Renewable Energy Feasibility Study

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Department of Energy
Tribal Energy Program Review

Pueblo of Laguna Utility Authority
Discussion Outline

• Background: Demographics, UA Formation

• Project Overview

• Project Objectives

• Project Tasks

• Project Contacts
Federally recognized Indian Tribe

533,000 acres straddling I-40, approximately 44 miles west of Albuquerque spanning four Counties

The Pueblo inhabitants have occupied this land since the early 1400s

According to 2004 estimates, the reservation is home to 4,294 residents living in the six unincorporated villages
• POL median household income of $27,664 is 23 percent lower than New Mexico’s household-median income of $34,133

• 60 percent of the Pueblo population has a household income less than New Mexico’s median income

• Unemployment rate for Pueblo residents is 7.7 percent as compared with 6.1 percent unemployment for Cibola County and 4.4 percent unemployment for New Mexico

• 25.2 percent of Pueblo families are below the poverty level as compared with 21.5 percent for Cibola County and 14.5 percent for New Mexico

• According to the 1990 Census, median household income on the Pueblo was $17,210 compared to $24,087 for the state of New Mexico. (GAP HAS NOT CHANGED)
### Pueblo of Laguna Household Income
#### 2000 Census

<table>
<thead>
<tr>
<th>Households</th>
<th>1,087</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than $10,000</td>
<td>192</td>
<td>17.7</td>
</tr>
<tr>
<td>$10,000 to $14,999</td>
<td>109</td>
<td>10</td>
</tr>
<tr>
<td>$15,000 to $24,999</td>
<td>212</td>
<td>19.5</td>
</tr>
<tr>
<td>$25,000 to $34,999</td>
<td>145</td>
<td>13.3</td>
</tr>
<tr>
<td>$35,000 to $49,999</td>
<td>191</td>
<td>17.6</td>
</tr>
<tr>
<td>$50,000 to $74,999</td>
<td>183</td>
<td>16.8</td>
</tr>
<tr>
<td>$75,000 to $99,999</td>
<td>44</td>
<td>4</td>
</tr>
<tr>
<td>$100,000 to $149,999</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>$150,000 to $199,999</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>$200,000 or more</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Totals (percent rounded)</strong></td>
<td><strong>1,087</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Median household income (dollars) $27,664
Pueblo of Laguna Reservation

Six Villages
(approximately 1,203 households)
Utility
Formation
Pueblo of Laguna
Organization Chart
(March 2004)

Government Services

Pueblo Membership

Pueblo Council

Office of The Governor

Office of the Secretary

Appellate Court

Office of Judicial Services
Tribal Court
Probation Services
Legal Services

Office of the Treasurer

Corporation Commission
Division of Education
Utility Authority
Laguna Industries, Incorporated
Laguna Construction Company
Laguna Development Corporation
Laguna Housing Authority
Private Business License/Permits
Range Associations
Laguna Rainbow Corporation
• Initial plans began mid-1980s
• Tribal Council created Utility Authority in 1998
• Tribal Government Programs transitioned Aug/Sept 2005
Utility Authority Board of Directors

Administrative Services

- Solid Waste
- Water
- Wastewater
- Septic
- Telecom
- Electric
- Gas
- Power Generation

Utility Authority is in place – Next Steps . . . .

- Develop Organizational Capacity
- Improve Services
- Identify Permanent Funding Sources
- Evaluate feasibility of Telecom, Gas, and Power Generation
Renewable Energy Project Drivers

- Improve quality and reliability of electric service on the reservation
- Work to promote energy self-sufficiency
- Encourage economic development
- Environmentally clean energy source
Potential Benefits

• External electricity sales

• Internal electricity use

• Land royalty payments: as much as $100,000 to $200,000 per year

• Tax payments: property taxes on the order of $100,000 to $200,000 per year

• Local economic development: construction of a $100 million wind farm would bring major opportunities for local firms and construction companies

• Local jobs: construction of a megawatt facility could involve about 150 people during construction and 6 - 10 permanent, well paying jobs on the Pueblo.

• Cleaner environment: when the wind blows, less coal and gas will be burned in New Mexico, helping to clean the air and water

• Tourism: opportunities to operate wind
Access to Existing Electrical and Gas Transmission Lines, proximity to I-40

PNM 115 kv LINE

El Paso Natural Gas

Transwestern Natural Gas
Pueblo of Laguna
Renewable Energy
History
Entered into a Wind Development Agreement with Foresight Wind Energy to explore the feasibility of developing a 40-60 MW, utility-scale wind power project on reservation land.

**When:** The data towers were installed in early summer 2005 and the study will continue through early summer 2006 when a feasibility study will be reviewed and the Pueblo will decide whether to continue forward to explore developing a project.

**Next:** The Utility Authority is working with Foresight to review the data and assess other issues related to wind power development to determine if Pueblo lands are attractive for this type of project and to determine if the Pueblo wants to move forward.

