

# JUDGING CRITERIA

SUSTAINABILITY IS ABOUT USING WHAT WE NEED, LIVING WELL AND LEAVING ENOUGH FOR FUTURE GENERATIONS. SUSTAINABLE HOMES SUPPORT A SUSTAINABLE LIFESTYLE.

SUSTAINABLE  
HABITAT  
CHALLENGE 09



BUILDING A BETTER WAY

WWW.SHAC.ORG.NZ  
0800 SHAC 09

SHAC 09 asks collaborative, tertiary-led teams to **design and build or retrofit a sustainable home**, develop a campaign to **inform the public** about how their design supports sustainable living and **pass on information and techniques** about their design to the building community.

Team outcomes will be judged in several categories. Each category has a number of possible parameters that you may want to consider. Your team will supply a report with reasoned arguments, simulation and modelling results and other research outputs to convince the judges of the benefits you expect in each category. How you make the trade-offs necessary to realise your vision will be based on how people in your region live – and will want to live – in your affordable, sustainable house and community in five years' time.

In November 2009, judges will review the house, your communications campaign, the resources you develop for designers and your final report. Your final report will describe the house and show the improvement your design exhibits when compared with your reference case and regional averages. Note that although reference is frequently made to “your house”, solutions are also welcomed for proposals for multi-unit housing proposals. The site shall be included when considering each of the judging categories, for example, site water use and runoff, site contribution to a sustainable community, and others.

## MINIMUM STANDARDS

Pick a type of housing currently being used, and design a new house that requires fewer resources and supports delightful, sustainable living. Show in a report how your new design delivers a step-change improvement over regional averages and typical house. Renovations are also welcomed. At the minimum, your house must meet Beacon's High Standard of Sustainability™ (see below), and be rated by the EECA Household Energy Rating Scheme (HERS). The use of other thermal modelling tools such as BRANZ's ALF3 is recommended.

Successful teams will make improvements in each judging category. Houses must meet all required building regulations. Your house must be furnished and fitted with appliances that the team shows to lead to a delightful, more sustainable lifestyle.

## JUDGING PROCESS

You will report on your goals, strategies, and achievements in each category. Your report is crucial, as it will present your arguments, simulations and other justifications that demonstrate how your new design is a significant improvement over your reference house and regional averages.

Seven categories consider the house and its link with the community. One category covers the communications campaign that explains the house to the general public and to the design and building community. Judges will examine your house performance in each category, and commend your team where progress has been made and recommend further possibilities and approaches.

Successful teams will consider and make improvements in each category, when compared with their reference house and regional averages.

## Beacon's High Standard of Sustainability™ ([HSS](#))

- A 25% reduction in energy use in new homes
- A 15% reduction in energy use in existing homes
- A 25% reduction in water use in both new and existing homes
- Average indoor environment temperatures which meet the World Health Organisation minimum standards
- Adequate ventilation without excessive draughts
- Provision for waste minimisation during construction, renovation and operation of homes
- Consideration of sustainability issues in the choice of materials used for construction or renovation of homes.

## Prize Eligibility

Some Teams completed a Vision or Concept, some have also completed their consented Design, and others completed their House, with or without associated Furnishings.

Completed	Prize Eligibility
Vision or Concept	Vision of Practical Sustainable Living Communications
Design	Vision of Practical Sustainable Living Communications Design
House	Vision of Practical Sustainable Living Communications Design SHAC House
Furnishings	Design
Communications Campaign	Communications

## Submission Process

9 September 2009 – Tim will contact you to discuss report.

23 September 2009 – Tim will contact you to discuss how to submit report, photos, and files.

1 October 2009 – Final Report Due.

6-8 November 2009 – Auckland Area Judge Site Visits

12-14 November 2009 – Wellington / Christchurch / Dunedin Area Site Visits

19-21 November 2009 – Symposium and Prizes! – book your travel today

## The Team Report

The purpose of the report is to explain your vision of housing to support more sustainable living. Explain how you have progressed to this goal, why the general public would want designs of this type, and how the building and development community can successfully re-implement similar designs.

Please submit your report by posting a blog entry in your team's area at [www.shac.org.nz](http://www.shac.org.nz). Or email the document to [tim@shac.org.nz](mailto:tim@shac.org.nz).

The report outline follows:

Paste Team Logo Here



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### **INTRODUCTION – TEAM PRESS RELEASE**

Please provide a three to five paragraph description of the SHAC Team's vision for more sustainable housing and their response to this vision. Use the style of a press release.

