

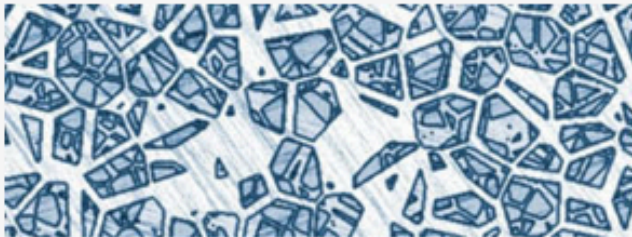
Sustainable Tribal Buildings & Renewable Energy Systems

ALICE M. AGOGINO
A CITRIS RESEARCH EXCHANGE



WICKED PROBLEMS IN SOCIO-ECOLOGICAL SYSTEMS: SYMPOSIUM AND WORKSHOP

SATURDAY, 10/26/13 9:00AM – 10/27/13 5:00PM
112 WURSTER HALL



It has been 40 years since Berkeley Professors Horst Rittel and Melvin Webber articulated the concept of "wicked problems," problems that are challenging because they are ill-defined, complex and constantly changing. In their seminal article in *Policy Sciences*, they argued that the profusion of wicked problems throughout social policy domains such as urban design and city planning posed dilemmas for the scientific approach to problem-solving, which was developed to deal with "tame" problems.

The notion of wicked problems is still widely embraced by designers and policy makers working on issues ranging from climate change to healthcare reform. Yet this formulation, rooted in modernism and emphasizing positivist science and technology, has been subsequently challenged by alternative epistemological approaches such as Marxism, feminism, and post-structuralism.

The Wicked Problem SYMPOSIUM on Saturday, October 26, will critically interrogate the history and evolution of Rittel and Webber's idea of the "wicked problem," and appraise the utility of wicked-problem thinking in the light of contemporary issues of significance to society from a broad and interdisciplinary perspective.

The related WORKSHOP, on Sunday, October 27, will address the more specific topic of Rittel and Webber's work as it pertains to the issues of urban and regional sustainability, and will feature talks that will later be featured as papers in an accompanying issue of the journal *Landscape and Urban Planning* (LAND). The extended conference is jointly organized by the College of Environmental Design (CED) at the University of California, Berkeley, the Global Institute for Urban and Regional Sustainability (GIURS) at the East China Normal University, Shanghai, and LAND.

Interdisciplinary Design Seminar, Spring 1989



THE DESIGN PROCESS

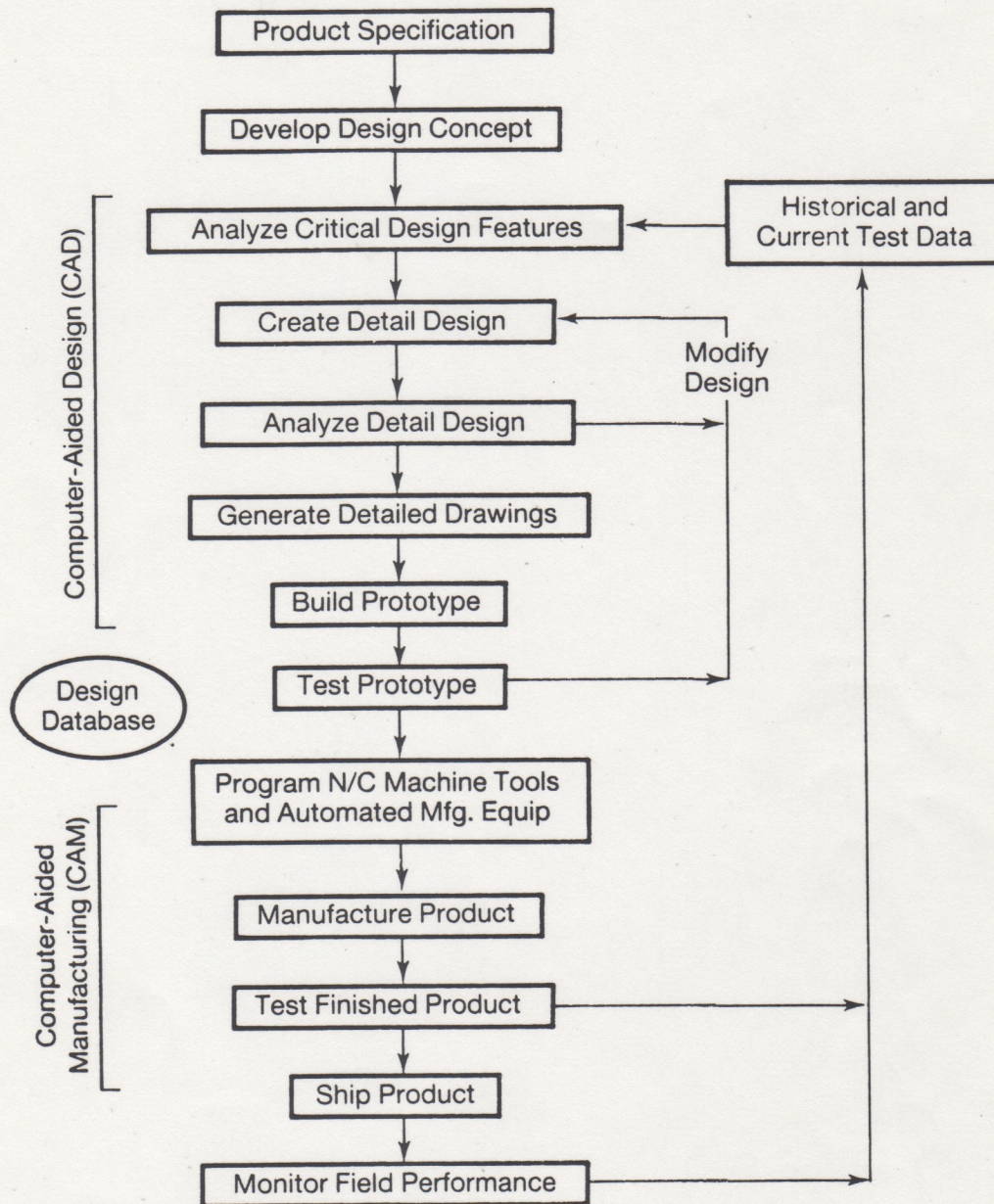


FIGURE 1-4
Typical steps in the design of a new product.

