



Red Lake Band of Chippewa Indians: Assessment of Biopower Development Options

Presentation for:

**Biomass Training and Business Development
Native American Energy and Minerals Institute**

May 15-19, 2006



Presentation Outline

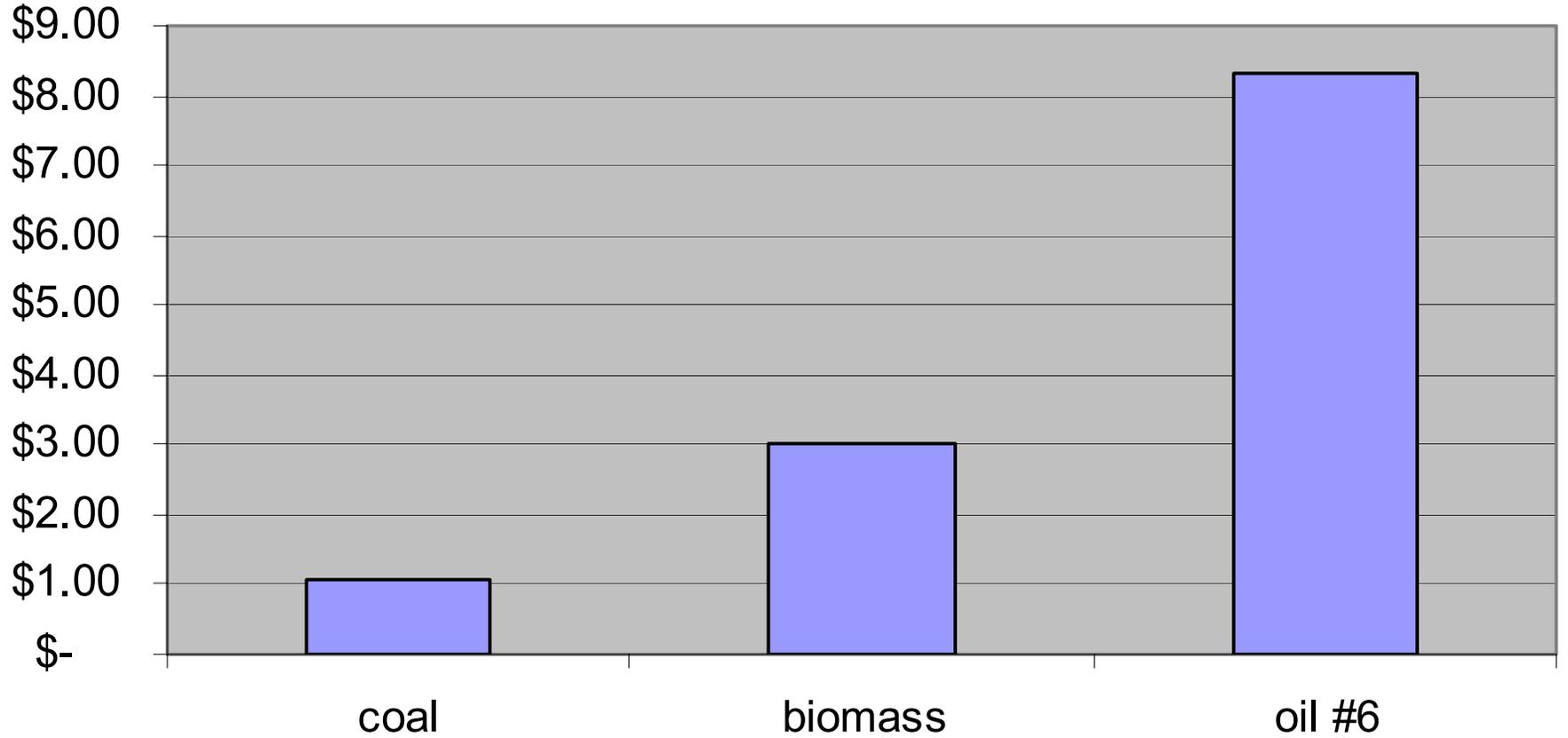
- Project overview
- Resource assessment
- Regional / Local utility issues
- Biopower
 - Demand
 - Supply
 - Technology
 - Economics
- Conclusions / Recommendations



