

Reviving the Oldest Approach to Sustainable Design:

How Cultural Values and a Sense of Place Lead to Green Building Design

Greenbuild 2009

Phoenix, AZ

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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





Kim TallBear

Assistant Professor of Science, Technology,
and Environmental Policy

UC Berkeley

Democratizing Greenbuilding

Modernity v. tradition, facts v. values

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.

Sandra Harding, *Sciences from Below: Feminisms, Postcolonialities and Modernities* (2008)

A sepia-toned photograph showing a person sitting in the doorway of a thatched hut. The person is holding a large, round basket or bowl. The hut is constructed with thick, vertical thatch. The background is dark and indistinct.

gives an idea of roundness, but Pomo "traditional" dwellings varied over time and space

[illegible]

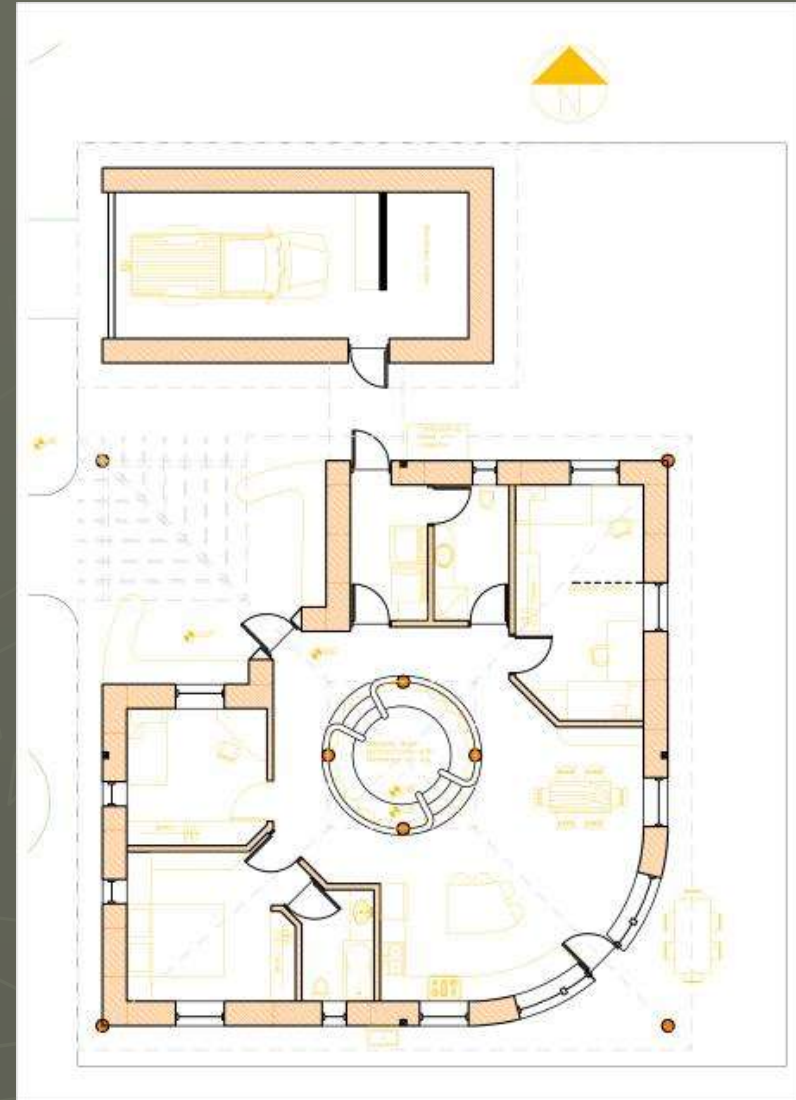
Non-Westerners and others considered to be “traditional” are compelled to engage with the techno-scientific fruits of Western modernity. They always end up weaving what is new and technological with the traditional—with practices, materials, concepts, and moral frameworks with which they are already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

The predicaments of morning light and roundness for building “green”



