

DEMONSTRATING NEW TECHNOLOGIES

The university perspective



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Overview – Working with Universities

- Why work with universities?
- What universities want out of the interaction
- Mechanisms for working with universities
- Project examples and lessons learned
 - Indow Windows
 - Trekhaus
- Resources



Why work with universities?

- Expertise
 - Add an R&D capability to any small business
- Credibility
 - Independent authoritative evaluation of technologies
- Equipment
 - Access to cutting edge specialized equipment that is too expensive for a small company to purchase and maintain
- Student labor
 - Excellent value (high quality/low cost) assistance with projects
 - Exposure to potential future employees
- Collaborations
 - Opportunities to expand engagement to include collaborative grant applications, etc.



What universities (faculty) want

- Educational and research opportunities for students
- University-friendly timetables
 - Undergraduate students are ideally suited for many tasks but work limited hours and may have limited availability due to exams or breaks
 - Most graduate students take 1-2 years to complete a degree and are supported (salary + tuition) by research grants
 - Most faculty have 9 month appointments. Engaging them in a significant way requires summer funding or advance notice to “buy-out” of a course in their teaching load
 - A project can be completed at an accelerated pace over summers, but competes with other projects for scheduling
- Publishable findings
- Beneficial and significant impacts on markets, science, and society
- Fair allocation of IP if appropriate

What universities (faculty) MAY not want

- Small projects that are too short term to be of substantial educational value to students and/or require substantial administrative overhead
- To gather data without an explicit research agenda
 - “do you want to monitor my project?”
- Overly restrictive non-disclosure agreements (particularly young untenured faculty)
- To serve solely as a testing facility/contract laboratory

Mechanisms for working with universities

- Fee-for-service
 - use/rental of equipment
 - small laboratory testing projects with hourly charges/invoices
- Small contracts (reduced IDC/overhead rates)
 - field measurement campaigns
- Partner on grant applications
 - OR BEST Commercialization program
 - Federal SBIR/STTR opportunities
- Student projects
 - Capstone projects for teams of engineering seniors (timeline is biggest limitation/constraint)
 - Case study projects for courses (e.g. building energy modeling course)

GBRL Project Examples

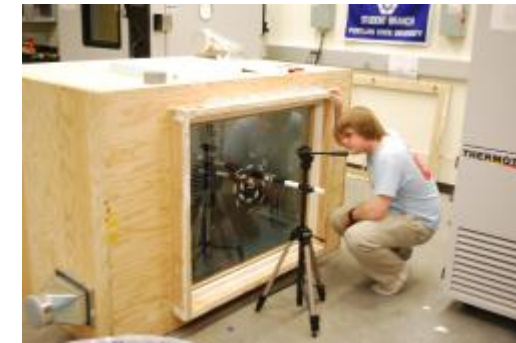
1. Indow Windows
2. Trekhaus

Indow Windows



Indow Windows

- September 2010 – initial fee-for-service project
 - Referred by OR BEST, Indow requests that we conduct laboratory measurements to evaluate performance of their product (<\$5k)
 - Accoustics, thermal performance, leakage