**Funding:** Pueblo assisted by Foresight in securing a Clean Energy Grant from the New Mexico Energy, Mineral, and Natural Resources Department (EMNRD). The $38,000 grant was awarded in March, 2005, to fund wind assessment activities through June, 2006. Additional funds may be sought if the feasibility study proves positive.
Lucero Mesa Wind Monitoring Tower

20 meter tower – loan from NREL
anemometers: 10m, 20m
wind vane: 20m
Seama
Wind Monitoring Tower

50 meter tower – std NRG equipment
Anemometers: 10m, 30m, 50m x 2
Wind Vanes: 30m, 50m
Pyranometer: 3m
Pueblo of Laguna Solar Installations

• The Majors Ranch is miles from any transmission or distribution lines so power for the Ranch must come from distributive energy sources.

• Now used as a Youth camp by the Pueblo, the project is primarily complete. Sacred Power (SPC) designed and installed a full line of renewable energy products including photovoltaic, wind turbines, solar hot water, solar hot air, solar powered water pumps, and satellite communications for the Majors Ranch Youth Camp.

• The Pueblo of Laguna Youth Ranch is set up to provide guidance to youth through positive role modeling experiences, that allows youth to build confidence in themselves and increase self-esteem.
SPC Solar installations

• Southwestern Indian Polytechnic Institute (SIPI), Albuquerque, NM

• SPC is actively involved in developing an renewable energy curriculum that can be implemented at the institute in the very near future.

• The institute would be one of a handful of universities educating students in the engineering, design and use of renewable energy technologies.

• In order for renewable energy systems to be effective, personnel must be trained in use, operation, and maintenance of those systems.
SPC Solar Installations

• SPC has federal contracts to design, manufacture and install Tel Sol Shelters and SP PV/Hybrids in support of Law Enforcement communications systems upgrades.

• The energy efficient shelters will house new digital radios, repeaters and other communications systems that are situated from outside police stations ranging to high mountain tops. Part of Project 25, the communication system upgrade will replace old analog with digital, providing greater range and clarity.

• The systems will be completely cooled and heated passively (no power required) and powered by renewable energy.
1. Evaluate of opportunities to pursue large scale RE generation
   - Wind
   - Solar
   - Biomass

2. Build on knowledge gained from prior projects, studies

3. Consider “hybrid” project to provide firming (with natural gas)
1. Business/organization planning

2. Community awareness/support
   - Community Outreach Program
   - Community Newsletter Development

3. Tribal energy load assessment
   - Update Estimates of Meter and Load Data
   - Evaluate Load Data
   - Review impacts of identified conservation measures

4. Power market assessment
   - Wholesale Power Purchaser Survey
     - Survey AZ, NM, CO
   - Survey IOUs (APS, PNM, TEP, PSCO)
   - Survey Publics (SRP, Cooperatives)
   - Survey Federal and State Agencies (WAPA)
   - Wholesale Generator Survey
5. Site-specific resource monitoring
   - Quantify Wind Resource
   - Quantify Solar Resource
     - Review Sunlab solar insolation data
   - Quantify Biomass Resource
     - Quantify solid waste resource
   - Quantify other biomass resource

6. Natural gas availability/cost
   - Survey for Nearby Pipelines
     - Prepare and Submit Study Applications
     - Review, Revise Study Results

7. Transmission/interconnection
   - Research Transmission Market
   - Research Nevada, Arizona, New Mexico

8. Preliminary system design
   - Size Wind Facilities
     - Determine Type, Number,
     - Arrangement of Wind Turbines
     - Estimate Annual Energy Production
   - Size Gas Turbine Facilities
   - Develop Power Price Forecast
   - Develop Monthly Natural Gas Price Forecast
   - Determine Type, Size, Arrangement of Gas Turbine(s)
9. Project location/resource maps

10. Evaluate potential environmental impacts/and fatal flaws:
   - Geology and Soils
   - Traffic & Transportation
   - Socioeconomics
   - Hazardous Materials
   - Waste Management
   - Cultural Resources
   - Air Quality
   - Biological Resources
   - Land Use
   - Paleontological
   - Public/Worker H&S,
   - Visual Resources
   - Water Resources
   - Identify Jurisdictions, Regulations
   - Discuss Target Projects with Air Quality Regulators
   - Discuss Target Projects with Federal Agencies

11. Tribal benefit assessment
   - Training and Other Tribal Professional Development
   - Identify Tribal Roles and Skill Sets
   - Identify Tribal Training Needs, Plans, Costs
12. Long-Term Operation and Maintenance Planning
   - Identify O&M Structure, Roles, Schedule

13. Economic Analysis and Feasibility Decision
   - Prepare Development Plan and Schedule (s)
   - Develop Capital Cost Estimates
   - Develop Power Sale Price Estimates
   - Develop Operating Cost Estimates
   - Develop Financing Cost Estimate
   - Determine Applicability of Incentives and Tax Credits
   - Develop Pro-forma Projected Operating Results
   - Evaluate Impact of Project on Electric System Acquisition
   - Determine Feasibility
   - Present Results of Economic, Technical Analyses
THANKS TO DOE, CONSULTANTS, QUESTIONS!!!!!!

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