Oaks covered by galls in early morning light

PPN-UC-Berkeley CARES
Final design,





Democratizing science and technology by acknowledging values and power



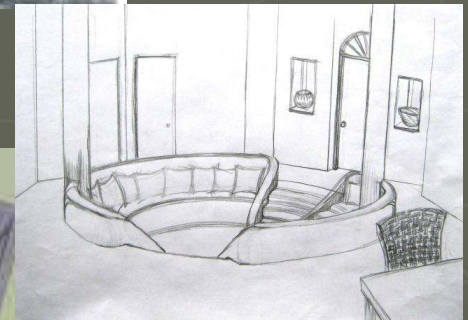
UC Berkeley - PPN Co-design workshop (April 2008)



- ▶ 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-sustainable towards Sustainable



Pinoleville Pomo Nation: Housing Issues and Aspirations



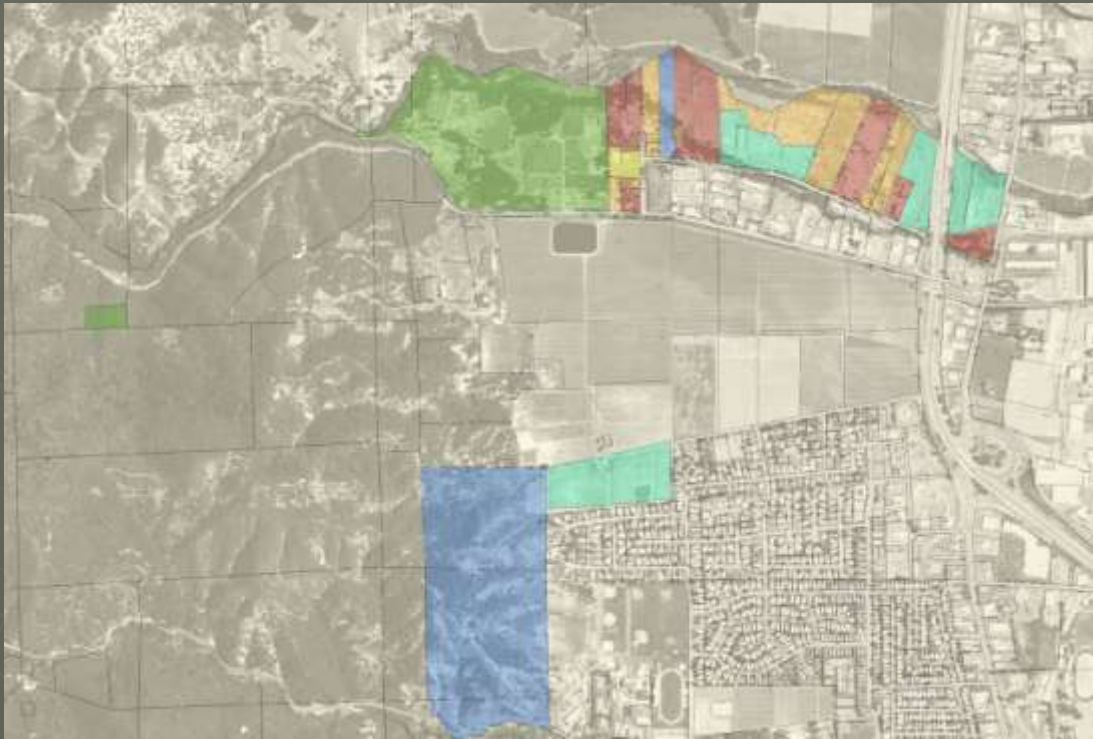
Where would the Pinoleville Pomo Nation like to go with their housing?

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?



Account Number	Bill Date	Amount Due	Due Date	Amount Enclosed
XXXXXXXXXX	05/16/2006	\$822.59	06/02/2006	

3942-38-894-194847-1 AT 4.344

PHOLEVILLE INDIAN RESERVATION
ECONOMIC DEVELOPMENT
500 PHOLEVILLE RD STE. B
URAH CA 95482-7121

PG&E
BOX 997001
SACRAMENTO CA
95899-7000

05/16/06 Please return this portion with your payment. Thank you. Receipt

ACCOUNT SUMMARY		
Service	Service Dates	Amount
Electric	04/08/2006 To 05/07/2006	\$421.34
Energy Commission Tax		1.25
TOTAL CURRENT CHARGES		\$422.59
Previous Balance		2,254.39
04/22 Payment - Thank You		2,254.39
TOTAL AMOUNT DUE		\$822.59
DUE DATE - 06/02/2006		

Local Office Address
2011 N STATE ST
URAH CA 95482

Account Number
194232158-2

May 2006

- ▶ 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?