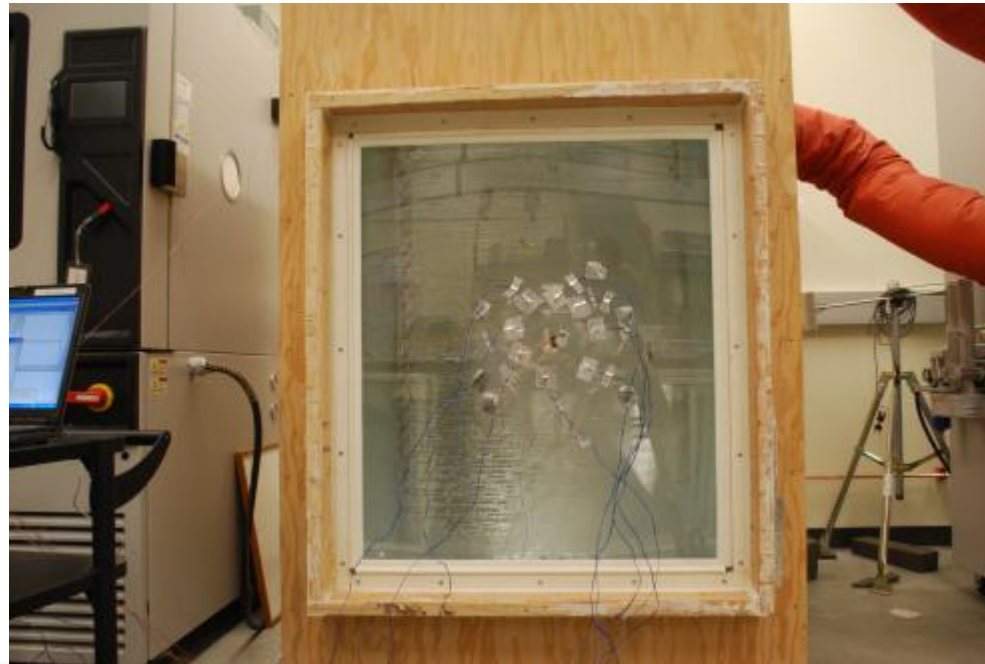
Indow Windows

- February 2011 – BEST Commercialization Grant
 - Additional lab testing
 - Testing and modeling in residential pilot homes
 - In-situ performance
 - Develop and validate models
 - Apply to other climates



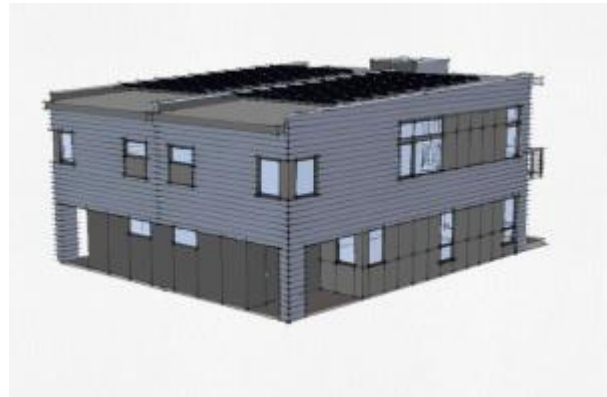
Indow Windows

- September 2012 – PDC/JIAC Regional Clean Technology Advance Initiative Grant
 - Accelerated life cycle testing
 - Laboratory testing of new designs



Trekhaus – passive house duplex

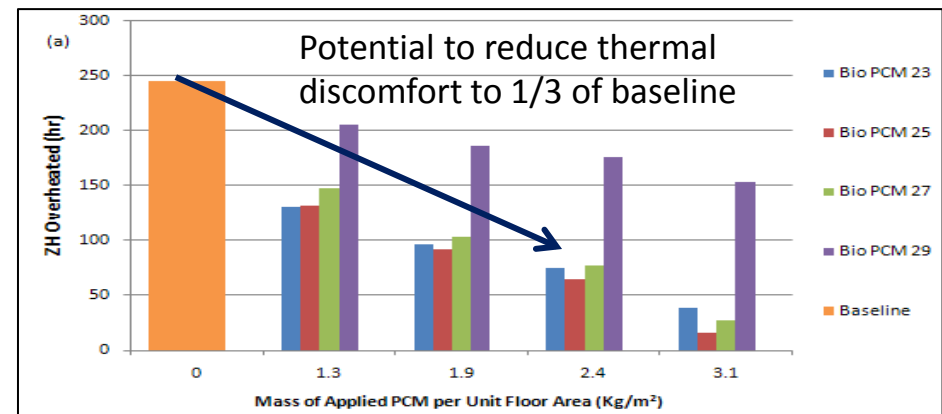
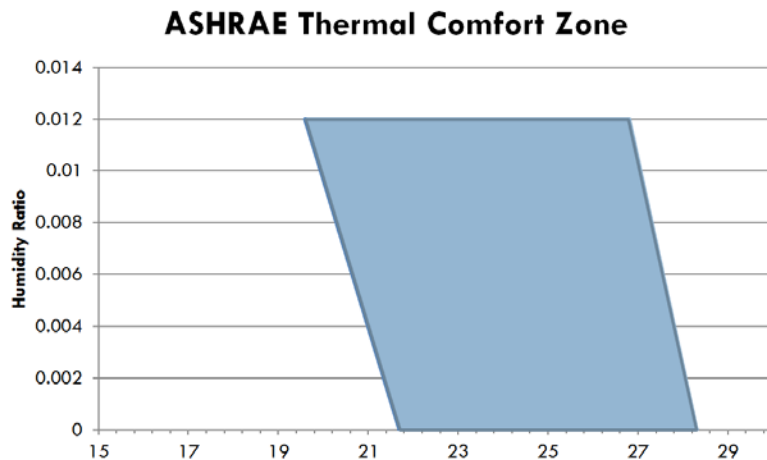
- Project team (owner, architect, contractor) contact GBRL
 - Referred by another Passive house collaborator
 - “Do you want to monitor our project?”



