Winnebago Tribe of Nebraska
Energy Options Analysis and
Renewable Energy Feasibility Study

U.S. Department of Energy
Tribal Energy Program Review

Leah Hunter, Energy Committee Member, Winnebago Tribe of Nebraska
Tracey LeBeau, Red Mountain Energy Partners

October 2006
Winnebago Reservation: 120,000 acres; 88 miles north of Omaha, NE
Project Location >> Winnebago Tribe of Nebraska
Project Overview >> Background

- NREL 20 meter anemometer in place from 2001-2002
- Energy Committee formed in 2003
  - Primarily Council members
  - Community representatives added in 2004
- Initial DOI study (2004) to consider resources
- NREL 50 meter anemometer loan secured August 2005
- Geothermal evaluation
- Two DOE-funded projects (2005-6)
  - Energy Options Analysis (completed)
  - Renewable Energy Feasibility Study (just underway)
- Interest in promoting energy self-sufficiency and economic development
- Focus on building energy knowledge/capacity
Project Participants

- Tribal and Staff Participants:
  - Winnebago Energy Committee
    - Louie Houghton, Council Secretary
    - Jim Snow, Council Vice-Chairman
    - Charles Aldrich, Council Member
    - Leah Hunter, Construction Management (plus Tax and TERO)
  - Winnebago Tribal Council
  - Winnebago Tribe Directors/Facility Managers
    - Land Management
    - Facilities

- Project Consultant:
  - Red Mountain Energy Partners
Objectives >> Energy Options Analysis

- Analyze energy management options, with goals of improving reliability, safety, and lowering *electricity* costs
- Analyze options for formation of a Tribal energy organization, enabling the Tribe to achieve its energy management goals
- Develop an Implementation Plan to carry out the best-fit options

- Early in the project, Council decided to focus on utility organization formation
Energy Options Analysis Steps

Options Analysis
- Energy Management Options
- Utility Service Options
- Generation Options
- Transmission/ROW Options

Governance/Structure Analysis
- Organizational Structure
- Tribal Input/Discussion
- Selected Programs and Defined Responsibilities
- Governance Structure

Implementation Planning
- Funding Analysis
- Skills Requirements
- Infrastructure Analysis
- Legal Issues
- Other

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Accomplishments >> Energy Options Analysis

Summarized Energy Management Options

- Conservation
- Energy Efficiency and Weatherization
- Demand Management

<table>
<thead>
<tr>
<th>Option Description</th>
<th>Cost</th>
<th>Implementation</th>
<th>Efficacy</th>
<th>Resource</th>
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<tbody>
<tr>
<td><strong>Conservation</strong></td>
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<tr>
<td>2. Conservation Curriculum</td>
<td>$$$$</td>
<td>Development of a community education plan that consists of information distribution and or community information meetings.</td>
<td>High</td>
<td><a href="http://www.eere.energy.gov/energy/education/conservation/pho/conservation_at_home/conservation_curriculum_overview.html">www.eere.energy.gov/energy/education/conservation/pho/conservation_at_home/conservation_curriculum_overview.html</a></td>
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<tr>
<td>4. Home Energy Saver The Home Energy Saver is designed to help consumers identify the best ways to save energy in their homes, and find the resources to make the savings happen</td>
<td>$</td>
<td>On-line resource for the homeowner.</td>
<td>Low to moderate</td>
<td><a href="http://hes.lbl.gov/hes/vh.shtml">http://hes.lbl.gov/hes/vh.shtml</a></td>
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<td>5. Development and Implementing of Energy Policies</td>
<td>$$-$$$</td>
<td>Adoption in full or in part of the model building codes developed by the U.S. DOE.</td>
<td>Moderate to high, implementing standard building codes can reduce energy burden 15-30%</td>
<td><a href="http://www.energycodes.gov/">http://www.energycodes.gov/</a></td>
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</tbody>
</table>