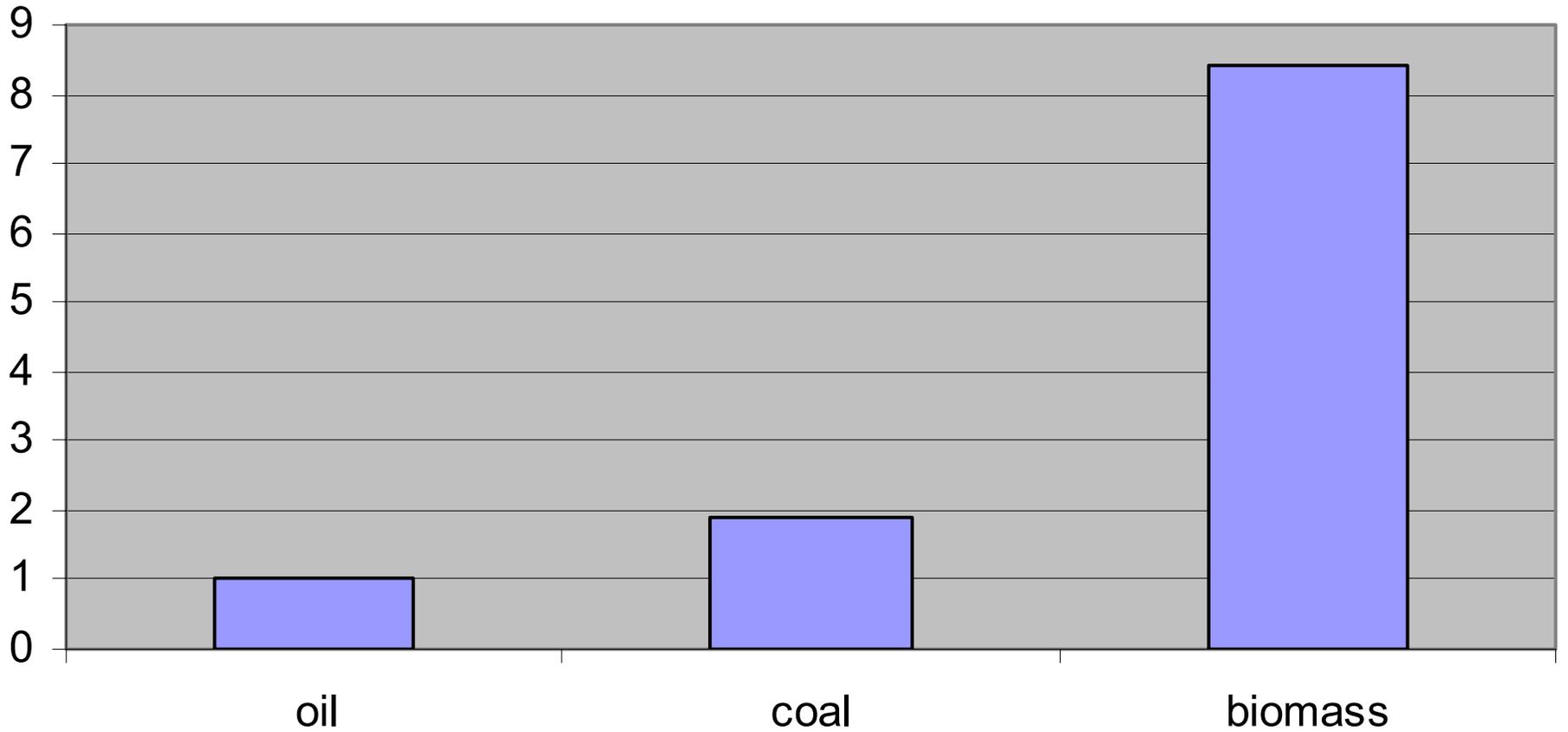
Project Overview

- Evaluate feasibility of creating value-added products from the Tribe's unmerchantable biomass resource
- Funded by U.S. DOE, Tribal Energy Program
- Work conducted by McNeil Technologies and Energy Cents Coalition (MN non-profit)
- Support from Red Lake Energy Task Force
- Other non-biomass activities as part of project

