



The Yurok Tribe's Energy Program: First Steps



DOE Tribal Energy Program Review Meeting
Award #'s DE-FG36-03GO13117 & DE-FG36-05GO15166
November 8, 2007

**Presented By: Austin Nova, Yurok Tribe &
Jim Zoellick, Schatz Energy Research Center**





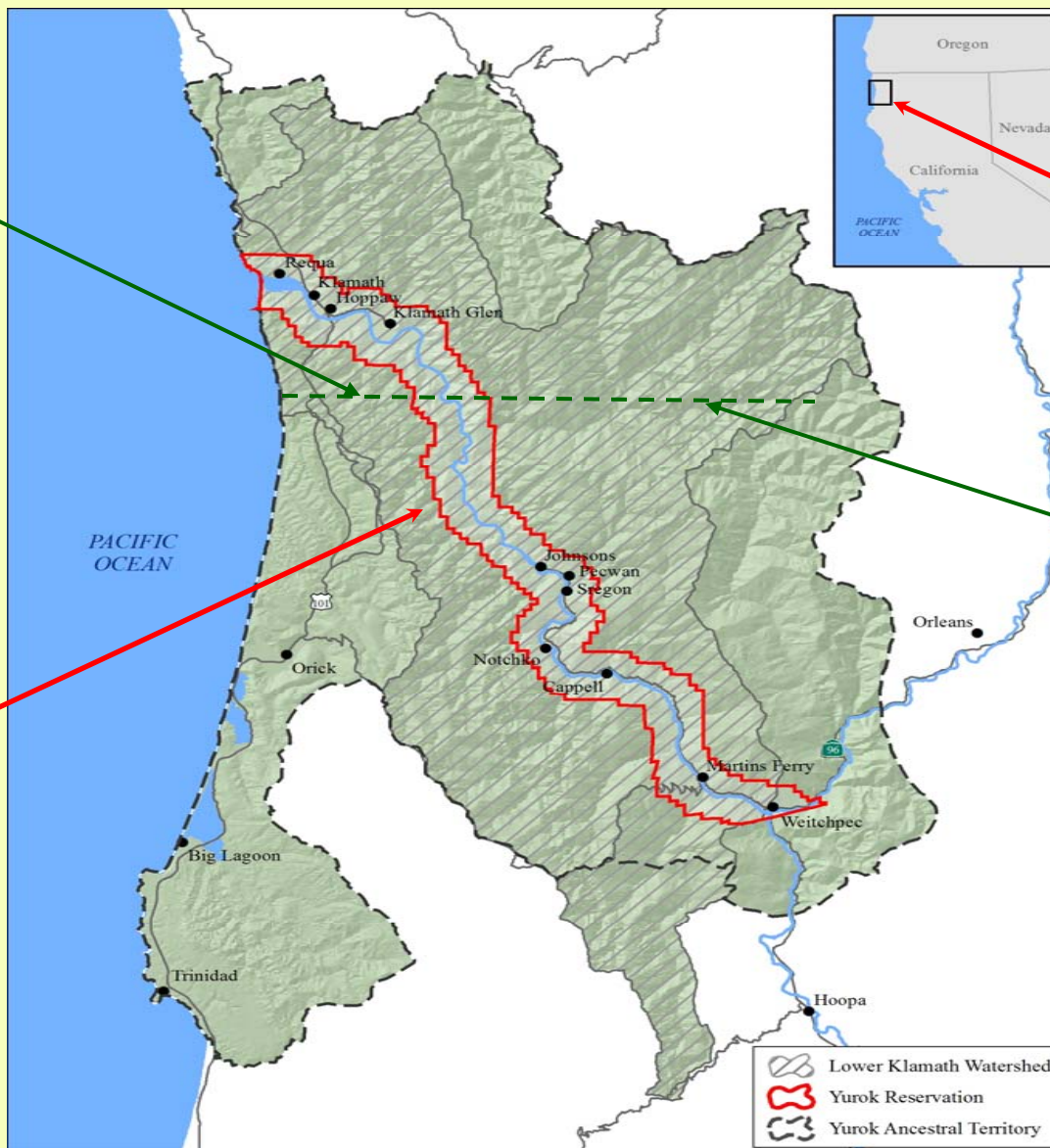
Background/Locati on

PG&E/
PP&L
Service
Territory
Boundary

**Yurok
Reservation**
Straddles the
lower stem of the
Klamath
River, 2 miles
wide and
44 miles long)

Located in
northwest
corner of
California

Humboldt/
Del Norte
County Line
& WAP
service
provider
boundary





Two DOE “First Steps” Projects

1. Tribal Utility Feasibility Study
(completed June 30, 2007)
2. Human Capacity Building in Energy
Efficiency and Renewable Energy
System Maintenance
(completed July 31, 2007)

Principal Partners/Consultants:

- Schatz Energy Research Center
- Winzler and Kelly Engineers





Project Goals & Objectives

Long-Term Goals:

- Increase energy self-sufficiency and create energy related employment and economic development on the Reservation

Near-Term Objectives:

- Identify and meet key energy needs on Reservation
- Establish Tribal energy program
- Develop energy expertise within Tribal staff
- Increase community understanding of energy issues
- Identify available funding and resources to support Tribal energy program
- Assess available renewable energy resources
- Develop plans for Tribe to provide energy services





Tribal Utility Feasibility Study

Can the Yurok Form a Tribal Utility?

- The Tribe is presently extending utility grid power to unserved areas of the Reservation.
- One option that was examined was for these new power lines to be owned and operated by the Tribe as part of a Tribal utility.
- The Tribe was hoping to wheel low-cost electric power from the Pacific Northwest into CA.
- Establishing a conventional Tribal electric utility was found not to be viable; wheeling not possible and customer base too small.