| **Energy Efficiency & Weatherization** |      |                |          |          |
| 1. Federal Tax Credits for Energy Efficiency | $$ | Review federal tax credits | Low to moderate, tax credits range from $200-$2,000 | http://www.energystar.gov/index.cfm?c=products.pr_tax_credit |
| 2. Residential Code Compliance | $ | Free tool for the evaluation of the housing stock relative to model energy efficiency building codes. | Low to high | http://www.energycodes.gov/rescheck/ |
| 3. Commercial Code Compliance | $ | Free tool for the evaluation of commercial buildings relative to model energy efficiency building codes. | Low to high | http://www.energycodes.gov/comcheck/ |
| 4. Residentail and Commercial Energy Audits (Contractor) | $ | Most useful within the context of a tribal energy plan to evaluate housing stock and make systematic improvement to the energy efficiency of the community. | Low to high, reduction in energy bills from 10%-35% depending energy source | http://www.eere.energy.gov/wip/informationresources/Tap.html |
| 5. Residentila Weatherization | $ | Formal, written evaluation procedures, the availability of a comprehensive set of minor and major energy saving measures, and installation of at least one or more of the following: attic/ceiling insulation | Low to high, reduction in energy bills from 10%-30% depending energy source | http://www.eere.energy.gov/wip/informationresources/Tap.html |
| 6. Residential Weatherization | $ | Formal, written evaluation procedures, the availability of a comprehensive set of minor and major energy saving measures, and installation of at least one or more of the following: attic/ceiling insulation | Low to high, reduction in energy bills from 10%-30% depending energy source | http://www.eere.energy.gov/wip/informationresources/Tap.html |
| 7. Training and Technical Assistance Program | $ | Identification of training and technical assistance needs. | Low to high | www.weatherization.org/ttassis.htm |
| 8. Weatherization Technical Assistance Program | $ | Identification of training and technical assistance needs. | Low to high | www.weatherization.org/ttassis.htm |
**Accomplishments >> Energy Options Analysis**

Summarized Utility Service Options

- Energy Committee
- Energy Commission (Policy)
- Utility Authority (Oversight)
- Utility Authority (Operations)
- Utility Cooperative
- Decision to focus on Utility Service/Structure Options

<table>
<thead>
<tr>
<th>Service</th>
<th>Description</th>
<th>Key Benefits</th>
<th>Required/ Resources</th>
<th>Estimated Implementation Costs</th>
<th>Implementation Timing</th>
<th>Key Issues</th>
<th>Critical Unmet Needs</th>
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<tr>
<td>Formal working group of individuals dedicated to investigating and recommending specific action regarding existing or new utility services to the community</td>
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<td>Energy Planning</td>
<td>Member Participation</td>
<td>$0-$20,000</td>
<td>60-90 Days</td>
<td>Consistency, time commitment to drive Winnebago utility matters</td>
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<tr>
<td>Energy Committee</td>
<td>Description Key Benefits Required Resources Estimated Implementation Costs Implementation Timing Key Issues Notes</td>
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<td>Committee</td>
<td>Authoritative body authorized to develop and regulate policies on utility/energy services</td>
<td>Assert Tribal Sovereignty</td>
<td>Administrative Support</td>
<td>$24,000-$48,000</td>
<td>3-6 Months</td>
<td>Ability to establish authority over specific utility operations over outside utility entities</td>
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<td>Utility Authority (Policy)</td>
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<td>Authority (Operations)</td>
<td>Council-established governmental entity(ies) or instrumentalities managing community utility services/operations</td>
<td>Consistent Efforts to Improve Administrative support Ongoing communications with System Infrastructure</td>
<td>Operating staff</td>
<td>$60,000-$120,000</td>
<td>6-12 Months</td>
<td>Initial and continuing member communication re: role oversight/coordination of services/operations on behalf of Tribe and members</td>
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<td>Authority (Operations Management)</td>
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<td>Utility Cooperative</td>
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Utility Organization Options

**Commission**
- **Purpose**: Regulatory authority
- **Benefits**: Central utility venue, Utility service coordination
- **Challenges**: Funding sources, Greater Council involvement
- **Needed Resources**: Legal authority, Tribal Utility Code/Standards, Administrative support, Multiple part-time members

**Oversight Authority**
- **Purpose**: Utility service policy/planning coordination
- **Benefits**: Centralized planning, Sovereign attributes of Tribe, Access to grant funding for planning/coordination, Less Council involvement
- **Challenges**: Ongoing funding needed
- **Needed Resources**: Organization leadership, Executive staff, Charter/By-Laws

**Operating Utility**
- **Purpose**: Operate/improve utility services
- **Benefits**: Sovereign attributes of Tribe, Separates utility assets/liabilities, Can allow for direct receipt of hydro allocations, Access to grant funding, Ability to finance infrastructure improvements
- **Challenges**: Fee structure required, Significant commitment to taking over operations
- **Needed Resources**: Organization leadership, Administrative/customer service support, Operations staff, Charter/By-Laws

