

Sustainable Cities 2011 - ACT

Recipient: Canberra Institute of Technology (CIT)
Sustainable Skills Training Hub

Location: Bruce, Suburb of Canberra

Category: Community Action & Partnerships

Highlights:

The CIT Sustainable Skills Training Hub aims to increase young people's engagement with education and training pathways, by establishing a purpose-built 'green' training facility. The Hub provides hands-on training in the installation, operation and maintenance of sustainable technologies, and knowledge of the latest sustainable building applications, materials and products.

The project supports the ACT Government's strong commitment to Vocational Education and Training to provide suitably skilled and qualified citizens to contribute to the economic, social and cultural wellbeing of the ACT.

It supports and enhances the ACT Government's investment in the existing infrastructure at CIT Bruce campus to further position the facility as a sustainable training ground in horticulture, sciences, engineering and building and construction.

Industry partnerships were consolidated with support gained for the project from the Housing Industry Association, Engineers Australia (Canberra Division), University of Canberra and ACT Planning and Land Authority.

Financial support for the project was gained from the Federal Government, ACT Government and from the CIT.

CIT will form new partnerships and build on already existing partnerships with industry and professional associations to facilitate an integrated approach to 'green' skills training.

The facility will further enhance the Institute's ability to contribute to the community through the provision of much needed training and demonstrated leadership in environmentally sustainable practices.

Category: 'Dame Phyllis Frost' Litter Prevention

Highlights:

The Canberra Institute of Technology plays an important role in promoting a litter free environment with signs displayed throughout the campus promoting litter reduction together with numerous litter bins situated around buildings.

Special butt tins positioned in designated smoking areas assist smokers to dispose of cigarette butts in the appropriate manner.

Category: Resource Recovery & Waste Management

Highlights:

In collaboration with the Housing Industry Association (HIA), GreenSmart® skills induction training was provided to all working personnel involved in the construction of the new facility.

GreenSmart® training is consistent with the overall objectives of the facility and had the added benefit of ensuring that those involved in the project were competent in the latest green innovation and construction techniques, particularly resource recovery and appropriate recycling of materials, which promote principles of sustainable development, accessibility and adaptability. It also increased skill sets and job opportunities for those who undertook the training.

Recycled or remanufactured materials used in the construction of the new building included concrete, bricks, timber, plasterboard, carpet tiles, rubber flooring, acoustic insulation, and acoustic panels which have a high level of recycled content.

A significant amount of effort by the Project Manager was put into reducing the amount of waste material on the project, with 80% (by weight) of all waste able to be sent for recycling.

General commitment to recycling programs is evident throughout with waste at source separation bins situated throughout high traffic areas within the campus.



Category: Environmental Innovation & Protection

Highlights:

The purpose built facility is to be used for hands-on 'green' skills training in emerging sustainable technologies for both residential and commercial construction sectors. Students will be trained in the installation, testing, commissioning, and maintenance of these technologies and will gain the skills required to assess and employ the latest in green building applications, materials and new products.

The building exceeds all current ACT Government requirements for sustainable commercial development and is able to conserve energy and water with a minimal carbon footprint. The facility incorporates the latest sustainable materials and technologies supplied by industry partners. These include:

- solar and wind power generation. Students are able to commission solar panels and wind generators, and receive hands-on scenario based training in testing and monitoring smart metering and data loggers for energy management and energy efficiency analysis;
- Bluegen Fuel Cell and tri-generation micro turbines with absorption chillers to produce electrical energy and harness waste heat for heating and cooling of the building;
- solar hot water systems for supply of hot water to building ablutions and for hydronic heating and radiator panels, and
- water recycling. All water used within the building is treated on site to provide students with hands on skills with installation, operation and maintenance of grey and black water recycling systems.

Category: Water Conservation

Highlights:

- All rainwater collected by the building is stored in storage tanks & is re-used for building heating & cooling systems, toilet flushing and irrigation on site.
- All plumbing fixtures within the building are rated 4 star (or better) for water efficiency, and waterless urinals have been installed. Tap fixtures are a mix of automatic, semi-automatic and manual versions which can be tested by students to confirm efficiency levels.
- All water use within the building is metered and monitored via the building management system.
- The fire sprinkler system has been designed to use minimal water for testing purposes.
- All water used within the building is treated on site to give students hands on skills with installation, operation and maintenance of grey and black water recycling systems. The treated water is then used for irrigation on site. The project has incorporated the latest technologies in water treatment including filtration, chlorine and organic removal, softening, reverse osmosis and electro-deionization.

