Yurok Tribe
Tribal Utility Feasibility Study
&
Human Capacity Building in Energy Efficiency and
Renewable Energy System Maintenance

Presented By:
Dustin Jolley, Yurok Tribe Engineer, Georgiana Myers, Yurok Tribe Energy Specialist
and Jim Zoellick, Schatz Energy Research Center
Projects 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 Tribal utility (energy services and renewable energy)
Location
Background

• Historically 70% of residents on the Yurok Reservation have not had convenient access to power or phone.

• Renewable energy power systems have been installed in the past that have not endured due to lack of proper use and maintenance.

• The Yurok Reservation straddles two counties and is located in the most remote corners of two utility companies’ service territories (PP&L and PG&E). Energy service programs are not readily accessible.

• Yurok Tribe members suffer from high energy cost to income ratios: a recent survey indicates 44% of residents’ income is spent on energy.
Background
RUS Power Line Extension

- Approximately 30 miles of 12.5kV power lines are currently being installed at a cost of roughly $150,000 per mile.
- This line extension will provide grid power to ~130 homes on the reservation.
- Upon completion, ~30 residences will remain without grid-connected electrical power.
Tribal Utility Feasibility Study

- Establishment of a Tribal Utility would require ownership and control of the electrical grid.
- Tribe is financing the grid extension, but is transferring ownership to PG&E due to cost of separate easements, cost of maintenance, and inability of Tribe to “wheel” power due to capacity of line.
Tribal Utility Feasibility Study

Establishing a conventional Tribal electric utility is not economically viable because the Tribe’s household electric service base is too small (130 households).
Tribal Utility Feasibility Study

Alternative Tribal utility models are being explored.

Project tasks are:

• 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
The following reports have been collected and are being reviewed:

- Community Context and Technology Options in the Yurok Tribal Electrification Project, Master’s Project, Christopher Greacen, University of California, Berkeley, May 1987
- Assessment of Capell and Pecwan Hydroelectric Projects, Humboldt Engineering
# Tribal Utility Feasibility Study

GIS energy database under development

<table>
<thead>
<tr>
<th>Biomass</th>
<th>Microhydro</th>
<th>Solar</th>
<th>Wind</th>
<th>Electric Demand</th>
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<tr>
<td>Treatment of mill waste</td>
<td>Stream location</td>
<td>Existing solar electric systems</td>
<td>Wind resource availability</td>
<td>Commercial demand</td>
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<td>Forest fuel reduction efforts</td>
<td>Stream gradient</td>
<td>Potential sites for new PV systems</td>
<td>Available ridgeline terrain</td>
<td>Residential demand</td>
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<td>Vegetation type</td>
<td>Stream flow</td>
<td>Potential sites for village scale solar</td>
<td>Land ownership</td>
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<td>Solar energy resource availability</td>
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<td>Land ownership</td>
<td>Cultural sites</td>
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<td>Terrain slope</td>
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<td>Existing roads</td>
<td>Land ownership</td>
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<td>Vegetation type</td>
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<td>Terrain slope</td>
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<td>Mill location</td>
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<td></td>
</tr>
<tr>
<td>Mill ownership</td>
<td></td>
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</tbody>
</table>
Tribal Utility Feasibility Study

Work plan for coming months:

- Complete renewable resource inventory
- Collect data for GIS database
- Develop plan for making renewable energy systems available on the Reservation
- Develop plan for providing maintenance and repair to existing renewable energy systems
- Develop plan for providing energy efficiency services on the Reservation
- Develop plan for billing for energy services
- Investigate opportunities for aggregating customer load
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
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Project Tasks

Task 1: Conduct Staff Energy Training
Task 2: Conduct Energy Efficiency and Renewable Energy Workshops
Task 4: Identify Energy Program and Funding Resources
Task 5: Develop Energy Program Strategy
Task 6: Conduct Community Energy Education Campaign
Task 7: Monitor and Document Project Accomplishments
Human Capacity Building Project

1st Quarterly staff training
• Discussed DOE funded projects
• Examined energy issues, built awareness
• Discussed energy efficiency and renewable energy opportunities on the Reservation

2nd Quarterly staff training
• Conducted round-table discussion
• Asked Tribal staff for their input regarding Tribal energy needs, role of the Tribal energy program, field work issues, resources, and opportunities
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Energy Advisory Committee

- Includes local utilities, Tribes, weatherization agencies, and regional energy authority
- Held first meeting
- Provided background information on project
- Asked for input on: energy needs, available resources, recommendations, collaboration opportunities
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Two week long energy trainings

Energy Efficiency
- Building energy systems
- Energy use, efficiency, and auditing

Renewable Energy
- PV, Solar Water Heating, Micro-hydro
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Residential Energy Audits

- Assess Energy Uses and Needs
- Highlight Areas for Potential Energy Savings
- Distribute High Efficiency Compact Fluorescent Bulbs and Water Heater Blankets
- Assess Renewable Energy Potential (Micro-hydro, PV)
- Assess Performance of Existing Off-Grid Systems
- Assess Electrical Systems and Readiness for Grid Connection
- Check for Other Health & Safety Concerns
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Residential Energy Audit Statistics

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
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<tbody>
<tr>
<td>Total audits</td>
<td>41</td>
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<tr>
<td>Total occupants</td>
<td>107</td>
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<tr>
<td>Elders</td>
<td>22</td>
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<tr>
<td>Children</td>
<td>32</td>
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<tr>
<td>Disabled</td>
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<tr>
<td>Renewable energy</td>
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<tr>
<td>Utility power</td>
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<td>PG&amp;E</td>
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<td>PP&amp;L</td>
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<td>Off-grid</td>
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<td>Site built</td>
<td>29</td>
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<tr>
<td>Modular/mobile</td>
<td>12</td>
</tr>
</tbody>
</table>
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Residential Energy Audits - Services and Referrals

• Minor RE system repairs (bad wiring, incorrect wiring)
• Referrals for electric bill rate reduction
• Referrals for weatherization services & CARE program
• Referrals to Housing Dept. for handicap bars
• Referrals to Social Services
• Provide information on safe generator operation
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Weitchpec and Klamath Tribal facility energy audits

- Insulation
- HVAC
- Lighting
- Appliances & computers
- Staff energy habits
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Education and Outreach

Energy Education Pamphlets
• Heating Efficiently with Wood
• Maintaining Renewable Energy Systems
• Generator Safety
• Reducing Household Energy Costs
• Efficient Lighting
• Simple Weatherization
• Phantom Loads

School Outreach
• Jack Norton School, Pecwan
• Weitchpec School, Weitchpec
• Margaret Keating School, Klamath

Margaret Keating School
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Work Plan for Coming Months

• Complete additional energy audits (100 targeted)
• Analyze data, develop needs assessment
• Collect and make referrals to county agencies for weatherization services
• Conduct two more staff trainings (discuss Tribal office energy audit results)
• Set up displays for energy education brochures
• Run energy education ads in Tribal newsletter
• Hold community energy education events
• Perform energy outreach to schools
• Conduct funding/resources search
• Hold 2nd advisory committee meeting
• Develop on-going energy program strategy
• Document project results, prepare final report