

SHAC 09 NEWSLETTER - SEPTEMBER 2008

The Sustainable Habitat Challenge has teams around New Zealand thinking and exploring ways to really live well. Teams want to sustainably support our culture and our economy with less reliance on scarce resources, while having lots of fun at the same time! Ten teams will build and fit out ten houses by October 2009.



1 EVENTS

EECA is sponsoring Home Energy Rating Assessors to work with SHAC teams. A Home Energy Rating is an assessment of the energy efficiency performance of a home. This includes: a) how well the building's design, materials, construction and orientation enables it to maintain a comfortable indoor temperature, and b) the efficiency of a home's two biggest energy users: the space heating system and the water heating system.

The assessment process will give teams a comparative star rating along with tailored, expert recommendations as to the most cost effective ways in which the home's energy efficiency – and therefore its rating – can be improved.

SHAC Team Whareuku was a finalist in the Sustainable Business Network Awards at <http://www.sustainable.org.nz/>

SHAC Team ZeroPlus is part of the [art/sec] exhibition at St Paul St Gallery, AUT, 40 St Paul St, Auckland Central, till 4 Oct 2008.

2 PEOPLE

Quotes from some of the over 100 team members around New Zealand:

What is my vision of Sustainable Living?

... "Efficient use of land, avoiding developing greenfield sites, sustainable communities, affordable homes, aiming for the passive as opposed to the active technology, encouraging a close interaction with nature in all our built environments and a super efficient, clean, integrated and affordable public transport system." – Christian Newman, Otago Polytechnic Team

... A "retrofit project that will generate energy, collect water, recycle waste and grow food" – Alexandra Hills, Victoria School of Architecture Team *The Plant Room*

... "Waste = Food, as nature has so kindly demonstrated." – Brendan Hicks, University of Canterbury School of Engineering and Christchurch Polytechnic, *Team Canterbury*

... "To celebrate the connection of craft and beauty through a sense of place and materials.", Sarah Johnston, Team *Central Otago*, Otago Polytechnic



... "Where everyone is satisfied with life" – John Cheah, University of Auckland School of Engineering Team *Whareuku*

3 TEAM UPDATES

3.1 SHAC TEAM DUNEDIN

The Dunedin team is working on an improved design for their yearly house builds. Contributors include project management firm Arrow International, and local architectural firms, the University of Otago, and the Otago Polytechnic. The new design will include conditions of sale that the house be sited with a particular orientation, allowing this relocatable house to be designed for the sun. Building and architectural draughting students will be guided by staff and local professionals. Graham Burgess's students will build the house in 2009. In 2008, Phil Ballard's students are working on the house as a class assignment. The team also includes energy students in the University of Otago Energy Management programme working with Assoc Prof Bob Lloyd who are examining the design's energy use for heating. Interior design, horticulture, and communications students will also have opportunities to contribute to this real-world project.

Ian Currie, Graham Burgess, and Phil Ballard
03 477 5830

3.2 SHAC TEAM WHAREUKU, UNIVERSITY OF AUCKLAND SCHOOL OF ENGINEERING

Students and staff at the School of Engineering are building an earthen house with unique 150mm walls.

Earth is the oldest building material in the world and it is still used to house billions around the world today. It remains popular not only because it is cheap and widely available but because it has many inherent unique qualities. Earthen buildings are naturally insect resistant, fire resistant and non-toxic. Earth also has a high thermal mass. This means earth walls can absorb heat during the day and release it during the night. Imagine a cool house on a hot Summer afternoon or a snowy Winters day without heaters. That's what an earthen house is capable of.

The problem with earthen buildings is that they don't bend very well and in an earthquake prone country like New Zealand something has to be added that will give the earth enough bending strength. Flax fibres were mixed in with the earth successfully but did not give enough bending strength so a small amount of steel reinforcement was added into the building system as well. The building system has come a long way over the last 4 years and the first flax-reinforced earth house began construction on the southern shores of Lake Rotoiti in February 2008. We call this building system Uku, one of the Maori words for earth.

Project Details: www.shac.org.nz/whareuku-proposal.pdf . Contact John (Jing Siong) Cheah <jche242@ec.auckland.ac.nz>

3.3 SHAC TEAM WAIKATO, WINTEC

Structural insulated panels are made from inexpensive insulating materials and are assembled in the workshop or factory. The strong, insulating, airtight panels are an important part of a more sustainable house. The Team Waikato design will also include rainwater collection, organic-based insulation, and will be reconfigurable with sliding interior walls. The pre-manufactured SIPs will lead to less construction waste and a faster build time.