Category: Energy Innovation

Highlights:

Building Envelope

- Kingspan panels (steel clad foam sandwich) utilised for cladding and roofing and provide R5.0 rating
- Double glazed windows throughout. Low level windows are manually operated with all high level windows automated via the Building Management System.

Power Generation – Power generation exceeds the power requirements of the building

- 2 kW 'BlueGen' gas fired fuel cell generates electricity using natural gas as a fuel source.
- 2 x 30 kW gas fired micro turbines generate electricity using natural gas as a fuel source.
- 10kW Solar Photovoltaic Panels – The building is fitted with solar PV panels mounted in two configurations. The first is a set of fixed panels in a standard configuration (facing North @ 35° inclination). The second set is mounted on two dual axis tracking systems which follows the sun path during the day. This set-up allows students to compare the efficiencies of both configurations.
- A 3kw wind turbine is to be erected remotely from the building to provide turbulence free operation.

Heating and Cooling

- Heat recovery modules – collect waste heat from fuel cell and micro-turbines to produce hot water for heating and cooling – This is the primary heating source for the building.
- Electric Heat Pump Chiller/Geothermal loop– provides hot and cold water via the geothermal heat exchanger located in the water storage dam onsite.
- Passive and Active (fan assisted) chilled beams – water to air heat exchangers provide the primary source of mechanical cooling within each room.
- Hot water radiant panels primary heating source. Basement has in slab hydronic heating.

- Adsorption Chiller – Utilises waste heat from the micro-turbines to produce chilled water for the building's cooling system.
- Dry & Spray Cooler – high efficiency heat exchanger which provides additional cooling for low and medium temperature water.
- BACnet BMS (Building Management System) – high level programming and control system to automate the buildings heating, cooling and ventilation systems.

Lighting

- Lighting in the building is a mixture of high efficiency T5 fluorescent fittings, high efficiency compact fluorescent fittings and LED fittings and are all controlled by a digital lighting control system.
- DALI Lighting Control System – a digital lighting control system which utilises sensors to detect ambient lighting levels and room occupancy to provide appropriate lighting levels throughout the building.

General

- The new building was briefed to conserve energy and water with a minimal carbon footprint and a significant aim of achieving over 100% power generation and water neutrality
- The building has a high performance external fabric which has high levels of insulation averaging an R 5.0 insulation value.
- All glazing is double glazed sealed units with a 12mm air space. All windows and doors are sealed on all sides.
- The combination of these high level insulation elements, orientation and shading means that the internal spaces are almost thermally neutral to external conditions.
- This building is designed to optimise experimentation and monitoring capacity to evaluate the best combination of comfort conditions and energy use.
- Modelling of the building using the Green Star Education Energy Calculator Guide Rev B.1 estimates the total greenhouse gas emissions to be 17,027 kg/CO₂ per annum which is **85% better than the standard practice benchmark energy usage**.
- The total actual electricity demand of the building is 53 768 kWh/yr, and the total produced is 64 678 kWh/yr. This calculation does not include any energy generation by the 'BlueGen' fuel cell which is producing approx 1 000 kWh/month. It is anticipated that this building will be a net exporter of energy.

Category: Heritage & Culture

Highlights:

CIT Green, a long standing group that has sustainability embedded into its charter, is focused on identifying and implementing ways in which students and staff can reduce their carbon footprint. These include promoting the use of bicycles and bicycle racks, identifying recyclable waste, thus reducing waste to landfill, and assisting students, teachers and staff to implement more environmentally friendly practices within their roles at CIT.

The CIT Environment Sustainability Charter lists CIT's commitment to environmental protection and education for sustainability. CIT focuses on integrating environmental sustainability content and practices across all courses. Most of CIT's courses have sustainable content embedded.

The aim is for students to graduate as sustainability practitioners and take knowledge into the community with the result being all students learning sustainability practices to take it into their workplace. Leading by example is invaluable. Incorporating environmentally sustainable practices within vocational training is beneficial for the environment, staff, clients, and the community as a whole.

CIT Green runs monthly forums on a wide range of environmental topics. These are advertised on all campuses and students are encouraged to attend.

Category: Young Legends

Highlights:

The training undertaken in this building aims to increase young people's engagement with education and training pathways, by establishing a purpose built 'green' training facility that provides hands on training on the installation, operation and maintenance of sustainable technologies, and knowledge of the latest green building applications, materials and products.