Tribal Utility Feasibility Study - Phase 2



Examine options for a non-conventional Tribal utility to provide energy efficiency and renewable energy services.

Project Tasks:

- Conduct inventory of renewable energy (RE) resources
- Develop plan to make RE available, maintenance plan
- Develop plan to provide energy efficiency services
- Investigate opportunities to aggregate load for bulk power purchase
- Research economic development opportunities for RE
- Develop energy service billing plan
- Determine steps to integrate energy services into existing Tribal utilities district
- Investigate funding and financing resources





Tribal Utility Feasibility Study

Inventory of Renewable Energy Resources

Resource	Potential	Scale / Application	Issues
Wind electricity	Small to moderate Not yet quantified	Sales to grid	Transmission access Few viable sites
Biomass electricity	Moderate 400 - 700 kW	Village scale Sales to grid	Access to non-Tribal resources Generation facility location Lack of small scale technology
Hydro-electricity	Large Up to 18 MW	Village scale Sales to grid Facility / household scale	Fisheries Cultural sites Access
Solar electricity	Moderate 200 - 500 kW	Facility / household scale	Resource best inland Localized shading Maintenance



NREL



NREL

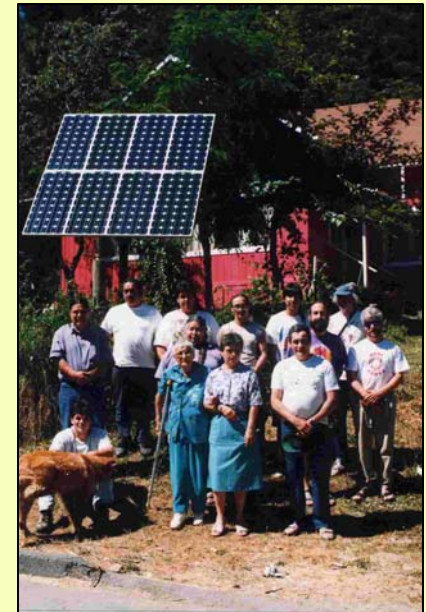




Tribal Utility Feasibility Study

Making Renewable Energy Systems Available for Off-grid Residents

- Tribe buys equipment at wholesale cost
- Standardized systems
- Build Tribal expertise in system installation and maintenance
- Charge customers a monthly fee
- Good customer education on use and care of system
- A similar model has worked well for the Navajo Tribal Utility Authority



Options for Monthly Cost to Customer

System Type	Full cost recovered (capital and O&M)	Full O&M	Routine O&M
Solar electric 1400 W	\$180/mo.	\$75/mo.	\$20/mo.
Solar electric 700 W	\$130/mo.	\$55/mo.	\$20/mo.
Micro-hydro/solar	\$180/mo.	\$75/mo.	\$20/mo.