- ✓ Specification
- ✓ Concept Design
- ✓ Analyze
- ✓ Detail Design
- ✓ Detailed Drawing
- ✓ Build Prototype
- ✓ Test Prototype
- ✓ Manufacture
- ✓ Test Final Product
- ✓ Ship Product
- ✓ Monitor Field Performance

Wicked Problems

Policy Sciences 4 (1973), 155–169

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Dilemmas in a General Theory of Planning*

HORST W. J. RITTEL

Professor of the Science of Design, University of California, Berkeley

MELVIN M. WEBBER

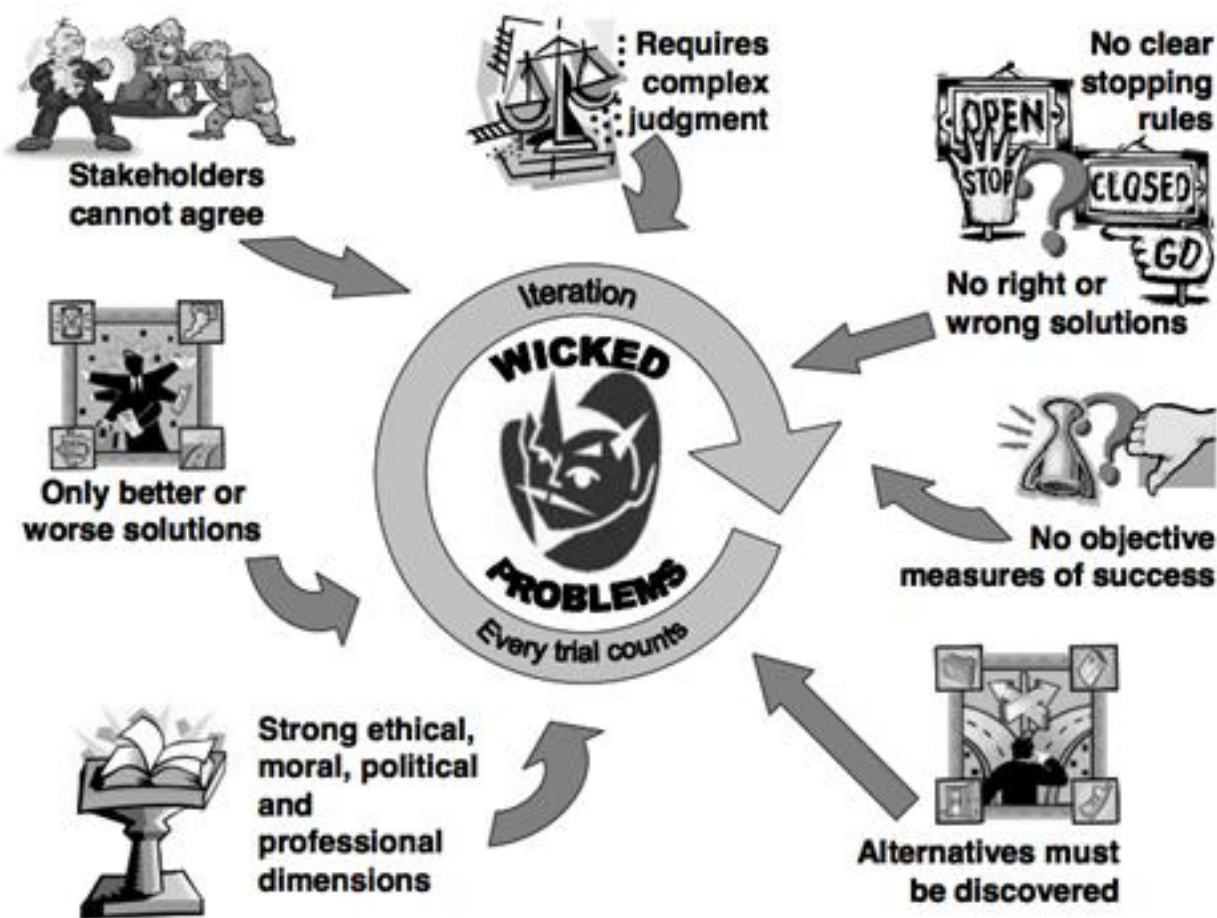
Professor of City Planning, University of California, Berkeley

ABSTRACT

The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems. They are “wicked” problems, whereas science has developed to deal with “tame” problems. Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the undisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about “optimal solutions” to social problems unless severe qualifications are imposed first. Even worse, there are no “solutions” in the sense of definitive and objective answers.

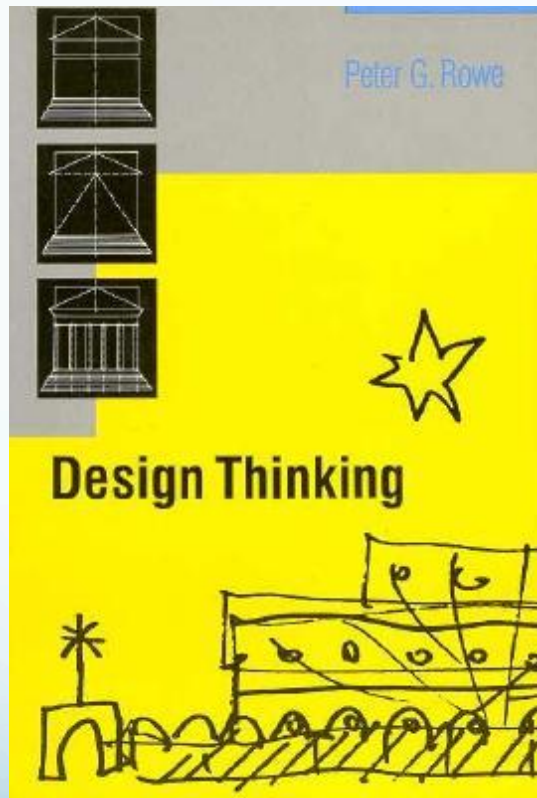
- Horst Rittel & Mel Webber define Wicked Problems, 1973.

