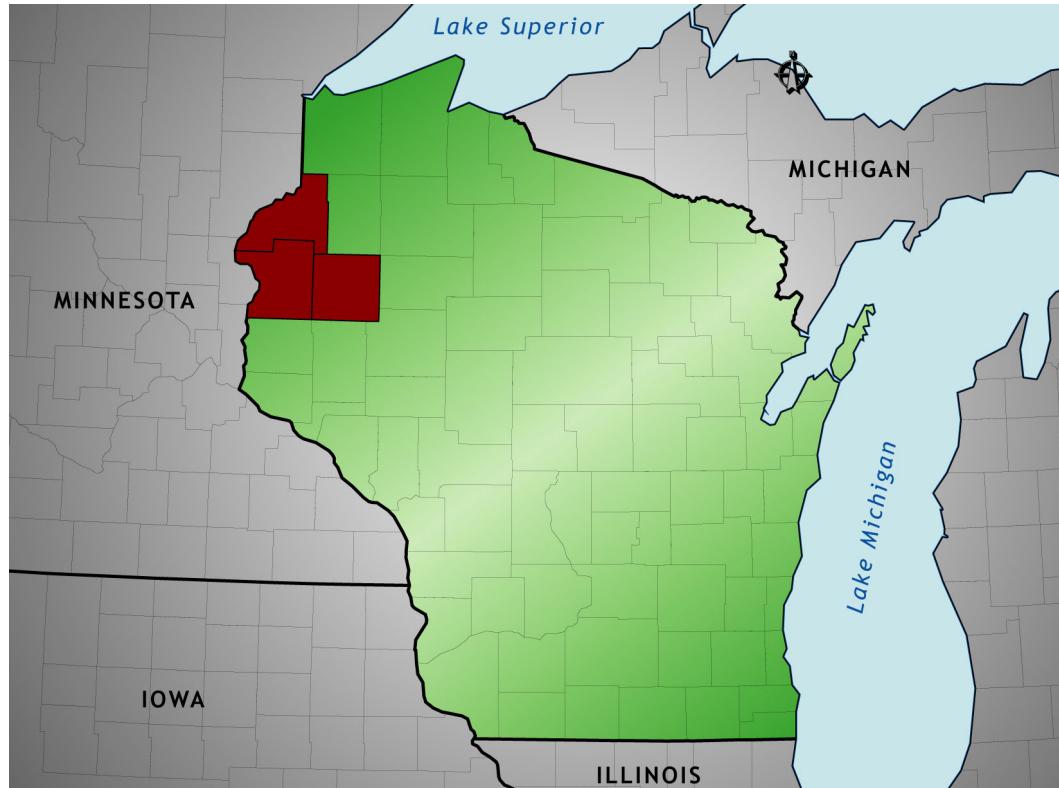


Bio Mass Electrical Generation on Tribal Lands

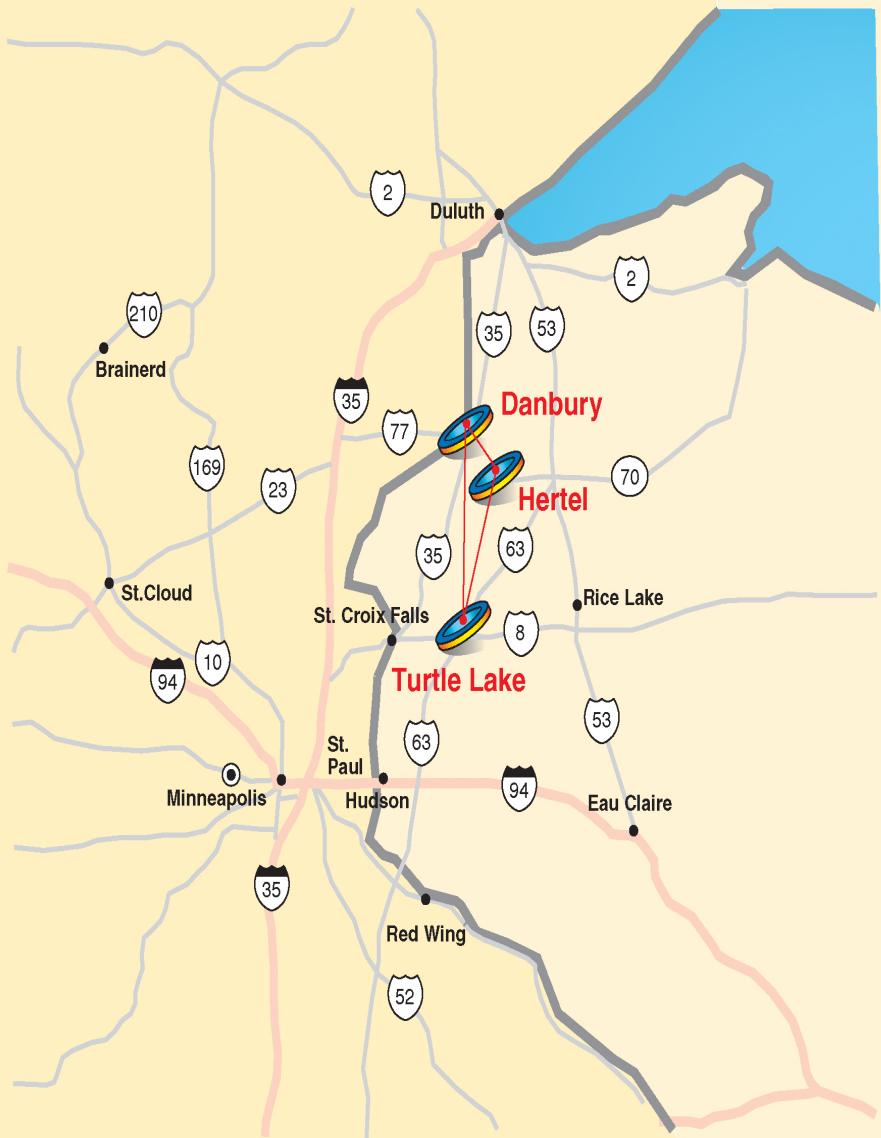


St. Croix Chippewa Indians of Wisconsin

The St. Croix Chippewa Indians of Wisconsin are located in northwestern Wisconsin. The reservation lands are scattered throughout three counties; Burnett, Polk, and Barron.



The Tribe operates three casinos, an aquaculture facility and various other tribal enterprises. Including the government center, the Tribe employs approximately 2,200 people.



Currently, Gaming is the best resource and asset that the tribe's members and government possess to improve the quality of life on the reservation.

The Tribe recognizes the need to diversify and add to these successes and in recent years has become aggressive in its pursuit of economic opportunities in attempts to diversify its means for self-sufficiency.

The St. Croix Tribal Economic Development goals are closely aligned with the DOE's "Renewable Energy Development on Tribal Lands" initiative. Using locally available bio fuel for power generation directly fits into the community, economic, social, and cultural goals of the St. Croix Tribe.³

Project History

- **During 2003, The St. Croix Chippewa Tribe applied for and was awarded a grant by DOE Tribal Energy Program to evaluate the feasibility of bio-mass electrical generation on tribal lands.**
- **Feasibility Study Objectives:**
 - Determine the fuel requirements for a biomass power plant and the fuel available in proximity to the St. Croix reservation;
 - Assess the economic feasibility of biomass electric generation;
 - Assess the potential for creation of revenue for the tribe;
 - Create new jobs for tribal members; and
 - Increase the attractiveness of the reservation area for business development.
- **Subsequent project development efforts are being funded by BIA Division of Energy and Mineral Resources.**
 - Resource Assessment
 - Waste Heat Utilization Engineering Assessment.
 - Equipment/Vendor Identification and Assessment.
 - Project Economic Analysis.

Feasibility Study Elements

- Available bio-mass fuel
- Customers and distribution system
- Applicable technologies
- Project definition (size, fuel source, preferred technology, siting criteria, etc.)
- Site Selection
- Permit Planning
- Economic Modeling
- Environmental Impacts Assessment
- Socio-economic Impacts Assessment

Feasibility Study Conclusions

- We concluded that:
 - Small, biomass-fired power plants could be feasible if the market would support a \$0.03 to \$0.04/kWh premium.
 - Implementation of proposed renewable energy portfolio mandates in WI could be expected to generate the needed premium.
 - Biomass fuel is locally available in sufficient quantities to support the project; however, the fuel collection and delivery infrastructure is undeveloped.