This might consist of a description of what the project has accomplished what problem it is addressing, how it is part of the longer term vision of sustainable living, the key outcomes, technologies and techniques, and an indication of costs in the ideal case.

Please include quotes or perspectives from students, occupants, or those that participated or been affected by the project.

Paste Team Logo Here

The Unitec sustainable house project (ECOCRIB) was created to improve the internal environment quality of an existing student built house. The insulation was increased to twice the minimum value set by compliance documents for achieving building code requirements. This is because timber frame houses react too quickly to changes in the external environment. The ventilation system was added for air changes and to make use of hot air in the roof cavity.

The original idea was to build the house on site at Unitec, not connected to the national grid or any council water supply and adjoining an organic garden established 10 years before. It was to be part of an ecology/sustainability centre for Unitec. A change to the structure of Unitec and the current economic turmoil has resulted in the house not being built. The all up budget of \$235,000 (including alternative energy systems and landscaping) became a victim of the economic sustainability of Unitec. 'If the building can be modelled is it necessary to build it?'

A key outcome for the Ecocrib is achieving a HERS rating for the building of 7.5 stars. This confirms it as a low energy home and well above 2008 minimum building code standards. The rating was done on the plans as submitted to council and for the house alone. No energy systems were shown on the plan.

To coincide with the designing and building of the Ecocrib, students from the Bachelor of Product Design were set the task to research into interior and exterior furniture design, fencing and screening design, kitchen design and bathroom design. They were then asked to design a product or product system that would either: reduce the amount of energy, water or materials used in production, and/or; contribute less waste into waste streams from manufacture, use or disposal, and/or; improve the indoor or outdoor environment, offer value for money and/or support a sustainable community. Senior Lecturer in Design Roger Bateman believes that:

"one of the biggest challenge the product design profession faces is to produce sustainable products. Actually designing sustainable products shouldn't be a choice it should be a requirement. Designers need to consider whether the materials they are using are damaging to the planet or sustainable,"

Bateman believe designers also need to understand life cycle analysis and how this can assist when designing products. 'The SHaC09 challenge has acted as an excellent catalyst for product designers to think deeply about their work and the impact their design decisions can have on the eco-sustainability of their products' he says.

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## 2 TECHNICAL JUDGING CRITERIA

Describe the main features of the house that support more sustainable living.

Report the Heating Energy Load (MJ/annum) for the entire house as given in your HERS report. Report the HERS star rating. Compare house with Beacon High Standard of Sustainability. Report how your assumptions of living style compares with assumptions for HERS.

For each of the SHAC judging criteria, describe in one or more paragraphs how your design will give an improvement over how we live today with less reliance on resources. Refer to the [SHAC Judging Criteria](#). Arguments will vary from the technical (eg increasing efficiencies, insulation) to the transformational (eg offering a better life in a new location, xeriscaping, different housing and urban forms, high quality and pleasingly compact housing, etc)

We suggest this section to be in the style of a Build Magazine article, describing the features for the design and building community. [2-4 pages]. The article must cover each of the SHAC Judging Criteria.

An Example of a BRANZ technical article is at the Build Magazine web site:

[http://www.branz.co.nz/cms\\_display.php?st=1&pg=2172&sn=62&forced\\_id=yesUH](http://www.branz.co.nz/cms_display.php?st=1&pg=2172&sn=62&forced_id=yesUH)

### **Sustainability case study [Roman Jaques with Heidi Mardon]**

Follows the design and build of a more sustainable urban house in Hamilton.

- \* [Difficult task of choosing materials wisely](#)
- \* [Passive design strategies](#)
- \* [Planning the new building](#)
- \* [Waste diversion during deconstruction](#)

SHAC Judging criteria to address:

Energy and Indoor Environmental Quality, Water, Materials, Waste, Affordable and Suitable for Purpose, Supporting a Sustainable Community

A number of Product Design students focused on water reduction during product use and this was manifest in the design of tapware and baths. Kyle Backhouse Smith designed a bath that not only reduced the amount of water required to have a 'luxurious' bathing experience but he also ensure that the bath shell was insulated to keep the water hotter for longer.

Damon Stenhouse focused on designing a centre for the kitchen that would support the family. He designed a central 'island' that is a food preparation surface, a dining surface and worktable for kids and parents to share. His design uses forestry certified timbers combined with metals that do not require paint finishes.