Photo of a SIP on a roof (also used for walls) <http://www.sips.org/>. Contact Rod Yeoman <rod@keiser.co.nz>

3.4 SHAC TEAM HOUSWISE

Housing New Zealand and University of Auckland Tamaki Campus

Team Housewise HNzc will retrofit a state house with upgrades that may include solar hot water, low flow toilets, aerated taps, rainwater collection, insulation, improved ventilation. The UoA School of Population Health students will evaluate social outcomes of the upgrades. Contact David Vui - Talitu <David.Talitu@hnzc.co.nz>

3.5 THE PLANT ROOM, UNIVERSITY OF VICTORIA, WELLINGTON

Wellington's entry, THE PLANT ROOM, is unique in that it deals with existing building stock - demonstrating how to convert an existing apartment building into a carbon neutral development.

The plant room is being designed by students and staff at the school of architecture at the University of Victoria. Researchers from Massey and local professionals are also contributing.

Regenerative architecture: Our regenerative habitat "THE PLANT ROOM" is an inner-city project that will generate energy, collect water, recycle waste and grow food whilst addressing urgent housing needs. It includes a series of linked outdoor "rooms" to enliven, improve and extend an existing building. Bolt-on elements will be configured to provide four typologies that build upon each other: micro - an edible garden window box, mini - a balcony space, midi - an outdoor room and maxi - a communal space. For the purposes of the competition one fully functioning show apartment will be constructed (in situ within social housing, or as a mobile show apartment in isolation) and a set of inter-connected "nodes" illustrating individual technologies (e.g. grey water filtering / living roof / rainwater + energy harvesting) will be distributed around sites in Wellington.

A Living Solution: We will be using "living" and eco-system services to improve the existing building fabric as well as being a catalyst for change in the surrounding area. Bolt-on elements enliven the façade. "Living" walls / roofs + vertical "swamp" features link THE PLANT ROOM'S, filtering grey water - this will be used to water edible gardens and flush toilets. Communal "PLANT ROOM'S" are also proposed which provide additional edible garden allotments along with a space to socialise with other building occupants. These eco-system services will be demonstrated throughout Wellington to help communicate the scheme to the widest possible audience as simply and clearly as possible. Contact Tim Gittos <gittos.tim@gmail.com>

3.6 TEAM CANTERBURY, UNIVERSITY OF CANTERBURY AND CHRISTCHURCH POLYTECHNIC

Every year students at the Christchurch Polytechnic Institute of Technology construct, on campus, a relocatable home which is then sold to the public. The current design and method of construction, whilst up to the NZ building code, is not considered sustainable. The new super insulated design, whilst not radically different from the current design, aims to account for all the decisions which are made and materials specified in the design process and to understand where the "unsustainability" comes from. This information will then be used to influence those decisions in the form of a sustainable specification which will be an augmentation to the technical specification for the house.

An additional element for SHaC Canterbury is to communicate the idea of super insulation and its effect on indoor temperature. A simple "dog-house" has been built by one of the team as a physical model to show how warm the interior stays once insulation is added. It will also demonstrate how ineffective this insulation can become if not installed properly (as in not pushed all the way into corners etc.) which can happen if those installing are not aware of how "heat follows the easiest path".

The relocatable home will begin construction around Feb 2009 at the CPIT campus. Contact William Corke <wfcl8@student.canterbury.ac.nz>

3.7 SHAC TEAM CENTRAL OTAGO POLYTECHNIC

The Otago Polytechnic Central Otago Team has been working on the design concepts for a private dwelling to be constructed in Cldye as part of the Sustainable Habitat Challenge.

The steep site is located just to the southwest of the Clyde Dam. We are pleased to have this elevated site just in case that dam

decides to spring a leak in the future!