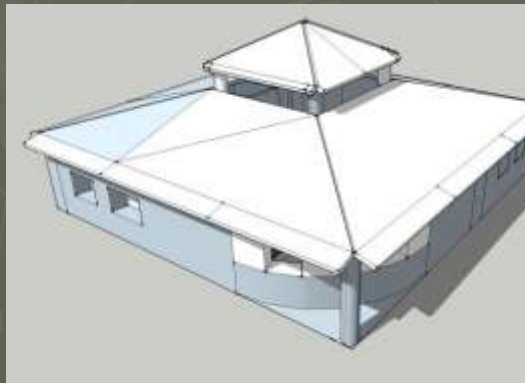


FIG. 4. TEMPORARY VILLAGE OF TULE HOUSES constructed on the lake shore in Lakeport. Traditional Pomo houses were made of hollow tule rushes which provided insulation against cold and heat.

Photograph possibly by O.E. Meddaugh, ca. 1899. Courtesy of Lake County Historical Society, Kelseyville, Cal.

- ▶ 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

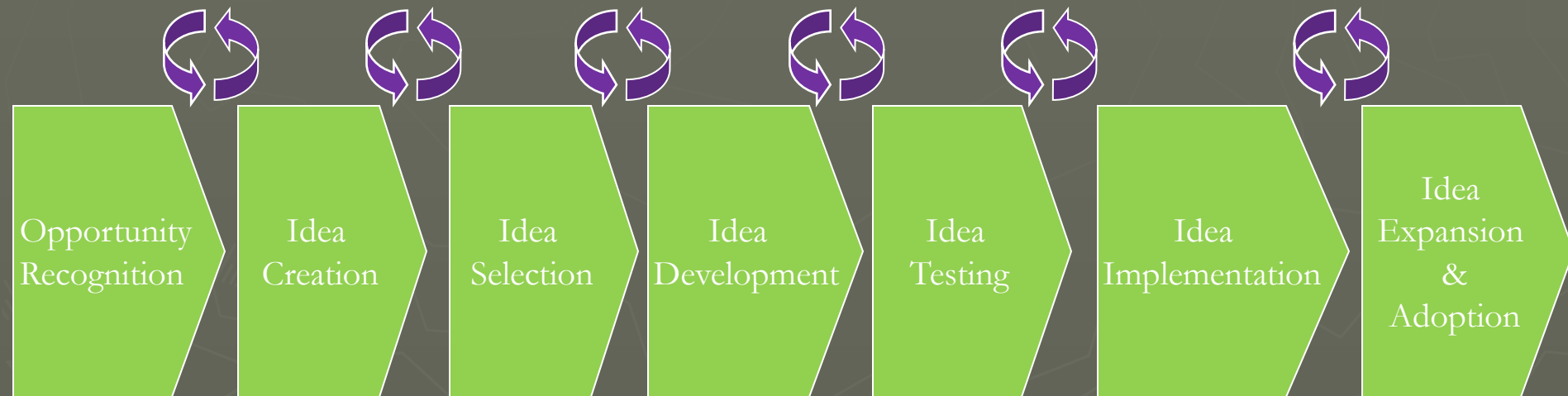
- ▶ Slow adoption by populous

- Common



- ~ 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



Central Tenets: Technology Driven Design Methodology

- Technology Centered Design focus:

I. Performance

II. Reliability

III. Manufacturability

IV. Price Points

V. Time to Market



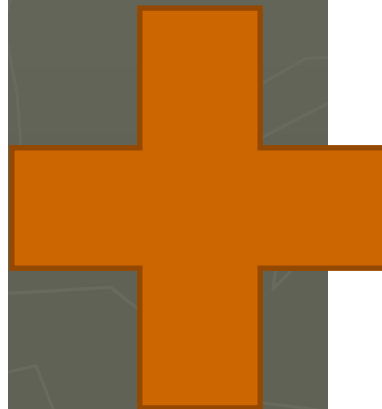
Central Tenets: Human Centered Design Methodology

