Aroostook Band of Micmacs
Strategic Energy Planning Initiative

Presented by:
Fred Corey
Environmental Director
October 2006
Overview

• About the Aroostook Band of Micmacs
• Project Background and Introduction
• Project Goals and Objectives
• Summary of Report
• Vision Statement
• Discussion on Vision and Plan
• Next Steps
Aroostook Band of Micmacs

• Federally Recognized by Congress in 1991
• 1,000 Enrolled Members
• Largest Maritime Tribe in Eastern Canada (50,000+ Members, 27 Reserves)
• Tribal Council form of Government (Elected body consists of Tribal Chief, Vice Chief, and 9 Tribal Council Members)
• Current land holdings include approx 800 acres non-BRAC acquired property
Project Background and Introduction

• US Department of Energy Grant
  – “First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands”

• Maine among highest energy costs nationwide (approx 10,000 hdd, electricity approx $0.13 per kwH)

• Energy one of ABM highest expenses
  – Tribal government spends >$200K annually on energy and energy assistance programs

• Opportunities Evaluated:
  – Energy Efficiency (residential, commercial)
  – Renewable Energy (wind)
Project Goals and Objectives

• Reduce Energy Costs
• Energy Independence
  – Independence from outside suppliers
  – Self-Determination
• Economic Development
  – Attract Businesses / Support Loring AFB Redevelopment
  – Job creation
  – Generate Tribal Revenue
Community Benefits

• Benefits for the Tribe:
  – Reduce energy costs to free up funds for other priorities
  – Greater self-sufficiency
  – Reduced reliance on imported fossil fuels

• Benefits for Individuals:
  – Lower energy bills
Project Activities

1. Form Energy Committee
2. Research and Education
3. Develop Energy Vision
4. Develop Action Plan

Aroostook Band of Micmacs
Preliminary Research Findings

- Energy efficiency audits find most buildings have only moderate efficiency upgrade opportunities
- Based on wind resource assessment, three of seven sites studied most promising for wind turbine siting
  - Wind resources are moderate
  - Grant financing important to economic feasibility
Preliminary Findings: Energy Efficiency

- Most energy efficiency savings in Presque Isle
  - largest and oldest buildings.
  - Majority of the tribe’s energy expenditures

- Audits performed at:
  - 36 Micmac – 2-family
  - 26 Northern – 2-family
  - 51 Micmac – single-family
  - 52 Micmac – single-family
  - Housing & Real Estate Building – converted 2-family
  - Head Start Building – converted 2-family
# Energy Efficiency Audit Findings

<table>
<thead>
<tr>
<th>Building</th>
<th>36 MicMac</th>
<th>51 MicMac</th>
<th>52 MicMac</th>
<th>26 Northern</th>
<th>Head Start</th>
<th>Housing/ R.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Thermostat</td>
<td>3.3</td>
<td>3.8</td>
<td>3.9</td>
<td>3.7</td>
<td>6.8</td>
<td>6.2</td>
</tr>
<tr>
<td>Lighting Retrofit</td>
<td>3.1</td>
<td>3.0</td>
<td>3.0</td>
<td>3.1</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>Refrigerator Replacement</td>
<td>1.5</td>
<td>-</td>
<td>2.8</td>
<td>-</td>
<td>1.6</td>
<td>1.6</td>
</tr>
<tr>
<td>HWH Pipe Insulation</td>
<td>4.9</td>
<td>5.9</td>
<td>5.9</td>
<td>4.9</td>
<td>10.4</td>
<td>5.5</td>
</tr>
<tr>
<td>R-30 Floor Insulation</td>
<td>-</td>
<td>1.2</td>
<td>1.2</td>
<td>-</td>
<td>4.9</td>
<td>4.7</td>
</tr>
<tr>
<td>Sillbox Insulation</td>
<td>7.7</td>
<td>-</td>
<td>-</td>
<td>7.8</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total Estimated Initial Cost</td>
<td>$879</td>
<td>$1899</td>
<td>$2449</td>
<td>$329</td>
<td>$5041</td>
<td>$4514</td>
</tr>
<tr>
<td>Life Cycle SIR</td>
<td>2.6</td>
<td>1.5</td>
<td>1.8</td>
<td>4.4</td>
<td>4.1</td>
<td>4.2</td>
</tr>
</tbody>
</table>
# Energy Efficiency Audit Findings

<table>
<thead>
<tr>
<th></th>
<th>Residential</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Total Cost of</td>
<td>$ 1,389</td>
<td>$ 4,784</td>
</tr>
<tr>
<td>Recommended Measures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average Annual Energy Savings</td>
<td>$ 307</td>
<td>$ 2,265</td>
</tr>
<tr>
<td>Approximate Annual Energy Costs</td>
<td>$ 4700</td>
<td>$ 11,750</td>
</tr>
<tr>
<td>Percent Annual Savings</td>
<td>6.5 %</td>
<td>19.2%</td>
</tr>
<tr>
<td>Simple Payback in Years</td>
<td>4.1</td>
<td>2.1</td>
</tr>
</tbody>
</table>

KEMA recommends setting priorities based upon the individual measures with the highest SIRs.

