Sustainable Energy Development Office
Government of Western Australia

SEDO GRANTS PROGRAM

Community Project Application Form

The Sustainable Energy Development Office (SEDO) Grants Program provides grants for community-based sustainable energy initiatives and sustainable energy research and development projects. This application form is for community-based projects.

Applications for grants can be made through competitive funding rounds. The eligibility requirements for community-based projects and the process for making an application are set out in the *Community Project Guidelines*.

These guidelines, details of the next funding round, information about research and development projects and further information about the SEDO Grants Program are available from the Sustainable Energy Development Office:

Web: www.sedo.energy.wa.gov.au/pages/grants.asp

Email: sgc@energy.wa.gov.au

Phone: (08) 9420 5664

Mail: Level 9 / 197 St Georges Terrace, PERTH WA 6000

1. Project Summary

Project name	Weather station and general purpose data logging system for schools
Applicant	Alternative Technology Association, University of Western Australia and Education Department of WA
Project type *Please tick the box which is most relevant to the proposed project*	☐ Initiative to assist householders increase their use of sustainable energy products. ☐ Initiative that encourages behavioural change to adopt sustainable energy practices, such as workshops and other educational programs. ☑ Public awareness raising activity, such as information dissemination, demonstration project or public display. ☐ Home energy audits. ☐ Other innovative activity that encourages sustainable energy use.

Description of project

Please provide a brief description of the project – attach additional information if necessary.

The project is to develop an integrated weather station and simple data logging system to allow students in schools, technical colleges and other educational institutions to use the data collected to run education programs using real data for their own circumstances and location. The system would include web hardware and software to allow the data collected to be available in real time on the web.

It is envisioned that data from a network of logging systems in more than 100 schools, many of who will be participating in the Solar Cities project, will be available through a central server either at the University of Western Australia or within the Education Department of Western Australia.

Data logging of power usage for various appliances, water heaters, air conditioners, lighting, etc and temperature, ambient climate conditions outside and inside buildings will be implemented.

All of the source code and technical notes will be made available and shared between school on the central server site. Educational packages, web training, project suggestions and new developments will be maintained on the web for school usage and sharing.

2. Applicant Information

The Applicant must be the organisation that will be responsible for implementing of the project.

Organisation name	Alternative Technology Association University of Western Australia Education Department of WA	ABN	57 533 056 318 37 882 817 280
Contact person	Jonathon Thwaites		
Phone	0419 924 355; 6488 7932	Email	jthwaites@admin.uwa.edu.au
Postal address	Safety and Health M450, University of Western Australia		
Suburb / town	Crawley	Postcode	6009

2.1 Key personnel involved in the project

Please include details of any contractors or consultants involved in the project.

Name	Qualifications and experience	Role in the project
Jonathon Thwaites	See Attached	Convenor, Project Manager - ATA
Howard Flinders		Sustainable Schools – Education WA
James Trevalyne	See Attached	Student projects coordinator – Engineering UWA

2.2 Details of the Applicant's history in completing similar projects

Please provide a brief description of similar projects previously performed by the Applicant, including their outcomes.

In 2003 Jonathon Thwaites put forward a 3rd year Mechatronics project at the University of Western Australia to implement hardware and software to data log a weather station and to build the web interface to allow the weather station data to be seen in real time on the web and for archived data to be easily downloadable.

The project was taken up by a team of 4 students. They project managed the implementation and carried out development of all components of the system successfully. At the end of the year the weather station was operational and live on the web. (see attached report).

I have implemented 2 solar power stations with data logging and that data is available on my University web site: http://www.sustainability.fm.uwa.edu.au/welcome
I also assisted the Chrysalis Montessori School in implementing their solar power station in Osborne Park and provided technical advice on how the project should proceed.

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In 2004 and 2005 I organised and staged the Perth Sun Fair for Western Australians.