Wicked Problems



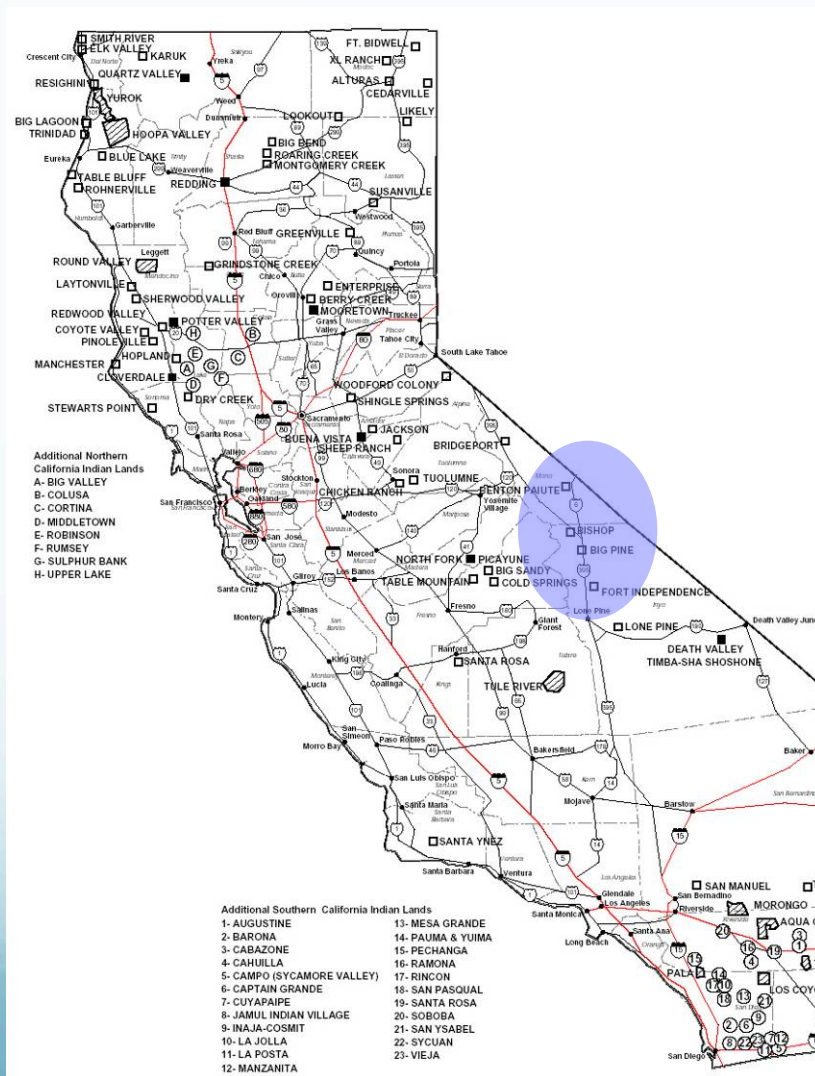
- Ethnographic Design Thinking
- Transdisciplinary Design
- Design as a Discourse
- Iterating/ Prototyping to Learn
- Community/ Co-Design Methods

Wicked Problems & Design Thinking



- Peter Rowe, 1987: Underlying structure of inquiry common to all designing. Limitations of a procedural view.
- **Peter Rowe** summarizes well-defined, ill-defined, and **wicked problems** from Horst Rittel.
- Design Thinking symposium, Delft University of Technology, 1991.
- Buchanan, Richard, "Wicked Problems in Design Thinking," *Design Issues*, vol. 8, no. 2, Spring 1992.

Framing: A Native American Story



Acorn preparation as practiced by the Mono Indians of Fresno and Madera Counties till about 1923

Black and White Oak acorns provided all their “bread food”

-- Michael Barry, Point Forward

Framing: Tame or Wicked Problem?



This Mono woman is preparing acorn meal, a slow difficult process of pounding and grinding with a shaped stone

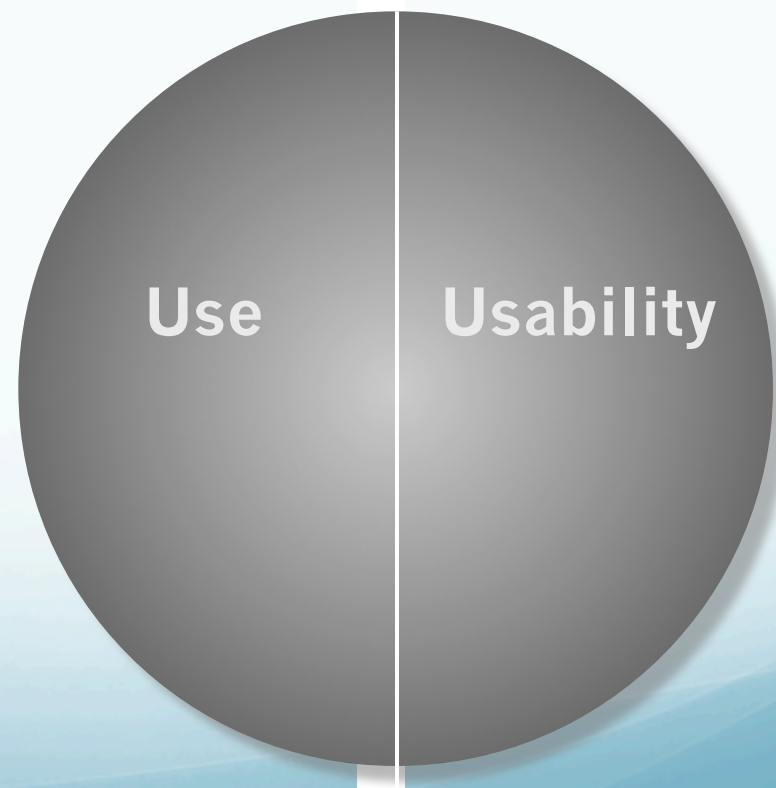
She is using a Community Mill, a large flat granite boulder with many holes which serve as mortars