Trekhaus – passive house duplex

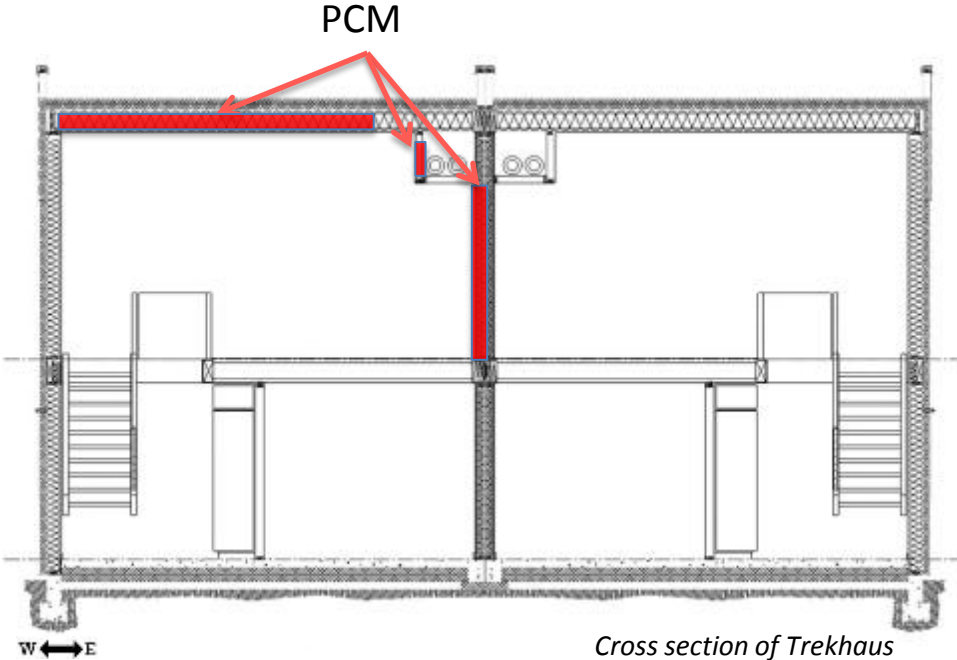


- Research question developed as a team effort
 - “Can Phase Change Material (PCM) improve thermal comfort in a super-insulated residential building?”
 - PCM moderates interior air temperatures by storing excess heat (~200 kJ/kg) in the form of melting a wax-like material embedded within the envelope.
 - Initial modeling study.... “yes”!



Install PCM in half of duplex and monitor every aspect of the building conditions & performance...

In ceiling



In walls

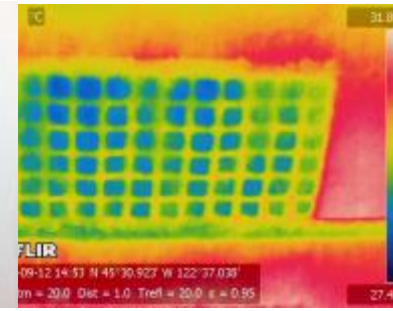


PCM mats had to be resized in walls to 24"x16" to fit the framing.



Trekhaus – passive house duplex

- Extensive monitoring possible because we were engaged during the project planning phase
- Funding: GBRL covered all extra costs using umbrella funding from US DoE. This is atypical.
- Extensive monitoring allows us to investigate a multitude of performance questions
 - HRV; heat pump water heater; PCM; IAQ; energy use behavior; thermal storage; PV power; etc.



Resources

- OR BEST Shared-User Research Facilities (see oregonbest.org)
 - SuNRISE (UO)
 - OR Process Innovation Center for Solar Cell Manufacturing (OSU)
 - Green Building Research Laboratory (PSU)
 - Green Building Materials Laboratory (OSU)
 - Energy Studies in Buildings Laboratory (UO)
 - infraStructure Testing & Applied Research (iSTAR) Laboratory (PSU)
 - High Performance Environments Laboratory (UO)
- University Tech Transfer offices