- Organised the ATA Electric Bicycle Rally at the Curtin Technology Park in 2002.
- Organised ATA renovation of the Homestead Farm display at the Perth Zoo.
- Assisted with organizing the ATA/ANZSES solar house day in 2002, 2003.
- Organising Committee Medical Physics conference.
- Organising Committee Radiation Safety conference.
- Proprietor of own business – Medical Physics.
- Director and company founder of BioWorks bringing biodiesel to communities
- Management of small teams at SCGH, UWA and HDWA.
- In-depth knowledge of renewable energy and sustainable technology.
- Have been involved in investment industry for the past 20 years.
- Have been involved in communication and training sectors for the past 20 years.
- Regularly run ATA/WARFA/UWA Biodiesel workshops at the University of Western Australia.

The University of WA is a Greenhouse challenger, as part of the Federal Government initiative and runs numerous course modules on sustainability, environment and energy efficiency in its formal courses.

3. Expected Project Outcomes

3.1 Raise community awareness of sustainable energy and the need to reduce greenhouse emissions

Please describe the extent to which the project will increase community awareness of sustainable energy, the need to reduce greenhouse gas emissions and ways to reduce fossil fuel energy use.

The benefits to arise from this project are to provide a significant input into the promotion and general awareness for young people of renewable energy and sustainable technology in Western Australia. In particular it will graphically demonstrate the links between climate, energy usage and habits, total energy used and the capacity to generate useful energy in the form of electricity.

It is envisioned the network of weather stations and data logging will eventually become Australia wide, although at this stage Western Australia is our target. On the central web site there will be a map of WA with a dot indicating active and/or live data logging sites. Clicking on any dot will bring onto the users screen detailed data from that site, current activities and information. There will be predesigned experimental and study projects, quizzes and worksheets for students and to assist teachers.

3.2 Number of participants and participant involvement in the project

Please describe the target group for the project, the number of people expected to participate and the extent to which they will be involved in or benefit from the project. Please list any key assumptions made in estimating participant involvement.

SEDO is aiming for 50 to 100 schools to participate in the Solar Cities program. If 50 to 100 children were involved in some way in each school that would immediately involve more than 5,000 students. Parents, teachers and other students in the schools would also have some involvement and exposure to the project by virtue of it being in their immediate school vicinity and presentation of school projects etc.

I would like to see the program extended beyond schools to community and government buildings and organisations.

3.3 Reductions in WA greenhouse gas emissions

Please provide estimates of direct reductions resulting from the project and the project's potential to reduce greenhouse gas emissions in the future. Please list any key assumptions made in estimating reductions in greenhouse gas emissions.

Reduction in green house gases will follow from an increased awareness of the issues involved in energy efficiency and sustainability and how the general public may alter their behaviour and choice in selecting equipment in the home or design or their home. For example choice of energy efficient equipment, recyclable equipment and materials, awareness of systems currently available to help them reduce, recycle and reuse etc.

It is clear that although computer programs like Nathers may give a good energy rating for a building, the energy used in the building depends largely on the habits and understanding of energy issues by the people using the building. This project will elucidate these issues.

3.4 Other benefits provided

Please describe any other benefits that the project will provide.

A fully integrated system will be provided with technical problems will be solved by University, ATA and other interested parties. All software, training programs, web based and other assessment IP will be freely available – there will be no IP ownership as such. All source code for computer programs, technical data sheets, design information, printed circuit board artwork, calibration data etc will be available on the web site. A bulletin board will be established so that information may be effectively and freely distributed.

The project will establish a wide and robust network within schools to communicate sustainable and renewable energy concepts.