- Human Centered Design focus:

I. Better account for the end user needs

II. Inform design with end user needs

III. Maintain performance and reliability



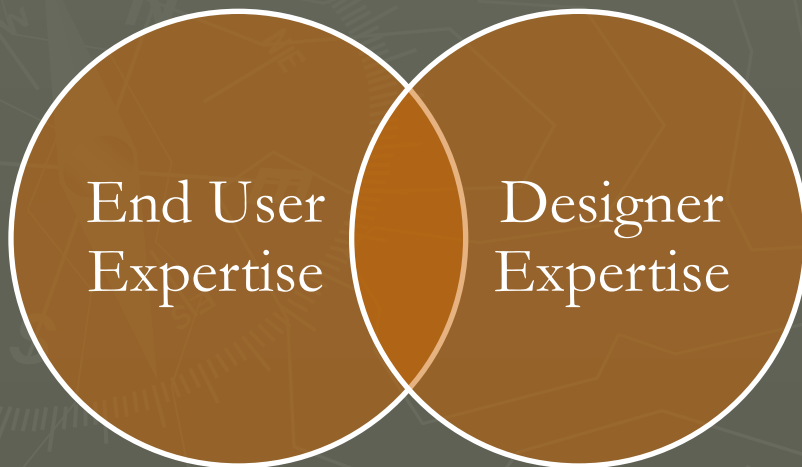
Central Tenets: Co-Design Methodology

- Co-Design focus:

I. End user is expert on needs

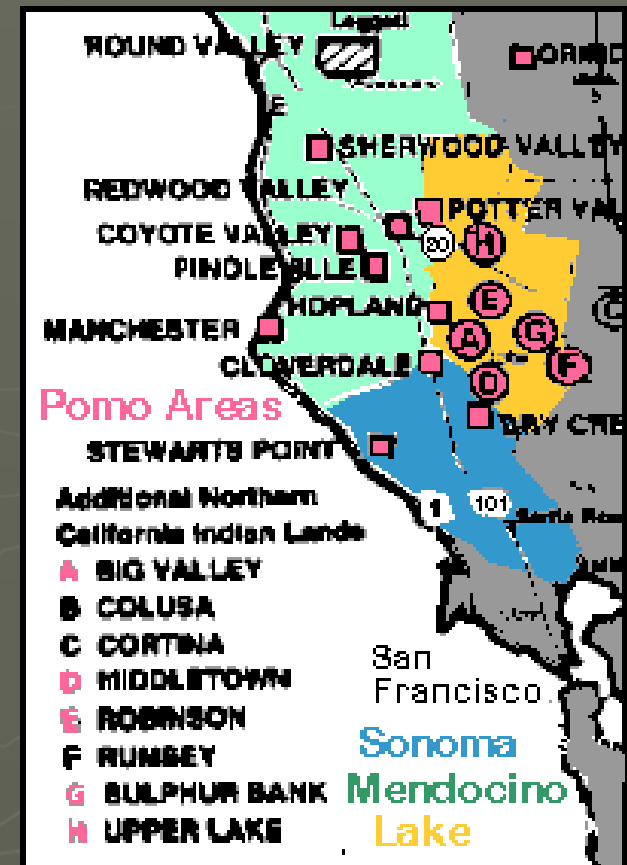
II. End users and designers both control idea creation