Two potentially viable projects were identified:

- 1-3 MW wood chip burning plant adjacent to St. Croix Fishery in Danbury, WI
- 1-3 MW wood chip burning plant adjacent to Tribal Headquarters in Hertel, WI

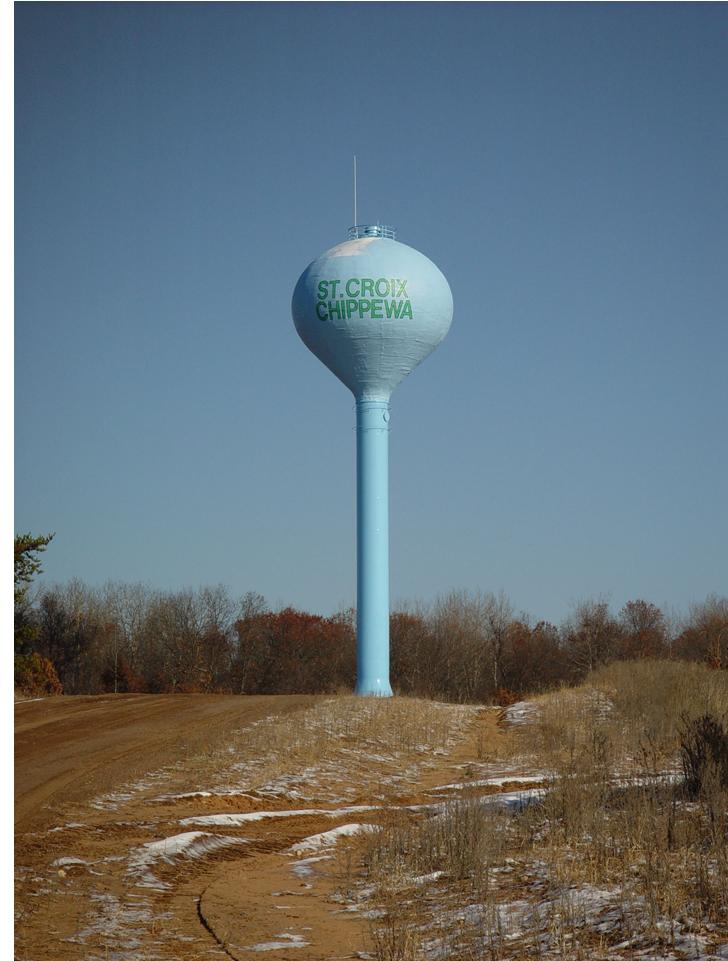
Danbury Site, St. Croix Waters Fishery

The Fishery uses 1.5 MW. Excess heat from a biomass-fired power plant may be used in the facility to reduce natural gas usage. Potential savings will bolster revenues and create additional full-time employment for the plant which at full capacity has 35 employees.



Hertel Site, Water Tower

The Tribe has worked with Caterpillar, Inc. (Power Systems North America) to develop, construct, finance, and operate a 40-45 MW peaking power project in a utility park, for the sale of capacity and energy to the grid. This location has infrastructure and land to also support up to a 10 MW renewable energy project. Excess heat from a biomass-fired power plant may be used to provide district heat for the tribal headquarters campus and/or heat for future industrial park developments.



Fuel Supply Alternatives

- Wood waste from sawmills and wood products manufacturing operations
- Tree farming
- Wood from logging operations
- Forest management and logging operations waste

Loggers / Tree Chippers

- Numerous loggers/tree chippers operate in the project region.
- Chips are sold for manufacturing, building materials, pulp & paper, and boiler fuel.
- The best price from local logging contractors is estimated to be \$20/ton.

Logging Waste

- Logging wastes can be collected using existing logging practices and chipped at the landing or at the site.
- Slash left behind by a harvester can be collected and either chipped or fed into a bundler to produce compact “slash logs” .
- Logging waste is an abundant, under-utilized fuel source.
- Utilization of logging waste will enhance the logged environment, provide a value-added product to the logger and produce “green” electrical power.
- Logging wastes collection and delivery infrastructure is undeveloped.

Resource Assessment Report – June 2006

- 1. Document 10 year logging history**
- 2. Determine state, county and private cuts**
- 3. Verify amount of slash available and how much should be left**
- 4. Conversion factors and fuel quality issues**
- 5. Slash management contract requirements – State and County policies**
- 6. Slash ownership issues**
- 7. Hertel and Danbury as potential locations**
- 8. Access limitations on slash harvesting**
- 9. Other general issues uncovered in the course of the project**
- 10. Loggers meetings and database**
- 11. Bidding processes**
- 12. Transportation costs**
- 13. Optimal collection method and wood chip supply chain**

Best Site Location

As a result of the Resource Assessment Report as well consideration of the best possible location to the utilize waste heat from the power facility, we have chosen to concentrate our efforts at the Danbury site.

