet its energy needs and protect the environment by delivering a strong, practical and long-term strategy for energy in Australia. Under the strategy:

- *Australia's energy resources will continue to be developed for the benefit of all Australians*
- *Australia's energy markets will be further reformed to ensure that they deliver reliable supplies of competitively priced energy*
- *high levels of energy security will be maintained and enhanced*
- *Australia's energy efficiency performance will be improved, delivering economic and environmental benefits*

A balanced, practical approach will deliver on Australia's environmental responsibilities, while preparing the nation for a greenhouse-constrained future. Investment will be made to deliver the low-emission technologies needed to meet demand for energy and lower Australia's long-term greenhouse emissions signature.

The Australian Government will continue to engage internationally and with the states and territories to ensure Australia's economic, security and sustainability goals are delivered. In doing so, it will work towards an energy future where:

- *Australia's energy resources continue to be developed for domestic and export markets providing prosperity and economic growth*
- *growing demand for energy by Australians and Australian businesses is met by reliable supplies of competitively priced low-emissions energy*

7. PROGRAM INFORMATION DISSEMINATION

The IEA Solar heating and cooling program is managed in Australia by Standards Australia the peak body for standards development. Details of program activities are made available to industry, government and researchers through the involvement of relevant Australian Standards Committees.

Standards Australia distributes Programme information through these committees and also to relevant research and industry bodies such as the Australian and New Zealand Solar Energy Society, The Business Council for Sustainable Energy, The Alternative Technology association and the Australian Institute of Energy.

8. SINGLE MOST SIGNIFICANT CHANGE IN PROGRAMME SINCE JANUARY 2004

The single most significant change that has effected the program in Australia since January 2004 is the incorporation of energy requirements for new buildings into the Building Code of Australia and the subsequent regulations that promote active and passive solar for mainstream residential and commercial buildings.