Framing: Use & Usability

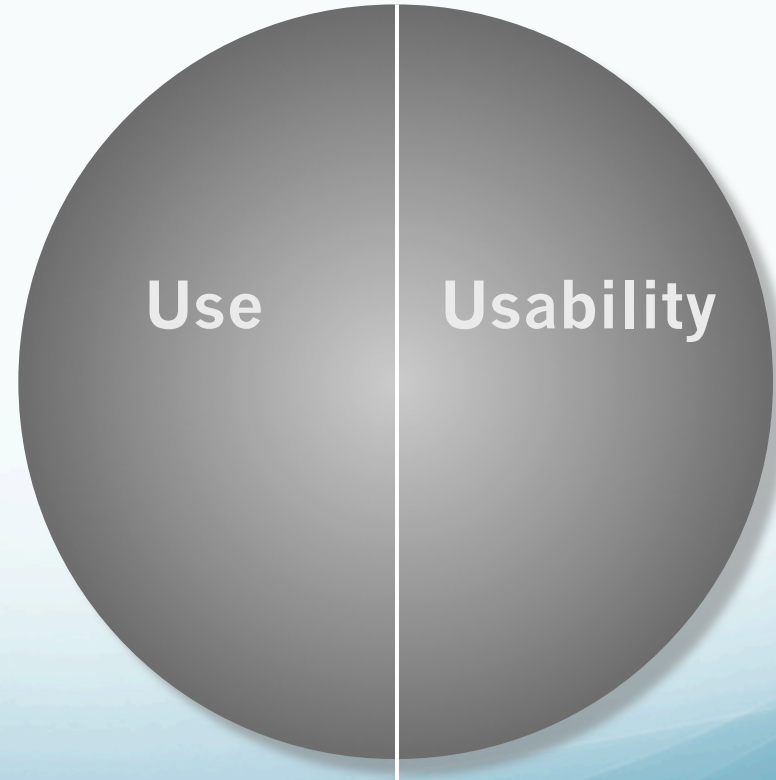
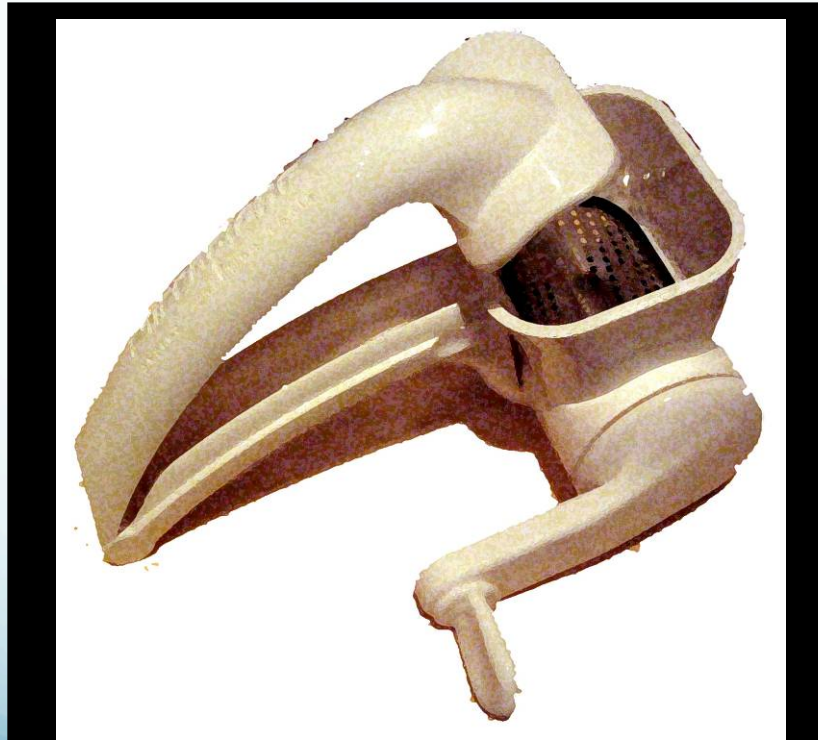
Function and Ergonomics

“It is a hard, time-consuming job for us.”



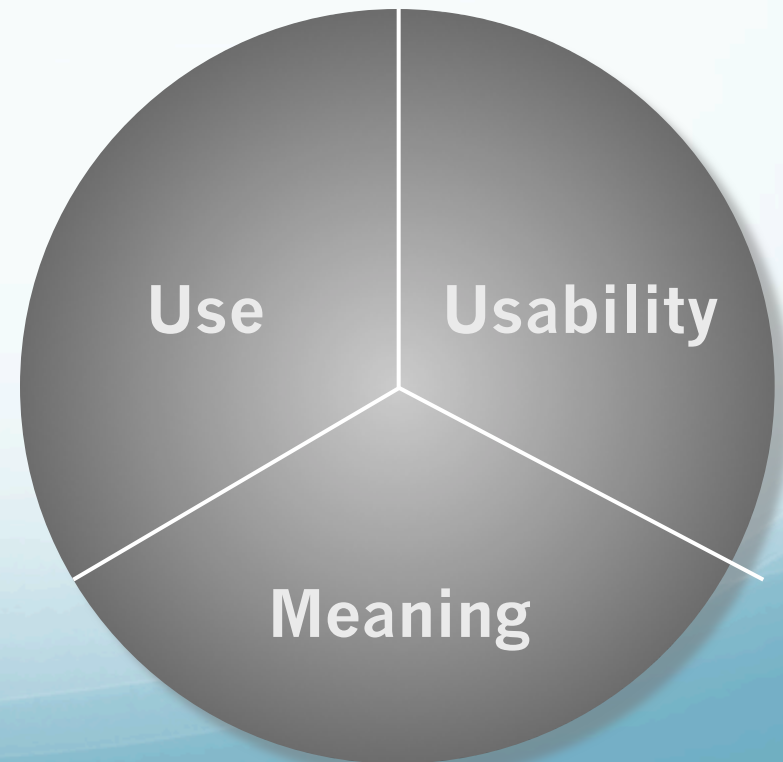
Framing: Use & Usability

Solution



Framing: Meaning

- *“From the village...to this boulder we have always come to sit and work. We sit and pound acorns, gossip, scold the children and make food for our tribe.”*
- *“The children play nearby and can hear our stories and songs.”*
- *“To pass the time, we tell stories and sing the songs of our people and how they live in the world.”*
- *“The acorn is mother to us all and this stone is where we give her life and she gives us life”*



Pinoleville Pomo Nation (PPN) Case Study

- The Pinoleville Pomo Nation is a Native American tribe located in northern California, USA



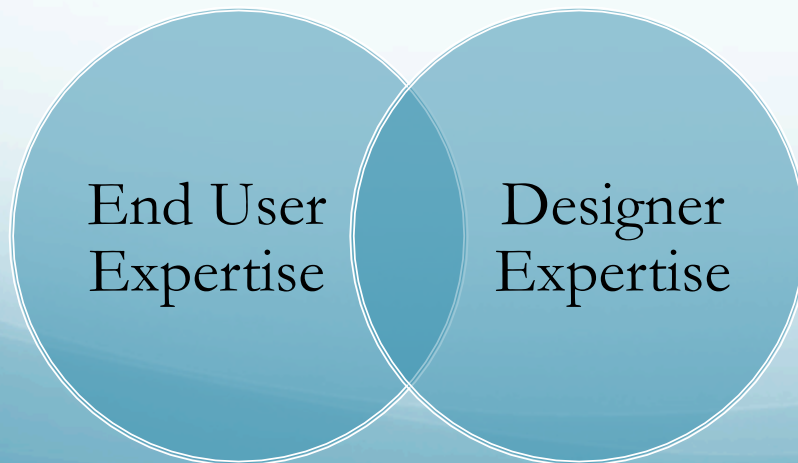
Concerns of the Pomo Nation

- Rising heating and cooling costs
- HUD-financed housing
- Did not reflect cultural and traditional values
- Drought conditions



Innovation Workshops

- End user is expert on local needs
- End users and designers both control idea creation
- Idea creation is done in context
- Gives agency during the design, development, and implementation



First PPN Innovation Workshop

Assess the needs and design sustainable housing that could be integrated into the tribal community



