

Inter-Tribal Council of Michigan, Inc. Environmental Services Division

Bay Mills Indian Community Energy Reduction Feasibility Study

Chris Kushman



Thank You

- DOE Tribal Energy Program
- Tribal Energy Program Review presenters
- Bay Mills Indian Community



Bay Mills Indian Community

- Upper Peninsula of Michigan
 - Cold temperatures
 - Prolonged exposure to strong north winds off Lake Superior
 - Short winter daylight
- Fishing and fish consuming community
- Electricity largely supplied by coal fired power plants
- Bay Mills Community College Building Trades Program
- **Community buildings**
 - Tribal administration building
 - College
 - Health center
 - Community building with gymnasium
 - Elementary school





Objectives

- Complete a feasibility study and resulting plan outlining the measures needed to cut energy consumption 30%.
- The goal of this project and of the Tribe is to reduce the energy consumption at the Community's most energy intensive buildings that will, in turn, reduce emissions at the source of energy production, reduce energy expenditures, create long lasting energy conscious practices and positively affect the quality of the natural environment.
- Increase occupant comfort



Process and Status

- Community Awareness - Ongoing
- Energy & Weatherization Audits - Completed
- Analyze Audits & Determine Opportunities – In progress
- Explore Energy Reduction Strategies – In progress
- Calculate existing use/cost, alternative use/cost and payback periods – In progress
- Feasibility Plan – Upcoming



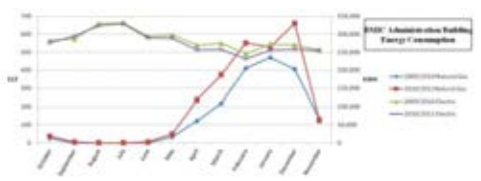
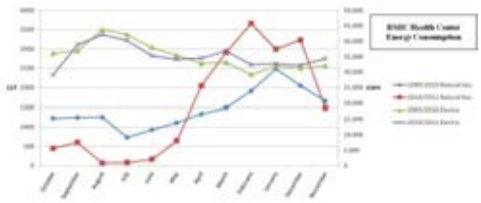
Community Awareness

- Project targets highly utilized Community buildings
- Project/buildings are intended to showcase energy efficiency to decision makers and Community
- Informal meetings for community members to share project information and exchange energy reduction knowledge
- Create Community outreach pamphlets/factsheets to advocate future energy reduction expansion

Energy Audits

- Inventory Energy Consuming Items and Compile Data

- Past energy consumption/bills
- Separate heating, cooling, other and establish baseline
- Utilize experience and information with building managers
- Conduct complete onsite inventories, inspections of items relating to energy consumption
- Document and assess items



Analyze Findings/Data and Determine Opportunities

- Deficiencies
 - Practices
 - Equipment
 - Buildings
- Transform
 - Energy reduction, comfort and savings

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Reduction from Energy Conservation

- Priority – energy reduction through conservation
 - Look to identify ways to further maximize benefit of energy
 - Utilize existing systems
 - Cost benefit
 - Examples include
 - Heating – Setbacks and setups using programmable thermostats and modify heating & cooling settings
 - 6pm–6am -10° Setback results in 15% heating energy cost savings
 - Adjust heating temperature from 72° to 69° results in 14% heating energy cost savings
 - Workstations – Power management settings modification i.e. hibernate
 - 27 Workstations on 24hrs 365 days = 23,652kWh or \$2,602
 - 27 Workstations hibernating 13 hrs/work day and off weekends etc. = 8,388kWh or \$923; savings of 15,264kWh or \$1,679
 - Exterior light timer optimization
 - Reset from all night using 12,528kWh or \$1,378 to 4hrs/day results in 5,011 or \$552; savings of 7,517kWh or \$826; 60% reduction
 - Provide solutions to space heaters i.e. change AC from 72° to 76°;
 - Focus to other systems that aren't compatible with conservation efforts



Reduction from Energy Efficiency

- Air leak sealing
 - Attic decks
 - Low building penetrations
- Insulating
- Heating, cooling, HVAC and hot water
 - High efficiency furnaces results in $\geq 5\%$ reduction in natural gas use
 - Air handler control systems to increase efficiency - TBD
 - Eliminating standard electric water heaters – Standard electric to hybrid heat pump using results in 63% reduction of electricity use
- Lighting
 - High efficiency bulbs/fixtures – T12 to T8 $\sim 40\%$ reduction, HPS to LED retrofit 86% reduction of electricity use
 - Occupancy sensors - $\sim 25\%$ reduction in office electricity consumption
- High efficiency equipment
 - Refrigerators – replacing old refrigerators with new high efficiency units results in 78% reduction of electricity use
 - Coffee machines – switching from heated base warmer machine to using to carafe unit results in 92% reduction of electricity use



Feasibility

- Energy use comparison between current and energy efficient alternatives
- Cost & Payback Period – The expenditures incurred from the purchase of equipment and materials, installation, maintenance and remaining value of replaced item if useable life remains.
- Sort items by highest energy reduction and lowest cost.
- Likelihood of alternative negated, turned off, overridden, removed, etc.
- Interference or other impacts from presence of alternative.



Energy Reduction Feasibility Plan

- Present a sustainable and economically feasible strategy to save money in a manner that serves to improve environmental conditions.
 - Utilize forecasted savings to, in part, invest in improvements to realize energy reduction
 - Prioritize sound/tight buildings
 - Prioritize the future of energy reduction within the Community
 - Innovative, reliable and realistic



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&
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Chris Kushman
ckushman@itcmi.org
(906) 440-0046