Reviving the Oldest Approach to Sustainable Design:
How Cultural Values and a Sense of Place Lead to Green Building Design

Greenbuild 2009
Phoenix, AZ
November 12, 2009
Reviving the Oldest Approach to Sustainable Design

Speakers:

Kim Tallbear – University of California, Berkeley
David Edmunds – Pinoleville Pomo Nation
Ryan Shelby – University of California, Berkeley

Moderator:

Michelle Baker – U.S. Environmental Protection Agency
Environmental Impact of Buildings

- Nearly 40% of US energy use;
- About 40% of US carbon dioxide emissions, the primary greenhouse gas (GHG), along with other GHG and air pollutant emissions;
- Indoor environments where Americans spend nearly 90% of their time, and which can present threats to human health and productivity;
- Over two-thirds of all non-industrial secondary materials generated in the U.S.;
- More than 10% of US freshwater usage;
- A major portion of urban runoff that is among the leading sources of water quality impairment.
What is sustainable building design?

A truly sustainable project would be one that consumed resources in an amount less than or equal to the resources it created. Its waste must serve as fuel for some other process, so that there is, in effect, no waste at all...
Pre-Contact Housing Types

DOMINANT TYPES OF SHELTER. After Driver and Massey.

http://www.kstrom.net/lsk/maps/houses/housingmap.html
Kim TallBear
Assistant Professor of Science, Technology, and Environmental Policy
UC Berkeley

Democratizing Greenbuilding
The modernity vs. tradition binary remains powerful today in shaping research in the natural and social sciences and their philosophies as well as in the public policy which such research serves. Such work typically treats the needs and desires of women and of traditional cultures as irrational, incomprehensible, and irrelevant—or even a powerful obstacle to ideas and strategies for social progress. No wonder modernity’s social progress has been delivered to only such a small minority of the world’s citizens.

Weaving new technologies with tradition

Non-Westerners and others considered to be “traditional” are compelled to engage with the techno-scientific fruits of Western modernity. They always end up weaving what is new and technological with the traditional—with practices, materials, concepts, and moral frameworks with which they are already familiar.

PPN-CARES Prototype

Pomo dwelling gives an idea of roundness, but Pomo “traditional” dwellings varied over time and space.
The predicaments of morning light and roundness for building “green”

Oaks covered by galls in early morning light

PPN-UC-Berkeley CARES
Final design,
Science and technology too are conditioned by particular histories of power and social and cultural practices. They are entangled with political economies.

The economies and cultures of science and technology condition peoples’ lives. “Green” building and its standards and criteria are derived from certain values and they shape possibilities.

The PPN-CARES collaboration illustrates the democratization of science & technology that is possible when those involved accept that knowledge of nature and the deployment of technology is not possible absent power and values.
History of Indian Housing Policies
From Sustainable to Un-stainable towards Sustainable
Pinoleville Pomo Nation: Housing Issues and Aspirations

Where would the Pinoleville Pomo Nation like to go with their housing?
PPN housing today

- 3 & 4 bedroom
- Ranch style
- Stick built
- Suburban lots
- Single-use areas
- Central utilities
PPN housing & sovereignty

► A function of:
  - Crisis management
  - Total development costs & other funding guides
  - Professional limitations in rural areas
  - Challenge of recuperating the spirit of the past, lost knowledge & skills

► But NAHASDA is changing this
What’s to complain about?

► Insecure
  ▪ Against crime
  ▪ Nosy neighbors

► Expensive
  ▪ Energy and water bills
  ▪ Upkeep

► Unhealthy
  ▪ Poor air quality
  ▪ Toxic materials

► Culturally Alien
  ▪ Little social space for gatherings or guests
  ▪ Little storage for arts, food
  ▪ Small kitchen
  ▪ Square
  ▪ Dark
  ▪ Mass produced
Other aspirations

► Create work opportunities
► Reinforce traditional skills & aesthetics
► Engage youth
► Balance community solidarity with privacy
► Respect beliefs about nature, humans
► Promote tribal self-sufficiency, sovereignty
► Play a role in housing innovation
Struggling to get there

- Overcoming suspicions of science & scientists
- Finding the right partners
- Mobilizing resources
- Respecting the process
Why does it matter?

- Up-keep requires buy in
- Green living requires changing behaviors
- Neighbors are watching
- And....
  - We can, and should, learn from tribal traditions
  - Tribal people can innovate/redesign
Respecting Sovereignty and Supporting Tribes’ Visions for Sustainable Housing
Partnering with the Pinoleville Pomo Nation: A Co-Design Approach to Creating Sustainable Communities

Ryan Shelby
Alfred P. Sloan Ph.D. Student Scholar
Cofounder, Community Assessment of Renewable Energy and Sustainability

2009 U.S. Green Building Council
Greenbuild Conference and Expo
November 12, 2009
Agenda

► About Me
► Sustainability Technology
► New Product Development Processes
► Methodological Approaches
► The Pinoleville Pomo Nation
► Pinoleville Pomo Nation and Berkeley Partnership
► Innovation Workshop
► Pomo Inspired Housing Prototype
► Outcomes of the Partnership
► Final Thoughts: Lessons Learned
► Q/A?
About Me

► Home: Letohatchee, AL

► Status: 4th yr. Ph.D. student in Mechanical Engineering

► Research Focus: Sustainability, Product Design, Expert Systems, Bayesian Models

► Graduation: May 2011
Sustainability Technology

• Some technology solutions:
   Great concern about environmental impacts
Sustainability Technology: Adoption Rates

- Slow adoption by populous

- Common reasons:
  - ~90% of US residential sockets still contain incandescent bulbs (1)
  - ~25% decline from 2007 peak sales level of CFLs (2)