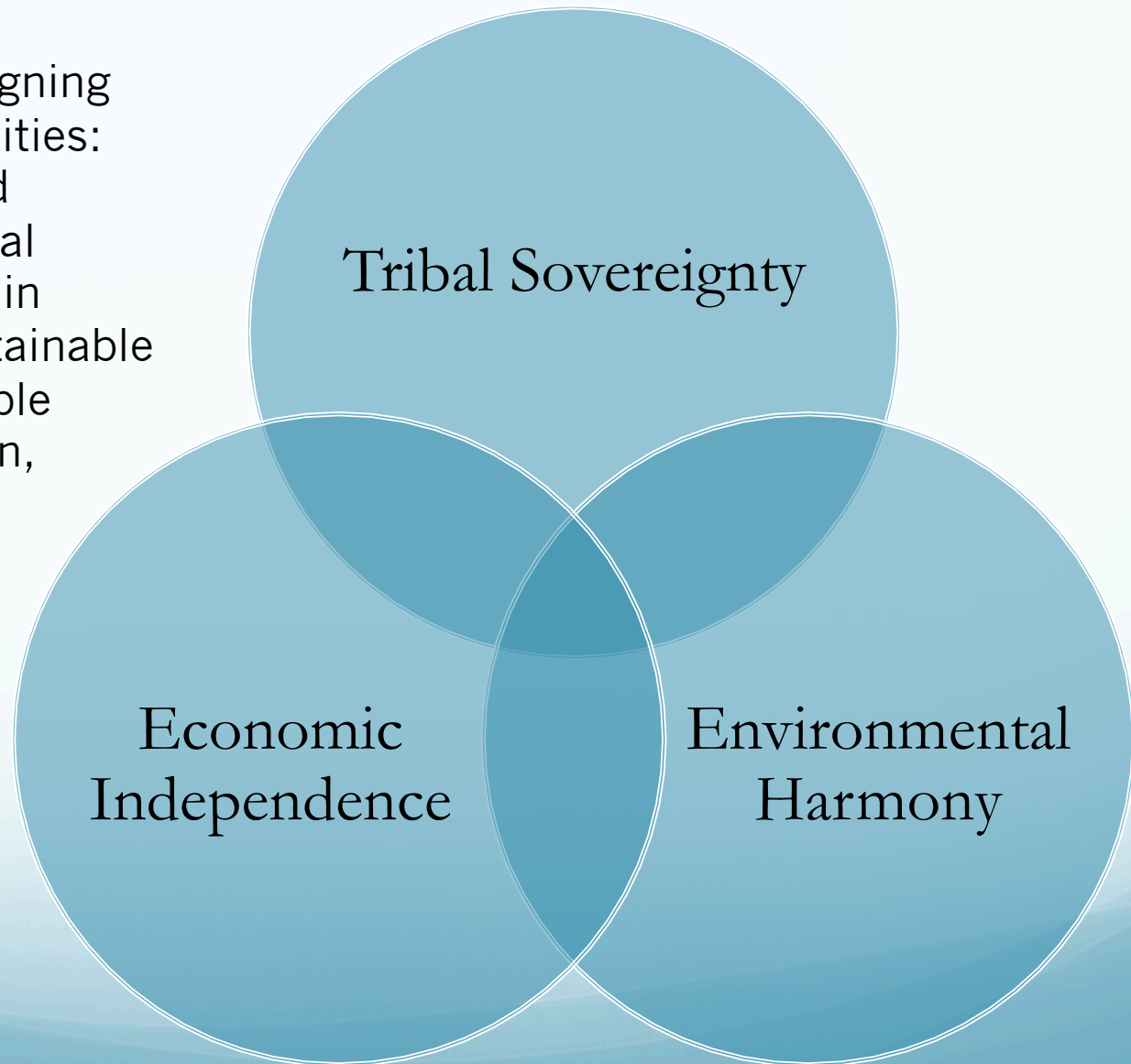
Top Needs and Metrics

- Learn and Use Traditional Techniques (Cultural Values)
 - Round Shape
 - Natural Materials
- Energy Conservation
- Water Conservation
- Privacy
- Exercise
- Storage
- Safety
- Comfort
- Lower Energy Costs
- Space

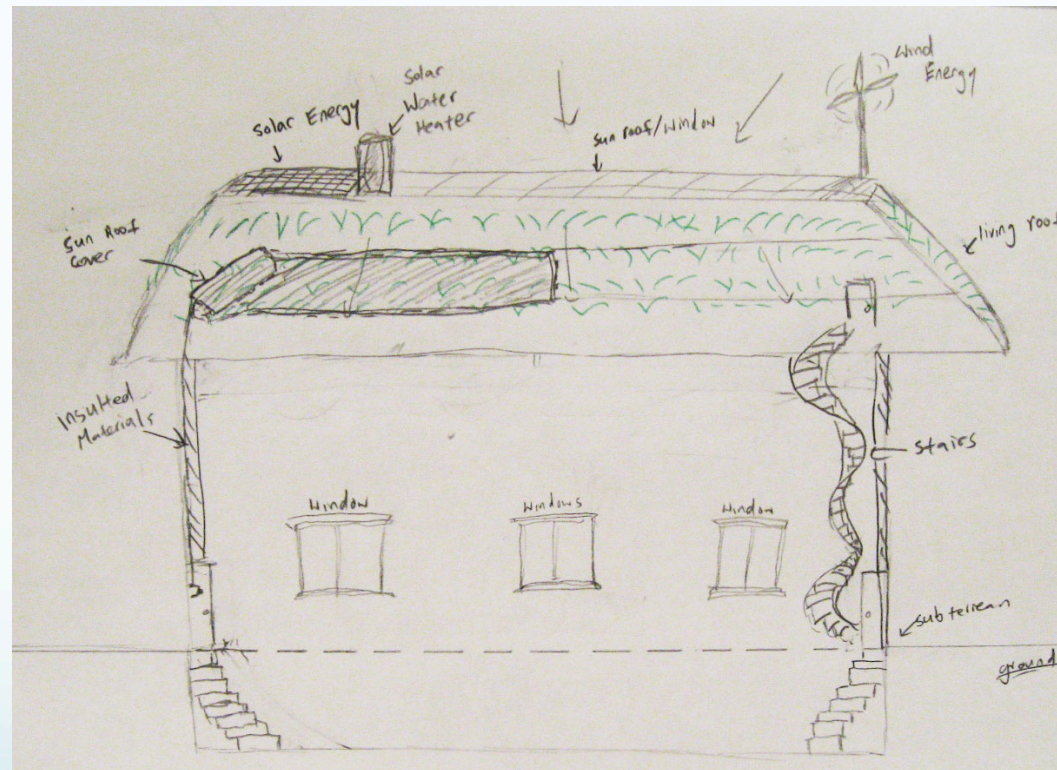


Framing Sustainability

Ryan Shelby, Ph.D.
Dissertation: Co-Designing
Sustainable Communities:
The Identification and
Incorporation of Social
Performance Metrics in
Native American Sustainable
Housing and Renewable
Energy System Design,
Spring 2013