Based on 30 year life-cycle cost analysis for 25 systems.





Tribal Utility Feasibility Study



Renewable Energy System Maintenance Program

- Systems must be maintained
- Here are three maintenance program options
- Costs assume maintenance of 25 systems

Maintenance Program Option	What's Covered?	Cost
1. Standard maintenance contract	Periodic maintenance checkups (3 times per year)	\$20/mo.
	Repair work as needed	Labor @ \$27.50/hr + parts, as needed
2. Full service maintenance contract	Full service checkups and repairs, parts and labor included	\$75/mo.
3. Fee for service	Repair work as needed	Labor @ \$27.50/hr (\$50 min) + parts, as needed





Tribal Utility Feasibility Study

Billing for Energy Services

- The Tribe will likely need to charge people something.
- This was attempted in the 1990s and met with negative reactions, in part due to concerns about fairness.
- The Tribe has since established a Public Utility District that charges for access to drinking water. Most people are paying their bills; the system is working.

IMPORTANT: Need for clear understanding

- Who owns the system (Tribe or resident)?
- Who is responsible for maintenance (Tribe or resident)?
- How much will the resident pay?





Tribal Utility Feasibility Study

Folding Energy Services into the Existing Yurok Tribe Public Utilities District

The Tribal PUD is the obvious choice of Tribal departments to take on energy services:

- Tribal ordinance already states that services provided by PUD “shall include alternative energy systems...”
- Already providing operation, maintenance, and billing (w/ support from Finance Dept.) for water systems
- Already have crews in field, vehicles, etc.

Some challenges:

- Need additional staff and training
- Need startup funds for tools and materials
- PUD staff has some concerns about whether billing will be enforceable





Tribal Utility Feasibility Study

Providing Energy Efficiency Services

Recommendations:

- **Collaborate with local service providers, make better use of available services** (existing WAP programs & utility programs)
- Make CFLs and other energy efficient appliances more readily available
- Provide energy education and outreach services to Tribal community
- Adopt a model energy code for the Tribe





Tribal Utility Feasibility Study

Energy Codes/Policies

- The Tribe and the Yurok Indian Housing Authority currently have no energy efficiency code or policy for new construction/remodels
- Governed by HUD policy, which uses energy efficiency standards that have not been updated since 1992
- The Tribe could save energy and lower utility bills for Tribe members by implementing an energy code
- **We recommend adopting California's Title 24 energy efficiency standards,** which are among the most stringent in the country and are already in effect for non-Tribal lands across the state

**2001 ENERGY
EFFICIENCY STANDARDS**





Tribal Utility Feasibility Study

Opportunities to Aggregate Electric Load

- Aggregating electric loads can allow for bulk purchase of power at more competitive rates and for financing of new electric generation
- Forming a traditional Tribal utility is one way of aggregating loads, not feasible for the Yurok Tribe
- Another option is called **Community Choice Aggregation (CCA)**, new program in CA for cities, counties and joint powers authorities (JPA), 1st program is still in process
- The private utility still owns and operates the electric grid, but the CCA can buy power from whomever they choose (including generating it themselves)
- To be feasible the Tribe would need to join a larger JPA
- The Tribe should keep informed and asses the opportunity to participate

Community Choice Aggregation



Local Government Commission





Tribal Utility Feasibility Study In Search of Further Funding...

Opportunities for Revenue Generation via Energy Sales to the Grid

- Sell to local utility under a Renewable Portfolio Standard (RPS) contract
- Sell to local utility as a Qualifying Facility (QF)

Possible Grant Funding

- We identified several possible funding sources at private foundations.
- Possible sources of funding for project implementation include: DOE, BIA, USDA Rural Assistance, EPA, HUD, etc.