The resources available at both the Hertel and Danbury sites proved to be enough to supply 3MW plants for either location, but showed the Danbury site to have three times the available resource in a 30 mile radius than at the Hertel site.

As indicated earlier in this presentation, the Fishery has a 1.5 MW load and an annual average natural gas usage of \$200K/year. Excess heat from the operation may be used to reduce the natural gas usage. Potential savings will bolster revenues and create additional full-time employment for the plant which at full capacity has 35 employees.



St. Croix Waters Fishery

Aquaculture... “the science, art and business of cultivating fish and shellfish”. In October of 2001, the St. Croix Waters Fishery opened in Danbury, Wisconsin. The 170,000 square-foot, \$23 million facility is a state-of-the-art, re-circulating aquaculture system. The facility has grown yellow perch and hybrid striped bass and is capable of producing approximately 1.5 million pounds annually for commercial sale.



St. Croix Waters Fishery



St. Croix Waters Fishery





Current Effort Funded by BIA Division of Energy and Mineral Resources

- Market Development
- Waste Heat Utilization Engineering Assessment
- Technology/Vendor Assessment
- Project Economic Analysis
- Pricing and Marketing Strategy

Market Assessment

- Wisconsin Governor Jim Doyle signed Senate Bill 459 into law on March 17, 2006, mandating an increase in State government purchases of renewable energy to 10% and 20% by 2007 and 2011, respectively; and an increase in statewide renewable energy use to 10% by 2015.
- Sharply higher natural gas prices, supply constraints and market volatility have combined to end the growth in gas-fired generating capacity and lessen biomass-fired projects cost disadvantage.
- Because of these factors, we anticipate that the market price for renewable power will soon support project implementation.

Wisconsin's Renewable Energy Mandates

- State Government Portfolio:
(State facilities delivered renewable power by local utilities)
 - 10% by 2007
 - 20% by 2011
- Statewide utilities renewable portfolio
 - currently at 4%
 - additional 2% by 2010
 - additional 4% by 2015

Potential Customers

- Captive use
- Regional IOUs and Co-ops
- State government

Waste Heat Utilization

- Fishery uses \$200k/year of Natural Gas (at gas price of \$10/therm)
- \$400k-\$600k/year excess heat available for industry attraction (depending upon size and technology)

Technology Assessment

- Stoker (lots of operating experience)
- Gasifier (more efficient, better emission profile)
- STRPG (most efficient, pre-commercial)

Comparative Economic Analysis

- Sensitivity Modeling Scenarios
 - Technology
 - Size of Plant
 - Financing / Deal Structure
 - Waste Heat Utilization
 - Operating Costs (fuel, labor, etc.)

Next Steps

- Preparation and Negotiation of Memorandum of Understanding (MOUs) for fuel supply, technology transfer, purchase power agreements, project financing, etc.
- Engineering, Procurement and Construction contracts
- Deal structure definition and associated legal work (formation of project sponsor entity, i.e.; JV, tribal entity, etc.)
- Connectivity and Transmission Approvals
- Environmental Permitting / Approvals
- Community Relations
- Contractor Selection
- Construction Management
- Energy Park Planning and Development

Our Vision

- Our expectation is that within the next year implementation of proposed renewable energy portfolio standards in Wisconsin will result in a firm market premium for biomass-fired power that justifies Tribal investment in the project.
- We believe that a small power project based on locally available biomass can be demonstrated to be economically viable in Danbury and replicated in numerous communities in northern Wisconsin, Minnesota and Michigan.

- The Biomass Project will contribute to the continued diversification of Tribal revenues and help increase, enhance, and improve the quality of life of Tribal and community members.
- The Biomass Project will provide new meaningful permanent employment, and retain and expand existing regional employment.
- The added spending in Burnett, Barron, and Polk Counties by those employed at the facility and in the logging industry would support jobs in grocery stores, food and beverage establishments, service stations, auto repair shops, clothing stores, barber and beauty shops, laundries and furniture stores.
- The benefits to the Tribal communities, both on the reservation and in the surrounding communities, would be substantial. The revenue generated would contribute to funding needed improvements in Tribal health care, housing, education, social services, community development, human resources, and other Tribal services and necessary infrastructure.