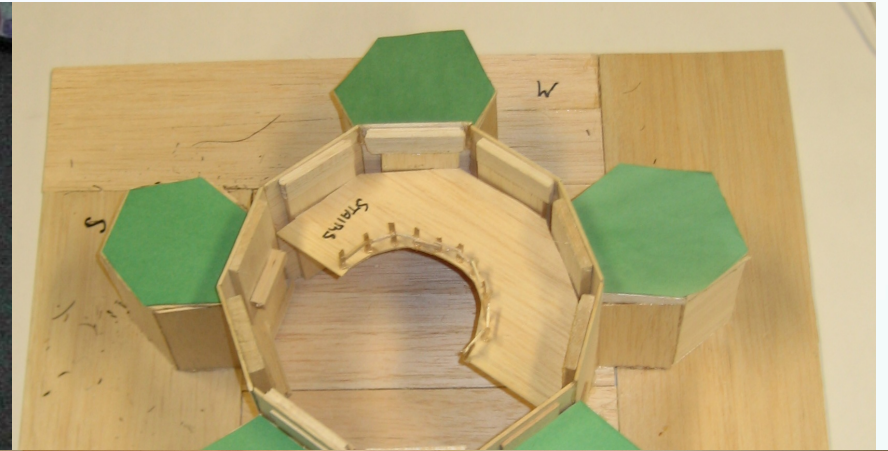


Early Co-Design Concepts



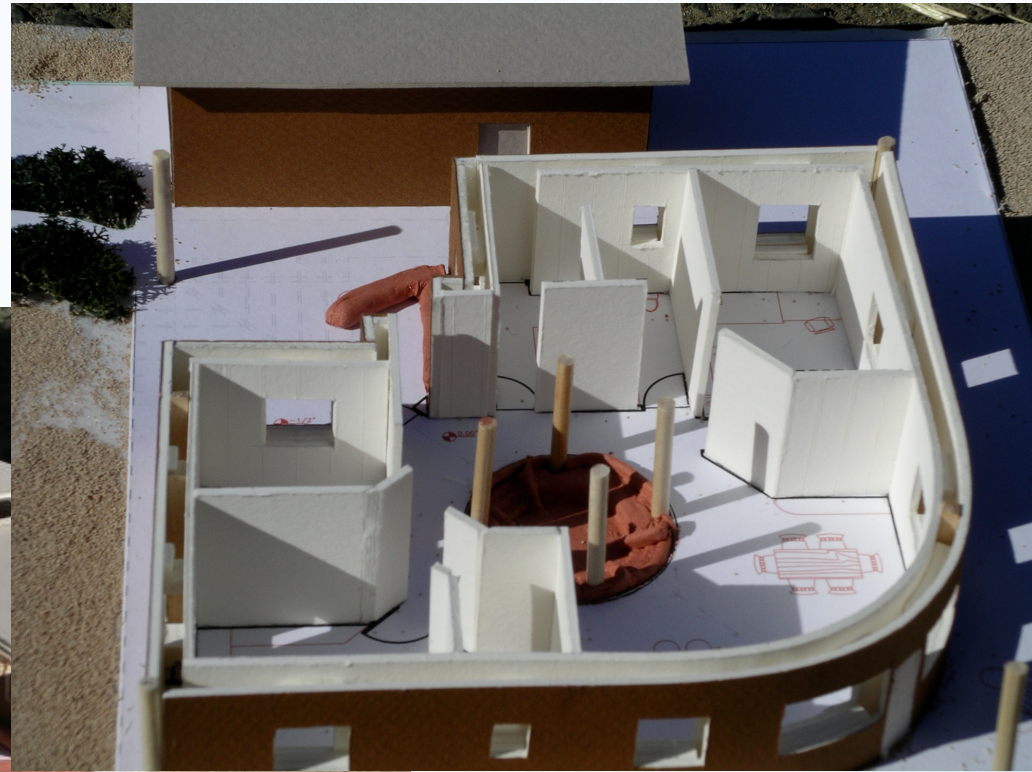
Conceptual Home Design with Solar and Wind Power Generation

Pomo-Inspired Housing





Final Co-Design Mockups





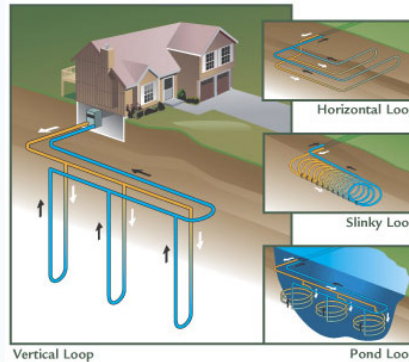
Co-Built

Co-Designed



Renewable Energy Solutions

- Geothermal heat pumps
- Solar electric
- Solar thermal
- Micro-hydroelectric
- Wind



- Deployment and development plan that has the renewable energy options and designs that meets the PPN's cultural, environmental, and economic requirements