Human Capacity Building Project



Project Team

Yurok Tribe:

Dustin Jolley – Tribal Engineer

Georgiana Myers – Energy Specialist

Stephen Kullmann – Energy Technician



Schatz Energy Research Center:

Jim Zoellick – Sr. Research Engineer

Richard Engel – Research Engineer





Human Capacity Building Project Tasks

Task 1: Conduct Staff Energy Training

Task 2: Conduct Energy Efficiency and Renewable Energy Workshops

Task 3: Perform Energy Efficiency and Renewable Energy Needs Assessment (via field audits)

Task 4: Identify Energy Program and Funding Resources

Task 5: Develop Energy Program Strategy

Task 6: Conduct Community Energy Education Campaign





Human Capacity Building Project Trainings & Workshops

- Quarterly trainings/presentations for staff &/or Tribal Council
- Two week-long, hands-on trainings (energy efficiency and renewable energy)

Energy Efficiency



Building energy systems
Energy use, efficiency, and auditing

Renewable Energy



PV, Solar water heating, Micro-hydro





Human Capacity Building Project

Energy Advisory Group

- Included local utilities, Tribes with DOE grants, weatherization agencies, regional energy authority, service agencies
- Held two meetings (April 2006 and July 2007)
- **Explore available existing services**
- **Make local connections**
- **Encourage collaboration**





Human Capacity Building Project

Residential Energy Audits

- Assessed Energy Uses and Needs
- Identified Areas for Potential Energy Savings
- Distributed High Efficiency Compact Fluorescent Bulbs and Water Heater Blankets
- Assessed Renewable Energy Potential (Micro-hydro, PV)
- Assessed Performance of Existing Off-Grid Systems
- Checked for Health & Safety Concerns
- Provided energy education materials





Human Capacity Building Project

Residential Energy Audit Statistics



Total audits:	58
Total occupants:	155
Elders:	25
Children:	30
Disabled:	6
Renewable energy:	11
Utility power:	34
PG&E:	19
PP&L:	15
Off-grid:	24
Site built:	42
Modular/mobile:	16

Note: Initial goal was to conduct 100 energy audits





Human Capacity Building Project

Residential Energy Audit Statistics - Energy Efficiency

- 67% reported primary source of heating was wood heat
- 78% have no air conditioning (8% evap, 14% AC)
- 30% have windows that were loose or very loose fitting
- 44% have single pane windows
- 20% needed water heater blankets
- 65% have primarily incandescent lighting
- **Many non-conventional structures, various levels of structural and electrical integrity, more difficult to serve**





Human Capacity Building Project

Residential Energy Audit Statistics - Renewable Energy

- 88% of sites without RE systems show good potential (primarily solar, some micro-hydro)
- Most RE system owners report they are “happy with system,” but over half reported “problems in the last year” and 73% had “replaced major equipment” at some point
- Less than 10% report “equalizing batteries”
- More than 30% of systems needed repairs
- 30% of PV systems needed tree trimming to reduce shading
- **Need for regular system maintenance is clear**





Human Capacity Building Project

Residential Energy Audits - Services and Referrals

- Minor RE system repairs (bad wiring, incorrect wiring)
- Referrals for electric bill rate reduction (higher baseline available for homes with electric heat)
- Referrals for weatherization services & CARE program
- Referrals to Housing and Social Services Departments
- Provide information on safe generator operation





Human Capacity Building Project

Audits of Weitchpec and Klamath Tribal offices Made recommendations on possible energy savings

- Insulation
- HVAC
- Lighting
- Appliances & computers
- Staff energy habits
- Potential for rooftop solar



Weitchpec



Klamath





Human Capacity Building Project

Education and Outreach

- Developed eight energy education pamphlets, distributed at Tribal offices
- Made three school outreach visits
Taught kids about energy efficiency and solar energy, sent them home with pamphlets and CFLs
- Tabling at two community events
Distributed pamphlets and CFLs, discussed energy issues





Tying It All Together and Taking the Next Steps

- Outcomes from these two projects can point the way toward a permanent program that will allow the Tribe to deliver needed energy services to its members
- **We urge the Tribe to keep energy planning a high priority and maintain continuity in their efforts**
- Build alliances with other North Coast Tribes and other agencies and jurisdictions on energy issues
- Continue the search for funding
- **Identify an “Energy Champion” within the Tribe to carry these efforts forward**





Thank You