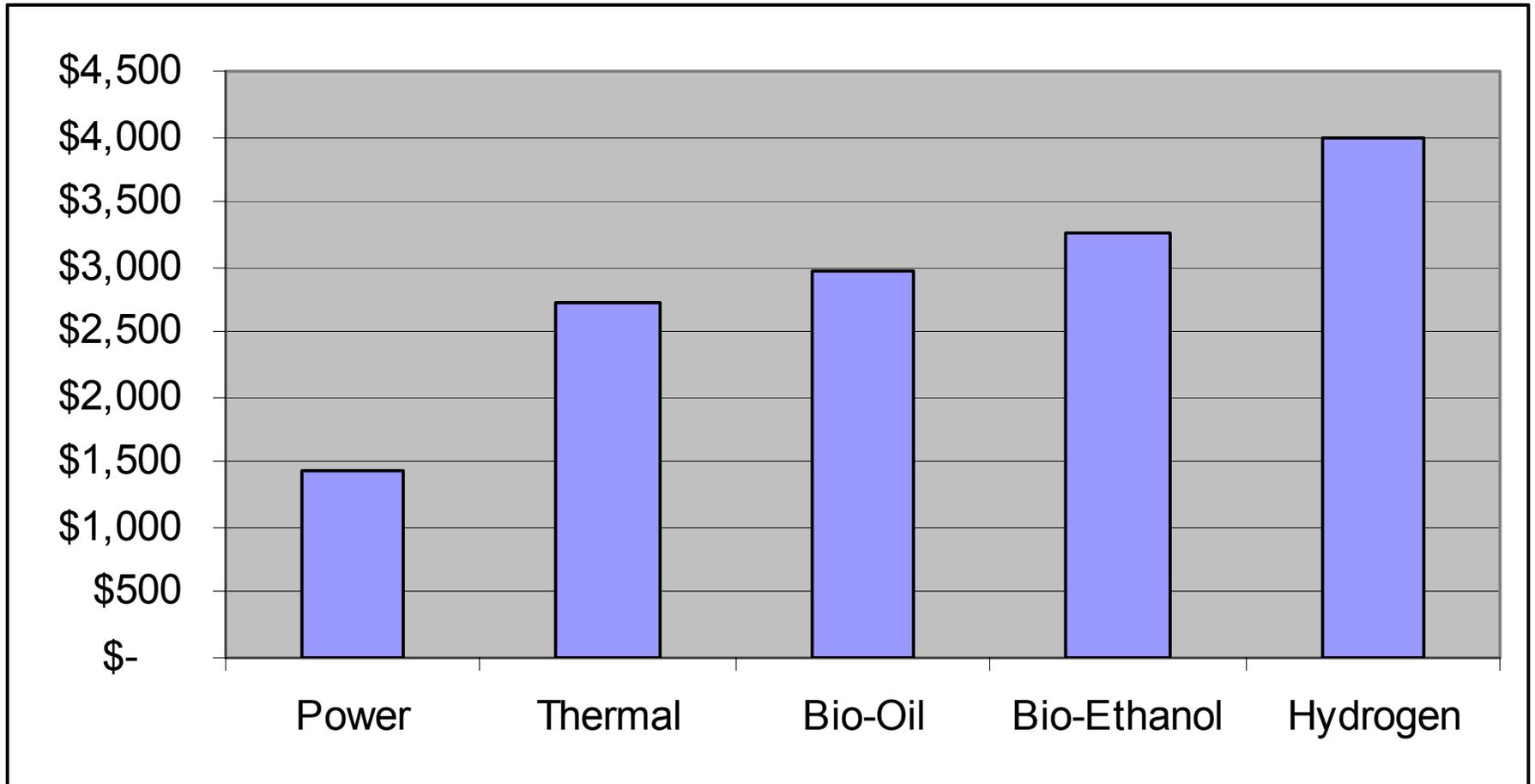
Fuels Comparison, \$/MMBtu



Fuels Comparison, CF/MMBtu