4. Project Implementation Timetable

Mile-stone	Milestone tasks *Please list specific tasks or work that will be completed for each stage or milestone of the project. Note that projects may involve less than five milestones, but should involve at least two milestones.*	Start date	Completion date	Expected actual (cash) expenditure to complete (excl. GST)
1	**Partnerships** • Establish partnerships, commitments from each partner and deliverables for each partner in the project – this is underway now. .		March 06	$3,000
2	**Review** • Review data logging capabilities of existing inverters available for the PV systems • Review available weather stations for cost, ease of use (data logging, wireless connection), robustness. • Review general purpose data loggers for other sensors for cost, ease of coding, robustness. • Review sensors that may be useful eg. current clamps, thermocouples etc		May 06	$7,000
3	**Implement hardware** • Wire up sensors, weather station, inverter and log them – make sure all the hardware works properly **Implement a weather station and data logging software** • Write software for the weather station to log the data and store it in a useful and easily accessible format (eg excel) • Write software for the data logger to log the data and store it in a useful and easily accessible format for the other sensors (eg excel) • Write software to put inverter data in a useful format • Write software to bring together all data in a useful and uniform format for teaching and presentation. **Web interface –"get the information out there"** • Write a web interface so the data is available on the web (preferably real time)		June 06	$15,000
4	**Suppport – make it a useful** • Produce a manual with example source code for the weather station and other sensors (preferably visual basic) • Provide technical data on the weather station and sensors. • Provide a web page for data access, FAQ, and help line for schools • Test trial the system and trouble shoot.		Dec 06	$10,000
5	**Marketing – get it into schools and used** • Presentation and workshops for school science and other teachers • Help with setting up systems if requested. • Liaise with Education dept, Solar Cities, SEDO • Establish logistics to maintain the project in the long term over many years with recurrent Federal AGO funding or otherwise.		Mar 07	$10,000
5	**Submit final report to SEDO**		May 06	$5,000

Total	**$50,000**

5. Project Budget

Actual or cash costs only (excluding any in-kind support)	**Expected expenditure amount (excl. GST)**
Salaries *(please include estimated hours)*	
Project Officer - 1000 hours	$19,000
Project Officer UWA - 400 hours	$11,000
Consultants or contractors *(please include estimated hours)*	
Will use UWA personnel and students	
Equipment	
Consumables	$1,000
Hardware, data loger, weather station, transducers, software etc	13,000
Other *(please describe)*	
Marketing	$6,000
Total	**$50,000**

6. Project In Kind Support

In kind support donated to project	Notional value
Voluntary assistance provided	
UWA Students	$30,000
The ATA will provide organisational support, project management and technical support.	$10,000
Donated equipment or services	
University of WA is providing: the labs, infrastructure, insurance, grounds, maintenance and repair support and security support.	$10,000
University of WA is also providing the experience and use of its Public Affairs organisation.	$5,000
Other in-kind support *(please describe)*	
Total	**$55,000**

7. Funding Sources

Cash funding sources (excluding any in-kind support)	Amount (excl. GST)
Funds requested from the SEDO Grants Program	$50,000
Funds provided from other sources *(please list funding sources below)*	
Applications will be made to LotteryWest, AGO, Dept Environment and Heritage, Education Dept WA	
Total *(Note the totals for sections 4, 5 and 7 should be the same)*	**$50,000**

8. Applicant's Certification

In applying for funding under the *SEDO Grants Program* I agree that: **(please tick ☒ each item below)**

☑ This application is subject to the *Community Project Guidelines* and I agree to meet all requirements of the program as set out in the guidelines.

☑ To the best of my knowledge the information provided in this application is current and correct.

☑ SEDO accepts no liability in respect of any claim or cause of action arising out of, or in relation to the project that is the subject of this application, and I will indemnify SEDO for any claim or liability arising out of or in relation to the project that is the subject of this application.

Signed:	Date:
Name: Jonathon Thwaites	Position: Convenor ATA WA Branch

Completed applications should be sent to:

Email: sgc@energy.wa.gov.au
Fax: (08) 9420 5699
Mail: SEDO Grants Program
Level 9 / 197 St Georges Terrace
PERTH WA 6000