For the exterior of the Ecocrib John Tilling designed a set of planters that can clip onto the gutter downpipe and create a dramatic hanging garden that obscures this often un-sightly plastic component. The product designers worked on concepts from storage to water harvesting products to lighting to furniture that can inhabit the areas in a room that are often wasted.

The HERS rating for this house confirms that it would need little energy to reach world health organization standards. The use of warm air from the roof cavity was part of the plans but the use of cool air from the south side of the house to cool it in summer is an unknown quantity. The Hebel aerated concrete panel system achieved Department of Building and Housing accreditation during this project proving it fit for purpose and costing marginally more than conventional brick veneer. This type of material has less embodied energy in manufacture and greater insulation values. An advantage with the extra insulation is less thermal gain in summer thereby reducing the need for inverter heat pumps, air conditioning and energy spikes in summer.

A black water system using worms and grey water system using a series of plant filter beds for evaporation was never finalized for permit due to staff changes.

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### 3 OVERVIEW OF PROGRESS AND CHALLENGES TO DATE:

A very interesting outcome of the SHAC project is the sharing of stories about what teams wanted to do, but could not for various reasons. For example, teams have had troubles getting materials approved, finding the funds to adapt overseas design guides to the New Zealand Environment, or sourcing system components at a price comparable to what is available overseas.

What design elements or strategies did your team wish to consider but could not include in the design? Why?

Design - Prototyping. Due to limited budget students could not undertake sophisticated model making or prototyping. For some students rough model making was enough for them and the staff to be confident that their approach was suitable. In other cases the lack of detailed model making meant that the communication aspect of their design was not fully realized.

Design students wanted to work with the Unitec building students to construct 'intelligent' interior walls that could contain products thus eliminating the need to double up on material usage. Examples of this would have been full height and width storage walls, illuminating walls, grey water systems and lighting systems. Due to budget restrictions and the house build being stopped these ideas could not be pursued.

Funding became the major issue for the Ecocrib team. The initial concept was conceived before the Shac project got under way. There was a willingness within Unitec for different disciplines to work together e.g. Design Schools intelligent wall systems. A change to senior management and the loss of much support for the project resulted in funding allocated to other areas

The new faculty members questioned the need to build when it can be modeled to see how it performs. This has higher priority. Improvements can be made before construction at the design stage potentially negating the need for costly renovations twenty to thirty years later.

Council approval was an issue as well. Auckland City Council was the only one in the Auckland region who had not endorsed the Hebel panel system. There was agreement on issuing a building permit for five years with the right to occupy the building. The Ecocrib team wanted occupants in the dwelling for a minimum of two years in order to have reasonable data. Hebel's panel system has now been approved by the Department of building and Housing

(please extend box as needed), or provide separate document.

## 4 TEAM FINDINGS

Please list the main findings from your experience. What recommendations do you have for someone who wants to attempt a similar project at your institution? This includes but is not limited to technical, process, support, and management areas.

**Main findings** – Design. Product Design students accepted the challenge to participate in SHaC09; they understand the need to work collaboratively on projects and to find new solutions to the challenge of ‘designing sustainable solutions for the future’. Regarding sustainable materials; design students were frustrated by the lack of availability of sustainable materials available to them in NZ. Designers working in Europe and America have a readily available pallet of materials that can be substituted for non-recyclable plastics or a much wider array of energy reducing light sources. Designers in New Zealand are hampered by the lack of availability of such materials and the lack of availability of New Zealand centric data on materials specific to New Zealand making Life Cycle Assessments difficult to carry out and make relevant. Undertaking the SHaC09 challenge has highlighted the need to find out exactly how to integrate sustainability into an already overcrowded curriculum and finding the right balance of design skills and sustainability knowledge. It is certainly true that students who wish to study sustainability in design are a certain type of student and attracting these students to study is a challenge.

**Collaborative** – Unitec’s Ecocrib entry was a collaborative project involving Applied Trades (UATI) Design and Landscape Architecture. They used the Ning social networking site to collaborate and this proved to be very useful. Dell ebooks and Nokia N95 smart phones were given to the students to make data sharing easy and fun. Regular COPs were held to update students on the latest software and Web 2.0 tools. Students in Design and Landscape made good use of the tools and technologies and their interaction can be seen at <http://designprojects.ning.com>

**Budget** – This is a difficult area to comment on. For Designers perspective the budget was always going to be an issue; prototyping is always expensive and often out of reach of the student. Programmes do not have the funds necessary to pay for students projects to be built therefore sponsorship is very often necessary. This is especially so with the building because of a high capital input. The timing of the recession did not do the team any favours. The 2008 enthusiasm of sponsors disappeared completely in early 2009. Unitec’s Ecocrib site on the Mt Albert campus had no electrical or water connections adding another fifty thousand dollars for alternative energy generation.