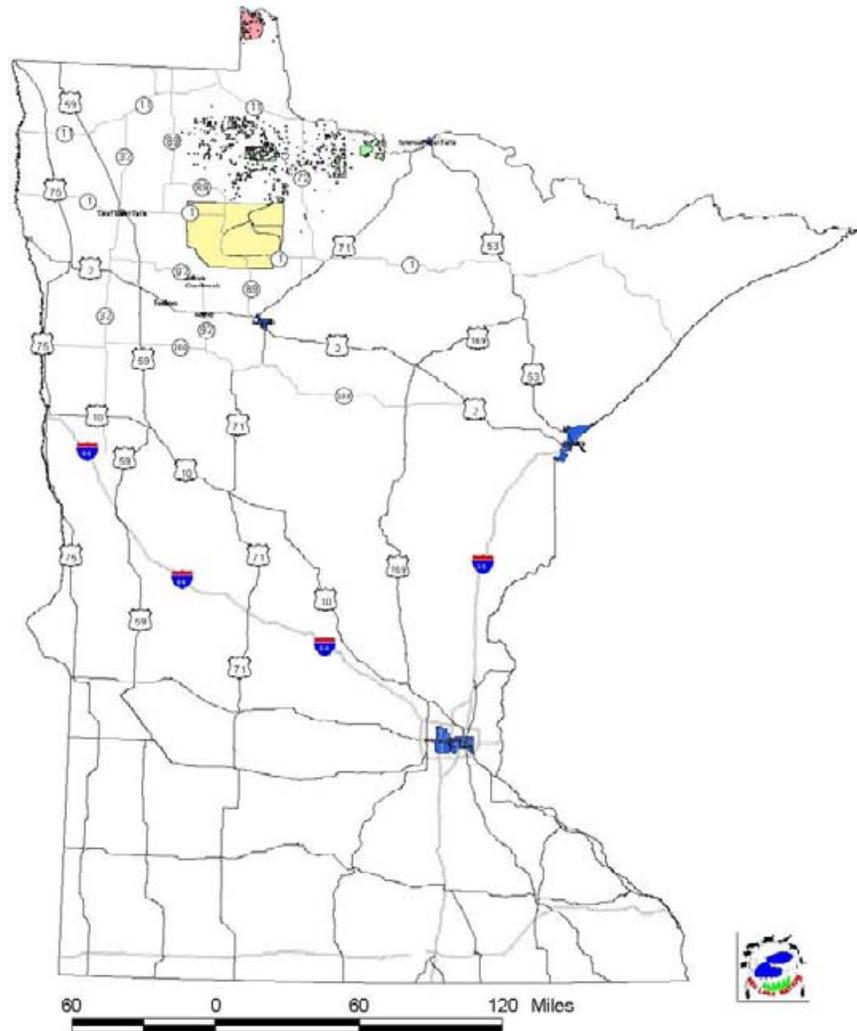


Illustrative Biomass Values (based upon 50,000 wet tons)