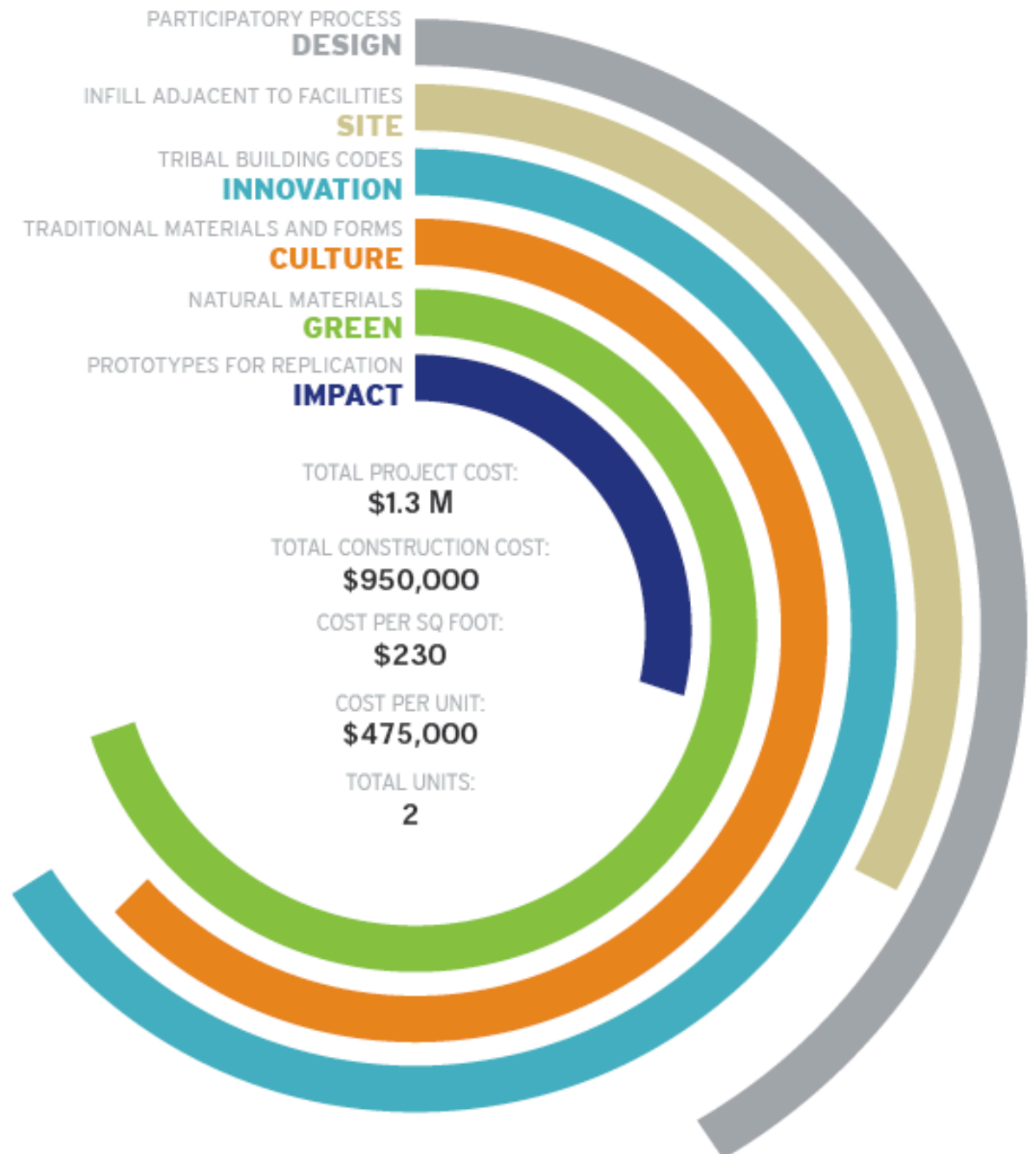
Impact

- Empowered the PPN to make informed decisions about renewable energy options
- Capacity building in green technologies
- Students were able to develop professional design and communication skills
- HUD funding secured to build culturally inspired sustainable homes and buildings: ~**\$1.2 Million in 2009**
- DOE funding secured to perform renewable energy feasibility studies: ~**\$120,000**



Renewable
energy-efficient
systems were co-
designed and
built by tribal
citizens

Rainwater
catchment and
grey-water
systems reduce
vulnerability to
water shortages



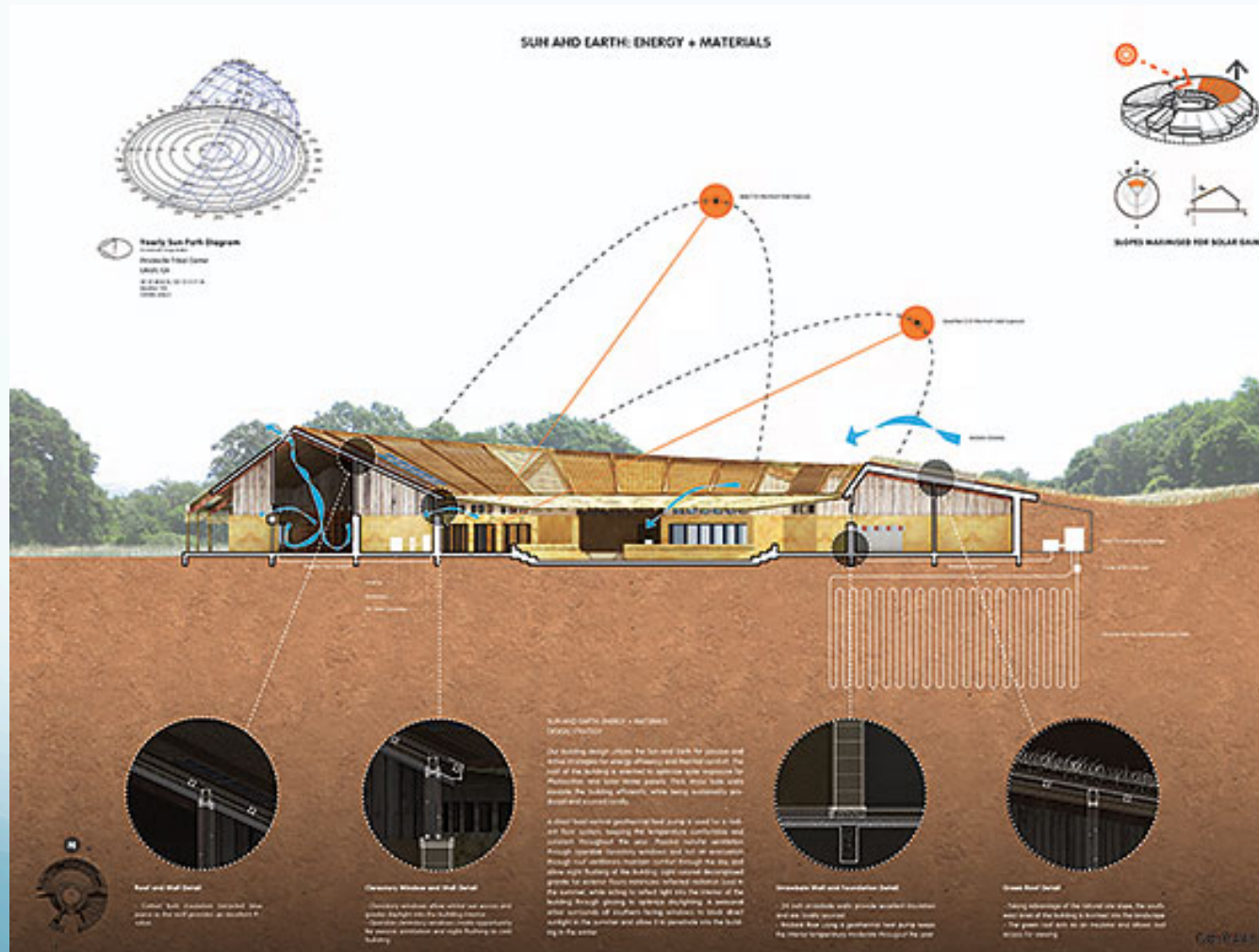
Smithsonian's Museum of American Indian Case Study