Chrysalis Montessori School Solar Power Project

http://www.scips-asta.edu.au/casestudies/chrysolaris

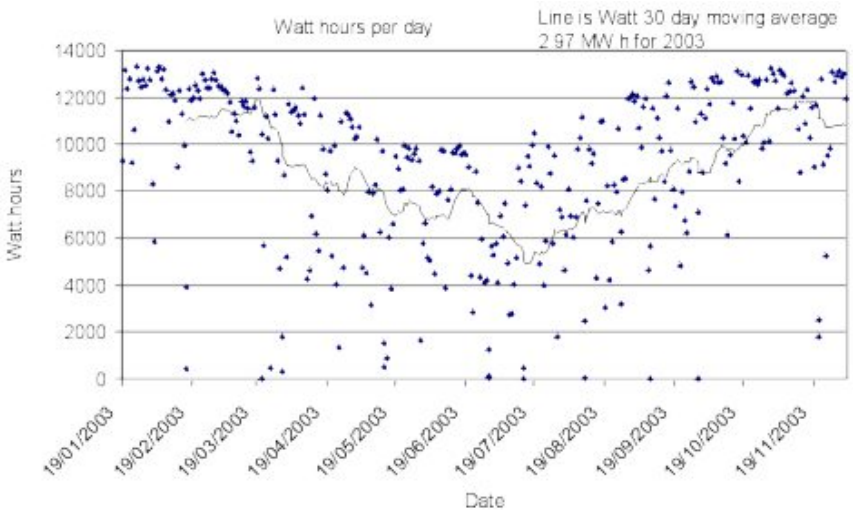
Chrysalis Montessori School children the solar power and weather station at UWA

Chrysalis Montessori School children designing their solar power station

Solar Power Station at UWA

http://www.sustainability.ofm.uwa.edu.au/welcome/solar_power_uwa

The University of WA Vice Chancellor opens the 2.4 kW solar power station at UWA



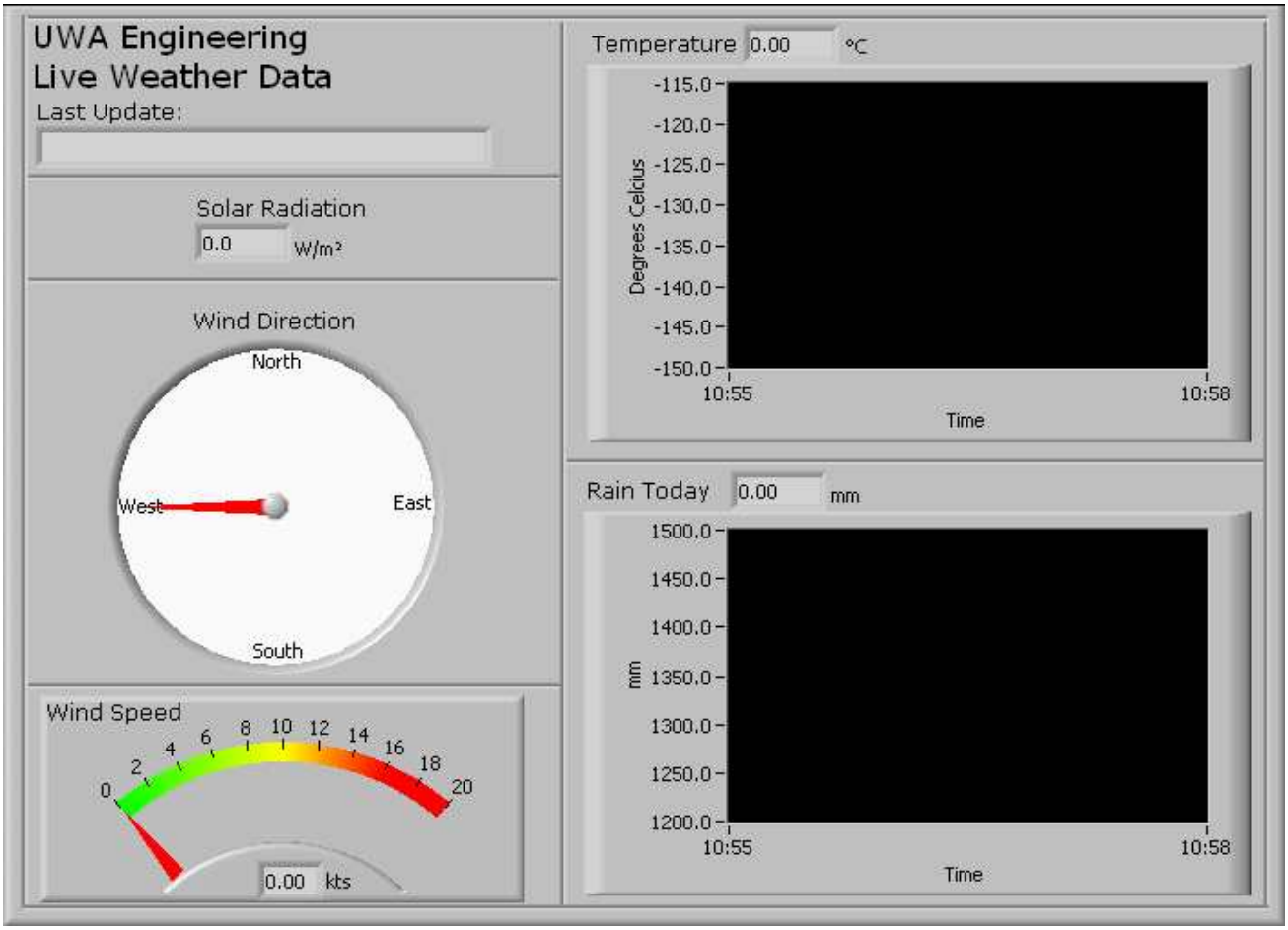
Daily energy production from the power station. See:

The weather station implemented at UWA by 4 Mechatronics students with live data presentation to the web.

http://www.sustainability.ofm.uwa.edu.au/welcome/weather_station

The weather station implemented at UWA

Live page data display for UWA weather station



Mechatronics Systems 210 or Mechatronics Design 310
Project Planning Worksheet

Project Name: Weather Station Number 168

Weekly progress chart

Semester week numbers

Activity Description	Estimated Hours to complete	Hours spent so far	Percent done	Hours remaining
Chris Thorp in charge of Electronics Subsystem				
Familiarization of project. Subsystem block diagram electronic. Test inputs/outputs of sensors	12	12	100	0.0
Design of signal conditioning	10	11	110	-1.0
Build signal conditioning modules	16	0	0	16.0
Testing of sensor and signal outputs with signal conditioning	6	0	0	6.0
Assembling of complete subsystem and integration with complete system	6	0	0	6.0
(Study Break) Resolve and refine configuration errors	12	0	0	12.0
Demonstration Week.Finalise any issues	8	0	0	0.0
Individual report write up	6	0	0	0.0
Tom Foster in charge of Programming Subsystem				
Familiarization of project, subsystem block diagram programming	12	12	100	0.0
Web page design, labview interface, data logging, webDAQ/100 configuration at output of daq	25	32.5	100	0.0
Integration of hardware and software	10	8	100	0.0
Testing of code. Labview and web pages	6	6	100	0.0
Resolve and refine configuration errors, complete web page – Testing	12	10	100	0.0
Demonstration Week. Finalise any issues	8	8	100	0.0
Individual report write up	6	0	0	6.0
Ian Tester in charge of Mechanical Subsystem and webDAQ Subsystem				
Familiarization of project, subsystem block diagram mechanical and data acquisition, test inputs/outputs of sensors. Formulate plan. Project Management. Group Meetings.	38	17	44.737	21.0
Initial mechanical testing of equipment, Complete total system block diagram to include integration of all sub-systems	8	8	100	0.0
Feasibility of implementing project in Labs on Line, part build signal conditioning	6	0	0	6.0
Signal conditioning as required, Programming as required	6	0	0	6.0
Testing of webDAQ with sensor inputs	6	3	50	3.0
Assembling of complete subsystem and integration with complete system	4	0	0	4.0
(Study Break) Resolve and refine configuration errors in total system	12	0	0	12.0
Demonstration Week. Finalise any issues	8	0	0	8.0
Individual report write up	6	0	0	6.0
Matt Jones in charge of Documentation and Co-ordination				
Familiarization of project, Submission of 1st project report.	12	10	83.333	2.0
Documentation of hardware such as webDAQ and sensors, and also progress for final report. All information to be included in web page	10	5	50	5.0
2nd Progress report submission including time sheets.	6	6	100	0.0
Co-ordinate testing of sub-systems	6	0	0	6.0
3rd Progress report submission. Demonstration submission	6	6	100	0.0
(Study Break) Resolve and refine configuration errors, complete documentation	12	0		
Demonstration Week. Finalise any issues. Documentation of demonstration	10	0	0	10.0
Individual and Final group report write up	12	0	0	12.0