Location Map





Motivation

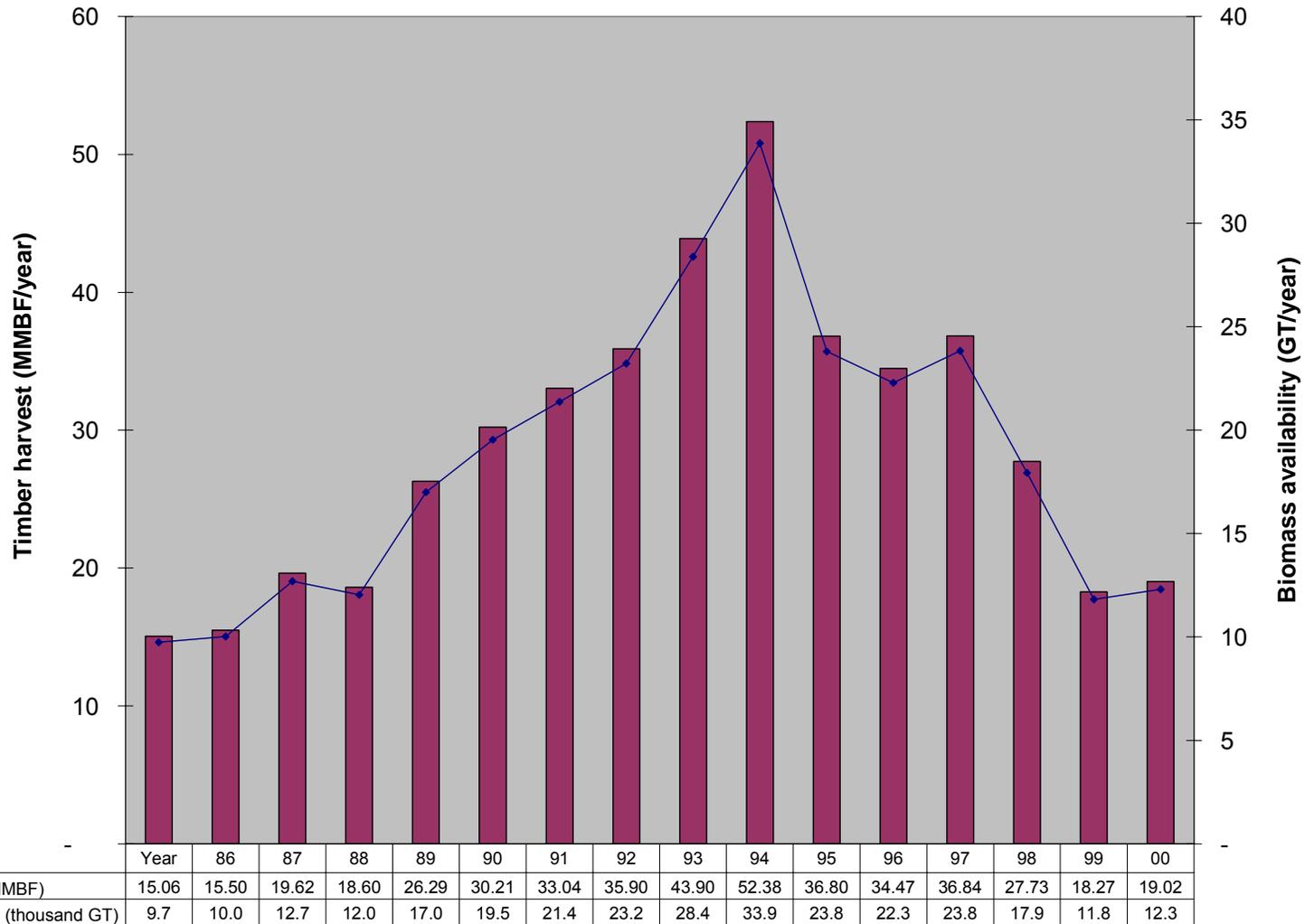
- Energy Self-Determination
- Utilization of “waste” biomass
- Economic development
 - Capacity building
 - Jobs
 - Retain \$ in local community
- Thumb nose at local utility?



Current Harvest

- Logging conducted by ~ 20 companies owned by Tribal members
- Firewood, pulp and OSB are outlets
- \$28-\$38/ton value
- Even aged management is most common form of harvest
- Converting up to 1,000 acres per year to Red Pine
- Currently harvesting only $\frac{1}{2}$ of AAC
- ~40,000 green tons / yr. available

Annual Timber Harvest on Red Lake Reservation (AAC 1992-2001 = 41 MMBF)