**Winnebago Utility Commission**
- Regulatory authority; policy and planning; potential for utility operations

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Accomplishments >> Identified Needs

- Needs
  - Coordinated infrastructure planning
  - Potential to operate one or more utilities in the future
  - Entity of Tribe with authority to access funding
  - Independent Board to oversee utility/energy issues
Accomplishments >> Energy Options Recommendations

- Expanded Energy/Utility Committee continue as transitional entity:
  - Identified Program Directors
  - Council Members
  - Legal Counsel
  - Other Identified Stakeholder(s)
  - Other support as needed
- Establish Energy Manager position
- Identify transitional and on-going organization funding options
- Develop Winnebago Utility Code
- Council to empower the Winnebago Utility Commission (regulatory and planning oversight) and at an appropriate time, Winnebago Tribal Utility (operations)
  - Winnebago Legislative Code amendments
Accomplishments >> Utility Code Draft

- Code authorizes the Winnebago Utility Board to:
  - Clarify tribal civil jurisdiction to regulate current and future utility services and facilities by creating a Commission structure; and
  - When appropriate, to perform utility services or acquire, own, or build utility facilities (generation; transmission; distribution) at a future date

- Additional information needed
  - Enforcement
  - Taxation
Accomplishments >> Utility Commission Implementation Plan

Community Communications
- Scope
- Purpose
- Contacts
- Processes

Utility Board Establishment
- Member selection
- Charter/By-Laws
- Compensation
- Schedule

Access to Funding
- Grants
- Loans
- Utility fees
- Member rates
- Direct existing Tribal revenues/

Council Authorization
- Approve Utility Code
- Seek funding
- Establish Utility Board
- Limitations on powers

Utility Infrastructure Documentation
- Electric
- Gas
- Water
- Wastewater
- Telephone
- Internet

Committee Analysis/Review/Coordination
- Review data/options
- Recommend to Council

Program/Service Prioritization
- Weatherization
- LIHEAP
- Energy Efficiency

Utility Code Development
- Authorize Utility Board/jurisdiction
- Franchise/access
- Service requirements
- Utility taxes
- Utility planning
- ROW
Project Status

- Energy Options Analysis completed
- Utility Implementation Plan completed
- Energy Manager position description developed
- Utility Code drafted
- Utility Providers summary completed
Objectives >> Renewable Energy Feasibility Study

- Develop a project planning and oversight framework
- Analyze Tribal loads and resources, power markets and delivery options;
- Analyze technology, system and environmental impacts;
- Design the project plans: stakeholder outreach, financial plans, permitting and agreements, O&M, and sustainable implementation plan; and
- Evaluate the project benefits and impacts
Project Overview >> Scope

- Capacity Building –Establish Energy Manager position
- Project Identification
  - Load Assessment
  - Resource Monitoring
  - Power Markets & Delivery
  - Community & Stakeholder Outreach
- Technology Selection and System Design
- Environmental Evaluation
- Project Economics
- Tribal Benefit Assessment
- Project Implementation Plan
### RE Feasibility Study

#### Project Schedule

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<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
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Project Status >> Wind Resource Indications

Wind Power Classification

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<thead>
<tr>
<th>Wind Power Potential</th>
<th>Wind Speed Density at 50 m</th>
<th>Wind Speed at 50 m</th>
<th>Wind Speed at 100 m</th>
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<tr>
<td>Poor</td>
<td>0 - 200</td>
<td>0.0 - 5.7</td>
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<td>Outstanding</td>
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<td>&gt; 9.0</td>
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Wind speeds are based on a Weibull k of 2.0 at 800 m elevation.

Transmission Line*

Voltage (kV)

- 35
- 115 - 161
- 230
- 345

* Source: NREL/MP/17015

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Project Status >> Initial Data/Insights

- Initial wind data (near casino) was not favorable for large scale power generation, but facility-scale wind was possible
- Expectations for better wind conditions in other reservation locations
- Excellent access to transmission grid
Project Status >> Load Assessment

- Data gathering underway
  - Monthly energy usage for all facilities
  - Hourly detail as available

Load Forecast Illustration

- Peak Load Intermittent Resources or 6 X 16 Power Products
- Spot Market Purchases “Imbalances” or Load Following Products
- Base Load Generation Resources or 7 X 24 Power Products
Further Information

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