Pinoleville Pomo Nation
Renewable Energy Feasibility Study Status

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Strategic Plan

- Self-sufficiency
- Job creation
- Revenue creation
- Cultural integrity
Strategy Into Energy Goals

- Choose energy technologies that reflect cultural values
- Small-scale, multi-source energy to maintain flexibility and resilience
- Potential to be off-grid
- Local M & O capability to generate jobs
- Support local projects first
- Sell enough to cover perhaps 50% of costs
Constraints

- Small land base
- Checkerboard
- Small population
- Few in-house tech skills
- Newly back on the land
- Little money
Opportunities

- New projects coming
- Access to potential markets
- Access to technical support
- Access to biomass
- Favorable micro-geography
Approach

• Multi-tribal

• Small pilot projects to test principles, build support, develop capacity

• Tied to other projects (prototype house)

• Co-design process
  – Tribal citizens as experts/designers
  – Centering cultural values
  – Providing educational opportunities
Introduction to CARES

• CARES is an engineering and sustainability assessment organization based at UCB

• Participants include community, industry, academia, and government reps

• Team members disciplines:
  – Engineering (Mechanical, Electrical, Civil)
  – Architecture
  – Business
  – Environmental Design and Planning
Mission of CARES

• Enable consumers and stakeholders to make informed decisions about sustainability and renewable energy technologies

• Co-design and implement solutions that meet end user needs
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: 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
Codesign: Innovation Workshop 2008

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

• Focus on is on the principles and goals of end user

• Good and Bad Technology Round Robin Session

• Split Group User Needs Assessment Session
  – Elders
  – Adults
  – Youth

• Brainstorming on Conceptual Designs Session
Innovation Workshop 2008: 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
Innovation Workshop 2008: Co-designed Concepts

Conceptual Home Design 1 with Solar and Wind Power Generation
Conceptual Home Design 2: Wind Power Generation and Grey Water
Pomo-inspired Housing Prototype
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
Renewable Energy Feasibility Study: Overview

- **Focus areas:**
  - micro-hydroelectric,
  - moderate-temperate geothermal electrical,
  - geothermal heat pumps,
  - biomass,
  - biogas,
  - wind,
  - solar electric,
  - solar thermal

- **Deliverables:**
  - Deployment and development plan that has the renewable energy options and designs that meets the PPN’s cultural, environmental, and economic requirements
Renewable Energy Feasibility Study: Work Done So Far

- Historical Avg. Electricity Consumption of PPN Homes
Renewable Energy Feasibility Study: Work Done So Far

• Estimated Avg. Electricity Consumption of PPN Homes after Efficiency

20 – 30% electricity savings projected
Renewable Energy Feasibility Study: Work Done So Far

- Determined the solar insolation potential of the Sozzoni property for 2010
I. Conduct Series of Innovation Workshops
   • Understand previous work done
   • Identify fundamental needs and preferences of Pinoleville Pomo Nation
   • Prioritize focus areas and determine product specifications
   • Establish synergy with other Native American Nations

II. Assessing energy potential of resources
    • Solar insolation
    • Volume flow rates
    • Wind speeds at varying heights (30 m, 50 m, 70 m, 100 m)
    • Yamobida (Pomo for wind hole creek)
    • Biomass potential from local forest companies
    • Biogas potential from local waste
III. Co-design energy systems for deployment

- Reconvene with PPN to analyze data and design system
- Culturally appropriate
- Multi-source, resilient
- Power Generation Capacity
- Economic ROI
- Job Creation Potential
- Maintenance and Operation by PPN
- GHG emissions production and ROI
- Reliability of Supply
- Market for Sale (i.e. sell back to grid)
Final Thoughts: Lessons Learned

• 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
A Note on Engineering Support.

• How can small tribal nations meet engineering needs?
  – Need to have technical partners worthy of trust
  – Need to work with other tribes
  – Need to control costs
  – Prefer iterative, co-design process to assure social structures and cultural values honored

• Creating an innovation hub with CARES
  – Available and accessible to tribal nations
  – Responding to a wide range of tribal needs
  – Committed to building tribal capacity, educating youth
  – Associated with university, but responsible to tribal nations
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Ask some sustainable questions