In 2001, the Tribe’s electrical energy costs were $1.5MM. Windmill electrical power may provide a means for energy cost reduction while environmentally friendly.
Tribal Structure

- Sault Tribe is part of the Anishnabe or Chippewa people
- Officially recognized in the early 1970’s - pursuant to the Indian Reorganization Act of 1934
- Became a Tribal Government on November 13, 1975
- Currently the largest employer in northern Michigan
- Provide many services to Tribal members
  - Health
  - Social Services
  - Education
  - Youth and Recreational
Tribal Structure (continued)

- Tribal Membership
  - In 2001, exceeds 30,000
  - The largest Tribe in Michigan
  - Majority live in the seven easternmost counties of the Upper Peninsula
Table 1

- **SEVEN COUNTY ENROLLMENT POPULATION**

- Alger County  497
- Chippewa County  5,908
- Delta County  980
- Luce County  372
- Mackinac County  2,593
- Marquette County  747
- Schoolcraft County  841
- **Seven County Total  11,938**
Project Overview

• Feasibility of a windmill power plant in the Upper Peninsula of Michigan
  – Analyze the economic and technical feasibility of both small and large scale wind power plants
• Phase One: Development, construction, financing and operation of a small wind power installation.
• Phase Two: Development, construction, financing and operation of a large-scale wind power plant.
Project Overview (continued)

- Economic and Technical Analysis
  - Wind resource assessment on Tribal lands
  - Evaluation of existing transmission system to evacuate power
  - Designs and cost estimates
  - Environmental issues
  - Electricity cost and economic viability
  - Partner with utility companies
Estimating Wind Energy Resource

- Wind energy resource is estimated by wind power classes, ranging from class 1 (lowest) to class 7 (highest).
- Areas designated class 3 or greater are suitable for most wind turbine applications, whereas class 2 areas are marginal.
- **In the Upper Peninsula of Michigan, we have wind classes from 2-5 (see map following):**
  - Class 2: inland (marginal)
  - Class 3: exposed lakeshore areas such as SSM, Whitefish Point, Munising, lower portions of the Keweenaw Peninsula, St. Ignace, Detour/Drummond Island and the Garden Peninsula.
  - Class 4: Middle portion of Keweenaw Peninsula
  - Class 5: Tip of the Keweenaw Peninsula, Isle Royale and offshore areas of Lake Superior.
Map of Wind Resource Potential in Michigan
Estimating Wind Energy Resource

- Michigan’s wind energy potential ranks 14th out of the lower 48 contiguous states

- Michigan has wind potential to justify a wind feasibility study (see map following):
UNITED STATES ANNUAL AVERAGE WIND POWER

CLASSIFICATION OF WIND POWER DENSITY

<table>
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<tr>
<th>CLASS</th>
<th>WIND POWER</th>
<th>WIND SPEED</th>
<th>SIGHT POWER</th>
<th>SIGHT SPEED</th>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
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<td>11.6-15.5</td>
<td>300-500</td>
<td>9.4-14.3</td>
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<tr>
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<td>251-350</td>
<td>15.6-19.5</td>
<td>600-800</td>
<td>14.4-17.5</td>
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<tr>
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<td>900-1200</td>
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<tr>
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<td>23.6-27.5</td>
<td>1200-1500</td>
<td>21.2-24.6</td>
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<td>751-1000</td>
<td>27.6-31.5</td>
<td>1500-2000</td>
<td>24.7-28.6</td>
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<td>1001-2000</td>
<td>31.6-35.5</td>
<td>2000-2500</td>
<td>28.7-31.9</td>
</tr>
</tbody>
</table>

RIDGE CREST ESTIMATES LOCAL WIND > 1000 FTF
Project Location

- Climate
  - Long, windy, cold winters
  - Mild summers
  - Wind energy resource in Michigan
  - Ideal conditions for wind energy at exposed lakeshore locations (see maps following):
Project Location - Service Area Map
Windmill Power Plant Locations in Great Lakes Region

- Wind power plants in the Great Lakes region currently exist in Wisconsin and Michigan only
  - Since 1998, five Wisconsin wind power plants have gone online and are located northeast of Green Bay, south of Lake Winnebago, and south of Wisconsin River.
  - Michigan has two wind power plants
    - Traverse City operating since 1996.
    - Mackinaw City operating since 2001.
Windmill Power Plant Locations in Great Lakes Region

- Proposed wind power plants in the Great Lakes region are planned for Wisconsin, Illinois and Michigan only
  - A Wisconsin project is planned for just north of Milwaukee, off Lake Michigan.
  - Illinois has two proposed projects located just southeast of Chicago.
  - Michigan has two proposed projects: Friendship Township in Emmet County, and Benona Township (north of Muskegon, off Lake Michigan).
Map of Windmill Power Plant Locations in Great Lakes Region
Project Participants

- Sault Tribe
  - Project Director
  - Grants Administrator
  - Resource Specialist
  - Legal Department
  - Technical Advisor
  - Administrative Assistant
Project Participants (cont.)

- Global Energy Concepts (GEC)
  - Chief Executive Officer
    - Karen Conover
  - Registered Professional Engineer
    - Kevin Smith
  - Technical Assistance
    - Rana Vilhauer
Project Participants (cont.)

• GEC - Subcontractors
  – Lake Michigan Wind and Sun
    • John Hippensteel
  – Consulting Engineer and Meteorologist
    • Robert Owen
Objectives

• Lower long-term energy costs by using wind energy to offset current costs
• Diversify employment opportunities
• Develop renewable energy resources to become economically self-sufficient
• Develop a significant source of renewable energy for our community
Technical Assistance

• GEC - works extensively with the National Renewable Energy Laboratory (NREL)
  – Welcome input, oversight and review from the NREL and the Department of Energy.
  – Has worked with Indians Tribes with successful outcomes.
Miigwech

Tell them they can turn on the heat when the wind blows!