



Sustainable Energy Update

ISST carries out research, development, prototyping, testing, monitoring and educational projects in both the renewable energy and energy efficient areas, and has strong links with key sustainable energy industry organisations.

ISST's mission is to develop systems and technologies that will sustain ecosystems, facilitate social and economic development while optimising the use of natural resources, minimising waste, emissions and other environmental consequences and reducing cost.

By fulfilling this mission ISST aims to become an internationally recognised powerhouse of sustainability research. The conceptual and technological advances generated will help South Australia become a national/international leader in sustainable development and will stimulate growth of industries that will export South Australian sustainability technology, products and expertise.

Sustainable Energy tackles the technological and environmental issues related to the use of renewable energy and management of conventional energy. It has developed commercial products, including a roof-integrated solar heating system and a new generation of solar lights, and methodologies for rating and monitoring energy use in housing developments solar powered dehumidification/cooling systems, combined solar hot water, space heating and cooling systems and thermal storage systems with phase change materials, testing for thermal resistance rating of building elements, component testing under extreme conditions using our environmental test chamber, air conditioning testing to AS/NZS3823, air conditioning star label testing, testing of thermal properties of ducting and of phase change materials and heat pump testing to AS/NZS4692.1:2005 is carried out in our balanced calorimeter room and constant temperature room.

Our **Sustainable Energy Industry Support Centre (SEISC)** was formed with a key focus on supporting solar hot water applications in Australia through testing and product development, supporting local manufacturers and importers of solar systems, and monitoring services and computer modelling support to government departments involved in the promotion, growth and regulation of solar thermal applications. The Centre actively develops new innovations with industry, including current developments to commercialise solar heating and solar cooling systems.

Our contribution to the **intelligent grid cluster** is the monitoring of energy use in a state-of-the-art sustainable development in the Lochiel Park Green Village. Apart from evaluating the detailed performance of various innovations and systems, the project will focus on the interaction of the householders with these systems.

Our **Regional Sustainability Centre** will be to build a demonstration solar power plant in Whyalla that can deliver base load electricity through the integration of unique thermo-chemical solar energy storage technology. In addition to providing local assistance during the design/implementation stages, the Centre will be responsible for the evaluation and monitoring process of the solar installation and will provide an opportunity for collaboration with researchers from the Australian National University who developed the solar dish technology being demonstrated in the project.

Sustainable energy industry support centre

Testing of Solar Water Heaters

The centre's accredited test facilities, including the outdoor Solar Collector Testing Facility, are located at the Mawson Lakes Campus of the University of South Australia.

The testing facility is designed to test flat plate and evacuated tube solar collectors to AS/NZS 2535.1:2007 for thermal performance and other aspects, including incidence angle modifiers and pressure drop tests.

The following test facilities and services have been established:

- development of testing facilities capable of conducting tests for determination of a tank heat loss from raised elements as per AS/NZS4692.1:2005
- assessment of a solar collector ability to withstand large-stone hailstorms AS/NZS 2712.1:2007
- assessment of the glass breakage safety AS/NZS 2535.1:2007
- assessment for the extent of water ingress and retention in solar collectors AS/NZS 2535.1:2007
- evaluation of the resistance of a solar water heater to damage due to freezing under low ambient temperatures and clear sky conditions AS/NZS 2535.1:2007
- evaluation of the operation of a solar water heater during periods of no hot water use during a period of high solar exposure AS/NZS 2535.1:2007
- evaluation of the solar energy transmittance of sheet materials AS/NZS 2535.1:2007
- assessment of a solar collector's ability to withstand temperatures close to the maximum temperatures it will encounter when empty during installation, when empty during any period of maintenance, and when full of water but not being used in peak summer conditions (currently being developed) AS/NZS 2535.1:2007
- expert TRNSYS modelling and auditing for energy saving calculations and evaluation of renewable energy certificates as per AS4234
- expert witnessing of all tests described in the Appendices of AS/NZS 2712:2007 are offered by the Centre, thus providing a reputable source of objective validation to a number of government organisations



Impact test



Freeze test

The existing test facilities and capabilities are continuously being upgraded to improve the efficiency and quality of testing outcomes to enhance our research profile and will provide a comprehensive service to manufacturers and suppliers of solar hot water systems.



Thermal performance test



Rain test



No-load operation test

For further information please visit our website <http://www.unisa.edu.au/isst/> or contact Professor Wasim Saman, Research Director (wasim.saman@unisa.edu.au) or telephone 8302 3008



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