The summary data below uses column E data.

Summary

Date of Report	19/Sep
Completion Date	24/Oct
Time Remaining (weeks)	5.0
Hours available per week (all members)	32
Hours available to complete work	160
Total hours needed (sum column E)	146.0

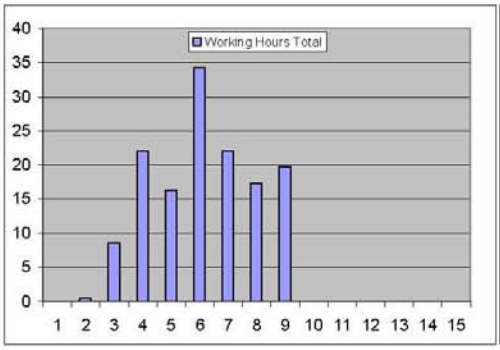
Mechatronics Systems 210 or Mechatronics Design 310
Planning Project Name: Weather Station Number 168

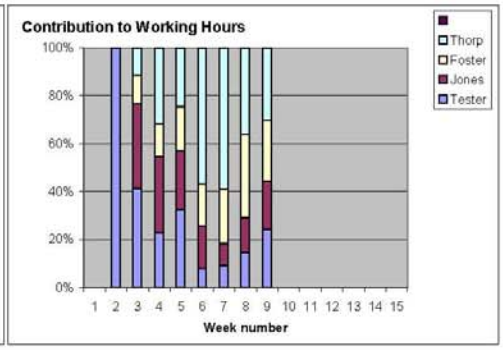
Working Hours Histogram Calculation

This worksheet calculates the total working hours on a weekly basis from the data in "Work Completed Record".
Enter name of each team member in the header row. All the data is computed automatically from "Work Completed Record" entries.

Week# - 1	Total	Tester	Jones	Foster	Thorp	
1	0	0	0	0	0	
2	0.5	0.5	0	0	0	
3	8.5	3.5	3	1	1	
4	22	5	7	3	7	
5	16.25	5.25	4	3	4	
6	34.25	2.75	6	6	19.5	
7	22	2	2	5	13	
8	17.25	2.5	2.5	6	6.25	
9	19.75	4.75	4	5	6	
10	0	0	0	0	0	
11	0	0	0	0	0	
12	0	0	0	0	0	
13	0	0	0	0	0	
14	0	0	0	0	0	
14	0	0	0	0	0	

Total	Tester	Jones	Foster	Thorp	0
140.5	26.25	28.5	29	56.75	0
percentage	19	20	21	40	0