The site is within walking and biking distance to Clyde even though the site is zoned Rural Residential. The site does offer some challenges with it's topography, but we are working with the contours so the house will sit within, rather than be placed upon the site. The following are some of the elements being incorporated into the overall design of this home:

Passive Design Principles

Straw Bale External Walls

Traditional Plasters

Masonry Stove (working with the Council to make this happen smoothly)

Earthen Floors

Solar Thermal Hot Water System in conjunction with Underfloor radiant heating (wetback as a back up)

PV System to supply the total electrical demand (the intention is to Grid-Tie to eliminate the need for batteries)

Composting Toilet with Greywater System

Rain catchment. Contact Jude Faircloth <judeF@tekotago.ac.nz>

3.8 UNITEC BACH IOI

As a collaboration between the Te Hira whanau and Te Hononga we propose: To develop a comprehensive design brief for the renovations / alterations to and implementation of new sustainable systems for a historic bach on Rangitoto island. To develop comprehensive designs for the renovations/ alterations using recycled and low embodied energy materials. To research appropriate alternative energy and waste disposal systems and make recommendations for adoption. To renovate the existing bach, build allowable alterations and install new alternative energy and waste disposal systems. To monitor over the new renovations, alterations and systems over the period of 1 year to assess their effectiveness and appropriateness

We have just completed our first stage of retrofits in the first week of September. A great week was had on Rangitoto!

3.9 UNITEC SUSTAINABLE

- Explore a range of systems which have the potential to increase the environmental and economic sustainability of a basic, new New Zealand home in terms of construction, energy provision, water supply, waste disposal, use of renewable resources.
- To decide which systems are most appropriate and will work well together in one house.
- To design a sustainable house, using as a basis the design of relocatable houses currently constructed at Unitec.
- To investigate and resolve legal issues surrounding construction of the house including consents.
- To construct a sustainable house.
- To evaluate the performance of the house in comparison with an ordinary house built without the special features incorporated into the sustainable house.
- To promulgate the findings of the study.
- To engage with community and business in supporting and encouraging sustainable practice.

Building students at Unitec will construct the house starting in September 2008. Contact Robert Tait <rtait@unitec.ac.nz>

3.10 UoA ZERO.PLUS

Based at the University of Auckland zero.plus is an international research initiative to design, build and monitor New Zealand's first Zero Emission House under international Passive House standards. The proposed living unit aims to offer new answers to needs and desires of occupants, while taking energy efficiency and carbon emissions into account as well as achieving a new level of Indoor Environmental Quality (IEQ).

Project Organization, Design, Construction and Monitoring: Dipl.Ing. U. Rieger, ,Dr. Paola M. Leardini, School of Architecture and Planning, The University of Auckland [NZ]

Building Physics: Dipl.Ing. Kerstin Rosemeier [NZ]

PHPP Validation for NZ and Project Certification: Prof. W. Feist, Passivhaus Institut, Darmstadt [D] Universitaet Innsbruck [A]

Sustainable Urban Design Strategies:

Prof. K. Zillich, N. Couling, B. Arch (hons), Institut fuer Städtebau und Architektur, Technische Universität Berlin [D]

Simulation Technologies, Timber Constructions:

Prof. D. Schwarz, Institute of Architecture and Planning, Hochschule Liechtenstein [FL]

Solar Design and Renewable Technologies:

Prof. A. Rogora, Building Environment Science & Technology Department, Politecnico di Milano [IT]

Consultant Architects and Engineers: Stephenson & Turner Architects Engineers, Auckland [NZ]

Uwe Rieger (UoA School of Arch)

09 373 7599 x88597 or u.rieger@auckland.ac.nz

4 INTERIM REPORT – 9 OCTOBER 2008

Teams are required to submit a report to SHAC on the 9 October 2008. The submitted reports will be made available for download on the SHAC web site. The reports will have the following sections:

4.1 INTRODUCTION

Team motivation for project. Overview. Include team logo

4.2 DESCRIPTION OF BUILD OR RETROFIT

Describe your design or key design elements for build or retrofit

Include a concept sketch/design/and drawings. An sketch indicating key design features is helpful for communications and judging.

4.3 MEETING THE JUDGING CRITERIA

For each of the SHAC judging criteria, describe how your design will give an improvement over how we live today. Include at least a paragraph for each SHAC judging category: Energy, Water, Materials, Waste, Indoor Environment, Affordability and Suitability and Supporting a Sustainable Community.

4.4 PROJECT PROGRAMME

Include an overview of your schedule indicating key milestones. What milestones have already been achieved?

4.5 PROMOTION AND COMMUNICATIONS

What communications has your team achieved? What are your plans?

4.6 CREATIVE SPARKS

Include quotes from students, academics, and professionals involved in the project about their experiences with the project.

Include a few photos from any meetings or construction progress suitable for republication

4.7 REPORT LICENSE

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