III. Idea creation is done in the usage environment



Pinoleville Pomo Nation Case Study

- 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



Innovation Workshop 2008: Framing Sustainability

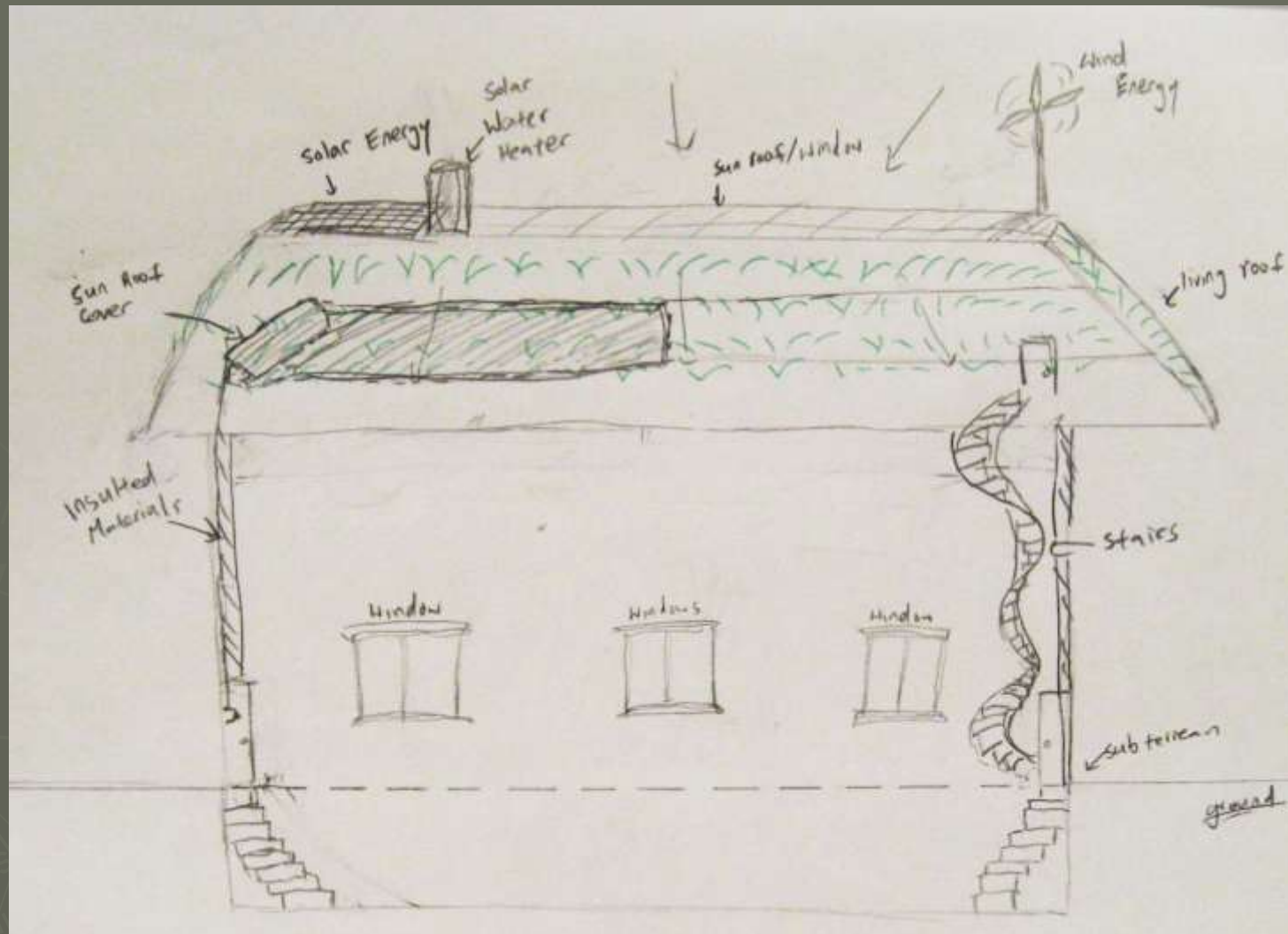


Innovation Workshop 2008: Top Needs and Metrics

- ▶ 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



Conceptual Home Design 3 with Grey Water, Wind, and Solar Power Generation

E10: Pomo-inspired Housing Prototype



Outcomes of Innovation Workshop 2008: PPN Quotations

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.*

Innovation Workshop 2008: Students' Quotations

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 teammates.*



Final Housing Design: Innovation Workshop 2009



Final Housing Design I: Summer 2009



Draft Plan 'A' for PPN Sustainable Home

Plan not to scale



North is ↑



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

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United Indian Health Services: Potawot Health Village



United Indian Health Services : Potawot Health Village



Thank you!



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