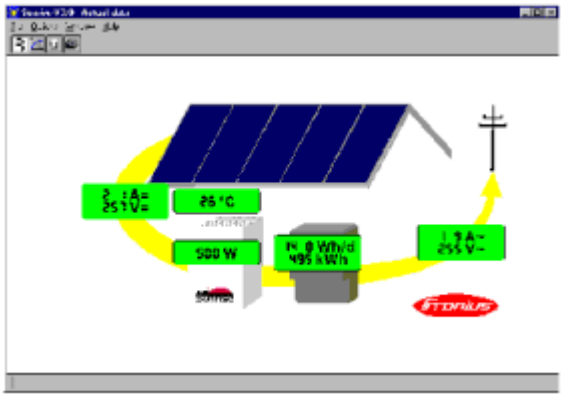


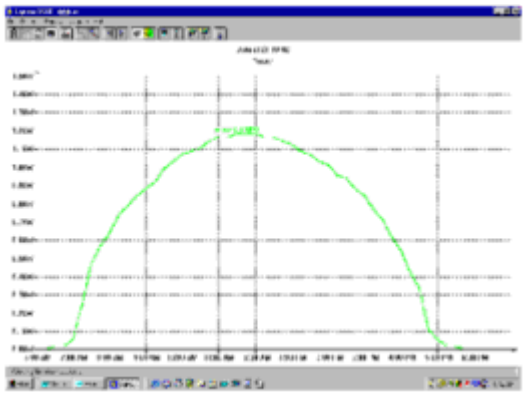
Solar Power Station at 255 Marmion St, Perth WA (Jonathon Thwaites' home)

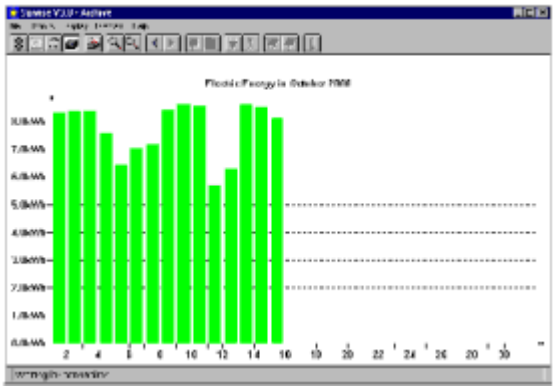
http://www.sustainability.ofm.uwa.edu.au/welcome/solar_power_urban2

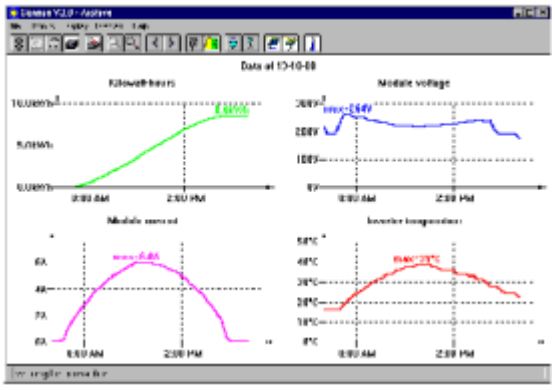
General view Solar Power Station at 255 Marmion St