Aroostook Band of Micmacs
Wind Resource Assessment

- Four turbine options were explored:
  - Bergey 10 – 10 kW
  - Fuhrlander 30 - 30 kW
  - EMS/E15 – 35 kW
  - Fuhrlander 100 – 100 kW

- Power curves show projected production at different wind speeds
# Financial Analysis – Best Case

<table>
<thead>
<tr>
<th></th>
<th>Admin Building Fuhrlander 100</th>
<th>Caribou 1 Furhrlander 30</th>
<th>Littleton 2 Furhrlander 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net Annual Energy Yield (kWh)</td>
<td>159,059</td>
<td>65,348</td>
<td>69.602</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td>$327,250</td>
<td>$134,750</td>
<td>$134,750</td>
</tr>
<tr>
<td>Average Annual Cash Flow ($000)</td>
<td>$7.2</td>
<td>$2.9</td>
<td>$3.9</td>
</tr>
<tr>
<td>Cumulative Cash Flow ($000)</td>
<td>$143</td>
<td>$58</td>
<td>$78</td>
</tr>
<tr>
<td>Net Present Value ($000)</td>
<td>$64</td>
<td>$26</td>
<td>$38</td>
</tr>
<tr>
<td>Positive Cash Flow Each Year?</td>
<td>Yes (except year 1)</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

*Aroostook Band of Micmacs*
Wind Resource Assessment: “Littleton 2”

- Littleton 2 located on residential street at top of hill beside homes
- Strongest wind resources exist at Littleton 2 – 6.3 m/s average wind speed at 50 meters
- Maximum generation at the site is 189,444 kWh per year
  - Equivalent of 54% of total electric load for ABM tribally-owned buildings

![Littleton 2 Estimated Generation](chart)

\[
\begin{array}{c|c|c|c|c}
\text{Turbine Type} & \text{Bergey 10} & \text{Fuhrlander 30} & \text{EMS/E15} & \text{Fuhrlander 100} \\
& (10 \text{ kW}) & (30 \text{ kW}) & & (100 \text{ kW}) \\
\hline
\text{kWh/year} & 11,181 & 59,981 & 88,466 & 189,444 \\
\end{array}
\]

Aroostook Band of Micmacs
Vision Statement

The Aroostook Band of Mi’Gmaq/Micmacs embrace energy efficiency and renewable energy to become increasingly energy independent and to reduce costs. Using proven and new technologies, the tribe harnesses natural resources from the wind, the land and the sun to provide half of its energy needs. New housing is designed and constructed with energy efficient features to reduce tribal members’ energy bills. The tribe's renewable energy and energy efficiency programs have reduced energy bills by over 25%.
Next Steps

• Draft Five Year Strategic Plan that Includes The Following Activities:
  – Energy efficiency
    • Complete Audits on Bon-Aire Housing Units
    • Conduct Appliance Inventories/Replacements
    • Extensive Energy Audit Training for Tribal Maintenance Personnel
    • Weatherization Training for Tribal Maintenance Personnel
    • Upgrades for Bon-Aire Housing Units
    • Incorporate Green Building Techniques into Future Facility Development Plans (develop building codes)

Aroostook Band of Micmacs
Next Steps (2)

- Renewable Energy
  - Conduct Wind Studies on Bon-Aire & Littleton Sites
  - Develop Geothermal Pilot Project for Evaluating Feasibility of Residential Geothermal Projects
  - Examine Potential for Wind Energy on Loring Industrial Site
  - Re-examine Potential of Wind Energy Payback on Caribou Site After Creating A Master Site Development Plan
Next Steps (3)

- Identification of Project Funding Sources
  - US DOE First Steps Feasibility Grant
  - USDA Renewable Energy Program
    (Implementation Following Feasibility)
  - Clean Renewable Energy Bonds (CREBS)
  - Sale of Green Tags
  - HUD ICDBG Housing/Community Facilities
    Grant for Implementation of Energy Efficiency
    in New & Existing Tribal Facilities
Next Steps (4)

- Evaluate reuse options at Loring Air Force Base Property
- Incredible opportunity for energy project
  - 7.5 million gallons of storage tank capacity
  - Coal storage yard with hoppers and associated infrastructure
  - Pipeline connection to deep-water port on coast, railroad spur
  - Large potential source of biomass
Questions

• Russell Dennis, Project Director
  Aroostook Band of Micmacs
  7 Northern Road
  Presque Isle, Maine 04769
  (207)764-1972 Ext. 22
  rdennis@micmac-nsn.gov
  www.micmac-nsn.gov