**Bigger picture thinking** – In these difficult financial times money needs to be spent well. Computer models will enable us to design buildings that perform to criteria to ensure sustainability before outlaying money for the building process. The less energy used over the lifetime of the building and the greater timeframe before any major intervention or renovation makes it more sustainable. If the world as a whole is using 1.5 times the available resources the longer economic lifespan of a building and contents must increase its sustainability. There is a requirement here to design flexibility into the use of buildings. The challenge is the development of software to forecast how a building will perform and building in a more controlled environment to reduce waste.

## 5 TEAM MEMBER COMMENTS

Please solicit comments from your team members about their experience. Emotional as well as reasoned responses are good for communicating the successes and challenges of this project.

The easiest way to collect these responses may be to have your team members sign up to the SHAC site at <http://www.shac.org.nz/main/authorization/signUp> and ask them to answer this question when they sign up.

Roger Bateman. I found the SHaC09 project very worthwhile. We integrated SHaC09 into the curriculum and ran a semester long project on sustainable design. Students were required to design concepts or products that answered the SHaC09 criteria whilst at the same time could be used/retrofitted into any existing or future interior. It was allowing for this diversity of approach that pushed the students beyond the project brief.

Robert Tait. It was truly an interesting but very frustrating project. Building students set up the Ecocrib website as part of a technology paper focusing on sustainability. They identified the problems and with the support of course facilitators wrote the brief. Frustrating for all when funding did not eventuate and the house was not built.

(please extend box as needed), or provide separate document.

## 6 COMMUNICATIONS CAMPAIGN

Please list promotions, communications and research outputs. Please list current and expected. Use either a formal (as below), or informal style as convenient. Attach copies of Media and Publicity Achieved by the team.

Faculty of Technology and Built Environment – Website as a link on the main Unitec site.

- No research outputs to date.

Design – none to date.

(please extend box as needed), or provide separate document.

## 7 COLLABORATION AND INVOLVEMENT

Please list your team members, email, and a few word description of their role.

(Building Staff) Robert Tait, Daniel Fuemana, Don Mardle, Steve Withers (Building Students) Daniel Boot, Graham Byron, Augustine Fepuleai.

(Built Environment Staff) Linda Kestle, Harry Roedel, Steve Hutana

(Product Design Staff) Roger Bateman, Martin Boulton, Cris de Groot, Isaac Flitta (Product Design Students) Damon Stenhouse, Jane Hakaria, Jesse Hinde, Elliot Grainger, Mark Buntzen, Winne Wu, Anne Feng, Akira Zhong, Oli Perilo, Mark Coulson, Kyle Backhouse-Smith, Natham Apiata, Michael Burr, Kristina Martin, John Tilling, Rebekah Williams.

(Landscape Architecture Staff) Penny Clifflin, Ian Henderson and students

(School of Communication Staff) Sara Donaghey, Ed Mason, Tim Marshall and students

Engineers; Rob Foster, HFC: Civil & Structural (north) Ltd.

Dave Convery & Bruce Green ( Geotech engineers)

Associate Professor Shane West, Head of Building and Construction Management, University of Canberra, Australia. (Project collaborator)

Auckland City Council; Mark Ulrich, Eion Scott, Rob Woodger, Bill Vautier

## 8 BUDGET

Please provide an indication of the significant budget items for the house construction working from your published plans. For houses that have yet to be sold, these numbers will not be published until after sale. Please attach a spreadsheet.

## 9 KEY PHOTOS

Please supply 5-10 hi-res photos of the project. Action shots of team, construction, design, and photos or rendering key concepts.

## 10 CONSENT DOCUMENTATION

Please provide copies of the consent documentation.

## 11 SURPRISE THE JUDGES

Please include, if desired, any more information or attachments that tells your team story to judges, the design community, and the general public.

*"The sustainability context expands the boundary of what design is, what it does and also who is involved, by drawing on dialogues, individuals and groups from outside design's traditional confines".*

Fletcher & Dewberry 2001

(please extend box as needed), or provide separate document.

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