Data logging Solar Power Station at 255 Marmion St

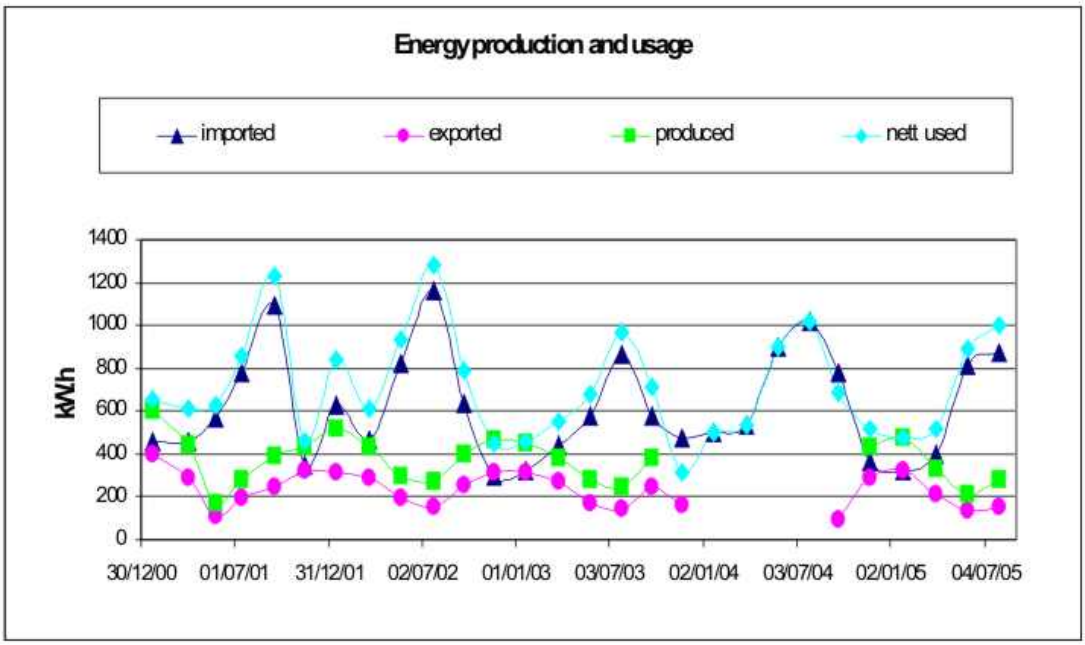




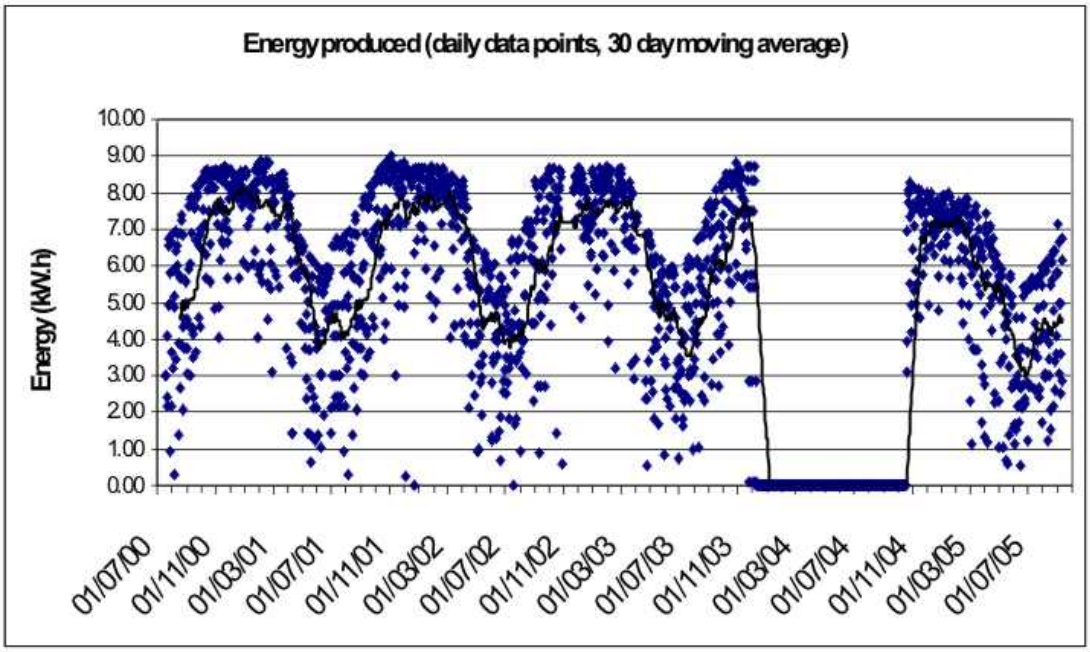




Electrical energy balance at Solar Power Station at 255 Marmion St



Daily energy production at Solar Power Station at 255 Marmion St



Registered solar power station No.1 in WA creating RECs - Solar Power Station at 255 Marmion St

Accreditation Code	Registered Name	Station	Fuel Source	State	Accreditation Date
SRPVWA01	Jonathon Thwaites	Rooftop PV	Photovoltaic	WA	27/04/2001
SRPVWA02	Angus King	Rooftop PV	Photovoltaic	WA	01/04/2001
SRPVWA03	Noranda Primary School	Noranda Primary School	Photovoltaic	WA	24/09/2001