Source 1: US DOE, CFL Market Profile, March 2009
Source 2: Richard Karney, Energy Star products manager, letter to C.F.L. industry stakeholders, 09/18/09
New Product Development (NPD) Process

Opportunity Recognition

Idea Creation

Idea Selection

Idea Development

Idea Testing

Idea Implementation

Idea Expansion & Adoption
Central Tenets: Technology Driven Design Methodology

• Technology Centered Design focus:
  I. Performance
  II. Reliability
  III. Manufacturability
  IV. Price Points
  V. Time to Market
Central Tenets: Human Centered Design Methodology

- Human Centered Design focus:

  I. Better account for the end user needs

  II. Inform design with end user needs

  III. Maintain performance and reliability
Central Tenets: Co-Design Methodology

• Co-Design focus:

I. End user is expert on needs

II. End users and designers both control idea creation

III. Idea creation is done in the usage environment
The Pinoleville Pomo Nation is a Native American tribe located in Mendocino County.
The Pinoleville Pomo Nation: Ukiah Parcel

- The PPN’s land reserve consists of ~106 acres on two parcels.
Initial Meeting: Concerns of the Pinoleville Pomo Nation

- Rising heating and cooling costs
  - Drought conditions
  - HUD-financed housing provides basic necessities
  - No representation of the cultural and traditional values
Pinoleville Pomo Nation and UC Berkeley Partnership

► Engineering 10 is a freshmen engineering design class

► Project goal: Assess the needs and design sustainable housing that could be integrated into the tribal community
Codesign: Innovation Workshop 2008

► Workshop held to understand needs and brainstorm concepts with PPN.

► Good and Bad Technology Round Robin Session

► Split Group User Needs Assessment Session
  ▪ Elders
  ▪ Adults
  ▪ Youth

► Brainstorming on Conceptual Designs Session
Tribal Sovereignty

Economic Self Sufficiency

Culturally Defined Relations with the Non Human World

Innovation Workshop 2008: Framing Sustainability
Innovation Workshop 2008: Top Needs and Metrics

- Energy Conservation
- Learn and Use Traditional Techniques (Cultural Values)
- Privacy
- Exercise
- Storage
- Safety
- Comfort
- Lower Energy Costs
- Space
Innovation Workshop 2008: Co-designed Concepts

Conceptual Home Design 1 with Solar and Wind Power Generation
Innovation Workshop 2008: Co-designed Concepts

Conceptual Home Design 2 Wind Power Generation and Grey Water
Innovation Workshop 2008: Co-designed Concepts

E10: Pomo-inspired Housing Prototype
One female resident, Deborah Smith stated:

- **Personally, I really enjoyed working with all of the UCB and CARES students over the one-year project.** To see this project go from an original model all the way through to the completed prototype was amazing. The students worked very hard to create this project. They asked a lot of questions and seemed to take genuine interest in our needs, such as: our energy bills and gray water usage, and to keep this project as green as possible.

- **We had several meetings with the UCB and CARES students and from these meetings they were able to accurately assess and meet our “green” ideas and traditional needs.** Because of this project, I have become very interested in sustainable environments and architecture. I look forward to working with CARES members Ryan and Tobias on future energy feasibility studies and other projects.
One male, Asian-American student wrote in his design journal:

► Today was essentially the kick-off for our human-centered sustainable design project. To be honest, I'm rather excited about it. I was assigned to my first choice project - solar electricity generation for the Pinoleville Pomo Indian tribe. I've been interested in alternate forms of energy for a long time, and am eager to learn more about, not to mention have the chance to work on my first genuine engineering project.

► Today, we had our innovation workshop at the PPN reservation in Ukiah. Man-where to begin! Overall, I'd have to say the experience was a positive one. I mean yes, it was a bit of a hassle getting there and it was certainly a very long day, but I feel that the knowledge gained about the PPN people and their needs... It was a productive/informative day, and I look forward to beginning the design process with my team mates.
Draft Plan ‘A’ for PPN Sustainable Home

Plan not to scale
North is ↑

- Entry
- Dining Area
- Kitchen
- Mud Room
- Bathroom
- Living Room / Family Area
- Master Bedroom
- Bedroom
- Garage
Outcomes of Partnership

► Empowered the PPN to make informed decisions about various renewable energy options

► E10 students were able to develop professional and communication skills

► Federal funding secured to build culturally inspired sustainable homes and buildings; Construction began in Summer 2009

► DOE funding secured to perform renewable energy feasibility studies: solar, micro-hydro, biomass, etc.
Final Thoughts: Lessons Learned

- Don’t Repeat the Mistake of the 1970’s: Dictating from on high

- There is no one standard for sustainability; merely frameworks

- Sustainability is personal; must be defined by the end user

- Key is to harness the local knowledge within end user group

- Co-design changes the power dynamics to utilize expertise of all

- Co-designing Solutions Willingness to Adopt
Acknowledgements

- Leona Williams (PPN), Carrie Williams (PPN), Don Williams (PPN)

- Erika Williams (PPN), Deborah Smith (PPN), Monica Brown (PPN)

- David Ponton (PPN), Angela James (PPN)

- David Edmunds (PPN), Kimberly Tallbear (UCB), Michelle Baker (EPA), Alice Agogino (UCB)

- Yael Perez, Tobias Schultz, Francesca Francia, Cynthia Bayley, Che (Tommy) Liu, Yao Yuan, and Aaron Chang (UCB, CARES)
United Indian Health Services:
Potawot Health Village
United Indian Health Services: Potawot Health Village
Thank you!

Ask some sustainable questions
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