Luce Foundation Video



- Sustainability in Products & Practice: <http://vimeo.com/35283830>

Next: Living Cultural Center

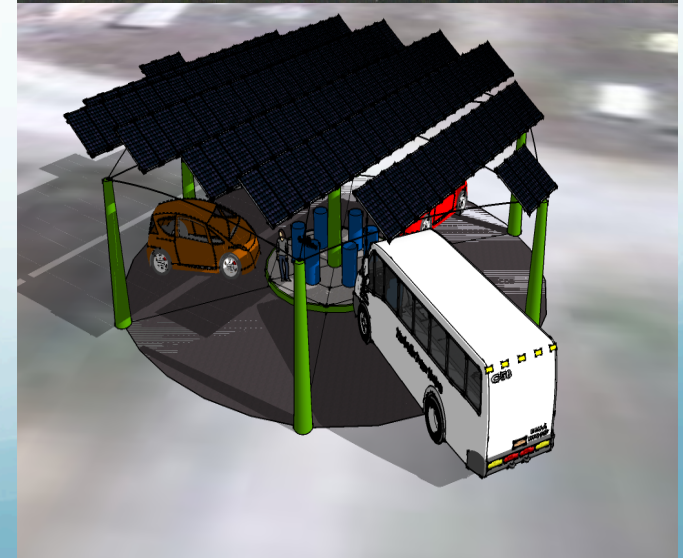


Interwoven
communities:
Participlace
2012 1st Prize
Winner

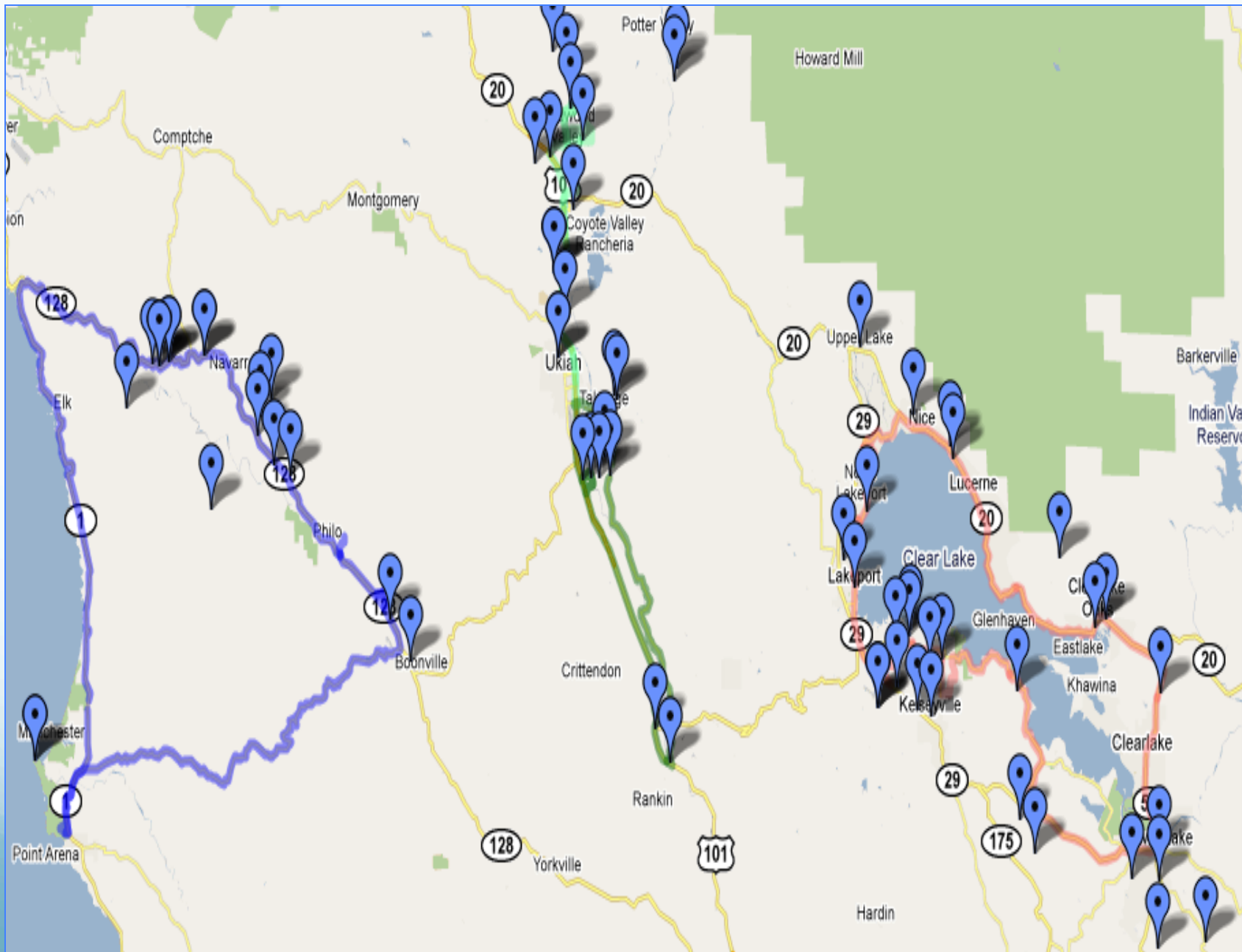
Yael, Perez,
Ph.D.
dissertation,
Global Architects
Meet the Place –
Bridging Gap
through ICT

Kashia Electric Vehicle Green Transportation Corridor

- Metropolitan Transportation Commission Kashia Pomo Indian EV Grant
 - Green Corridor along HWY 101 and 1
 - 2 year pilot project
 - 6-8 EV charging stations
 - Locations: Stewarts Point in Sonoma County, Santa Rosa, Ukiah, Lakeport
- Target Goals:
 - Expand alternative energy transportation services to tribal communities and the general public
 - Reduce greenhouse gas emissions
 - Improve air quality and decrease climate change impacts
 - Lay the groundwork for expanding EV charging stations to other North Bay tribes
- Potential Vehicles: Nissan Leaf
 - 24 kW-hr battery
 - 14,464.8 kWh for 60,270 miles
 - minimum array size is 10.5 kW



Potential Electric Vehicle Charging Stations and Routes



Next Steps



- Closing the CARES loop and assessing sustainable living
- PPN & Kashia MicroGrid (power, internet, lighting, electronic entertainment, EVs)

PPN & EPA Partners

- 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)



Tribal CARES Team



Student Team Leaders: Ryan Shelby & Yael Perez



Tribal Cares Supported with CITRIS
Seed Funding