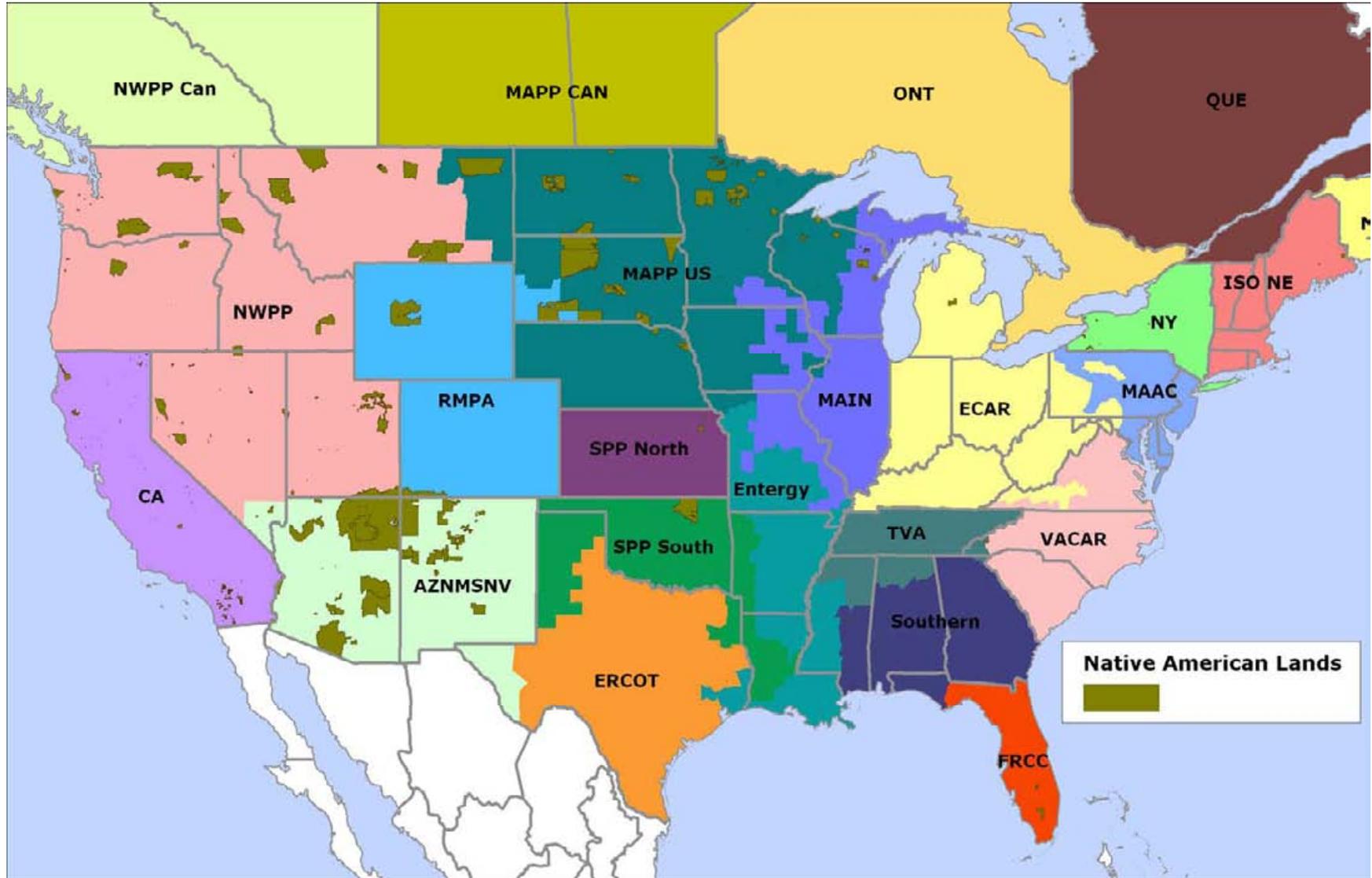




Assess Electricity Markets

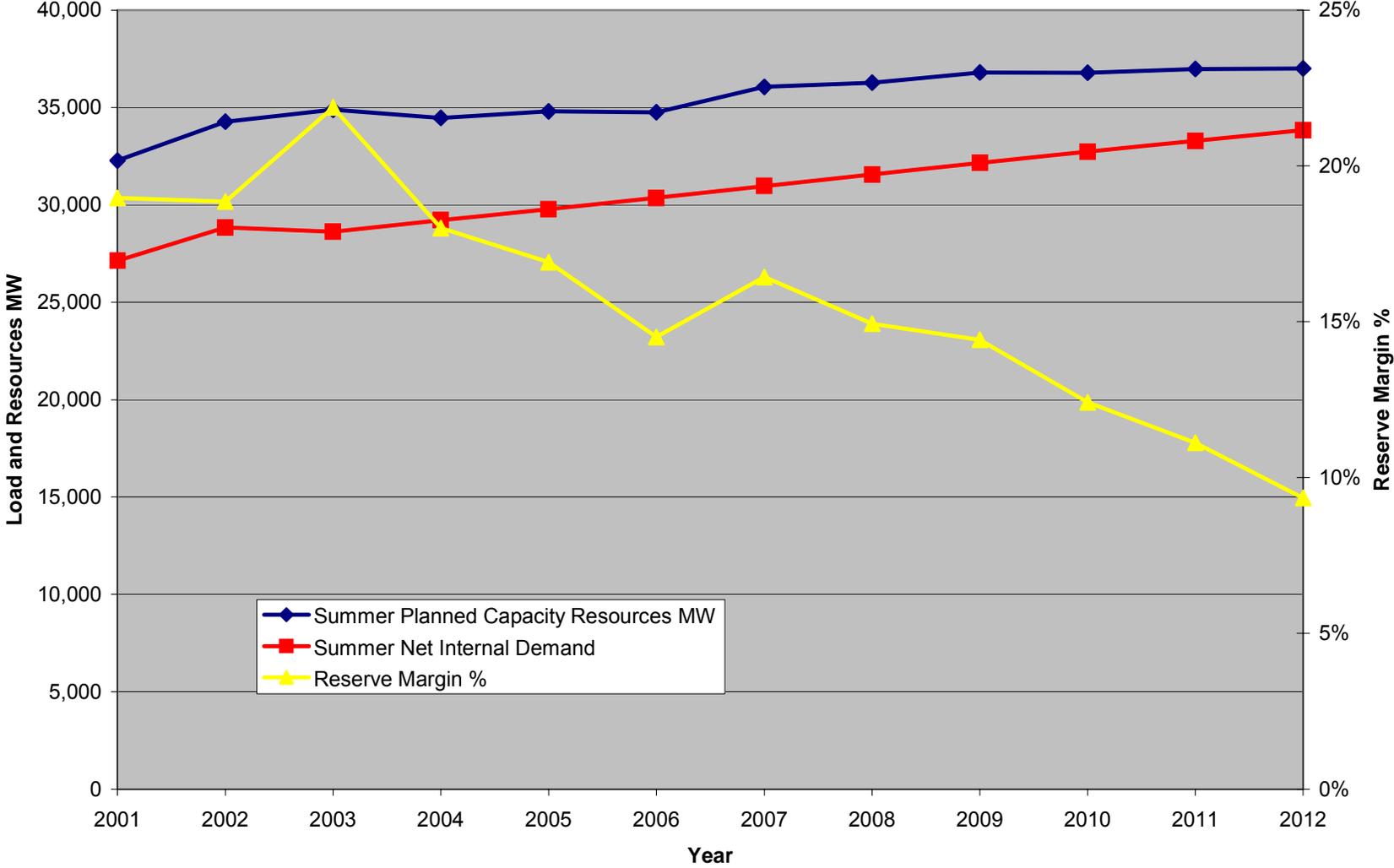
- Demand: evaluate local, regional and state electric power markets
- Retail and wholesale costs
- Mandates, need for renewable power
- Transmission
- Costs of producing biomass electricity

Mid-Continent Area Power Pool



MAPP Forecast*

MAPP Load and Resource Forecast



*Source: Energy Velocity



Minnkota IRP Highlights

- 2.2% forecast for annual growth
- Will exercise Square Butte (coal) options in 2006-2009 to meet demand growth = 95MW
- DSM provides 340MW
- Not subject to any mandates or renewable portfolio standards
- Next supply side option is peaking or firm hydro from Manitoba Hydro
- Interest in biomass only at least cost prices



Beltrami
Electric
Coop.

- Adversarial relationship with Tribe
- Beltrami purchases from Minnkota Power Cooperative
- Residential avg. \$0.062/kWh
 - Regional residential avg. \$0.065/kWh
 - Beltrami ~5% lower
- National residential rate average \$0.084/kWh
 - Beltrami ~26% lower



Biopower

- Application?
 - offset retail purchase
 - sell to grid, or
 - combination
- Identify utility policies and rates
 - Interconnection
 - buy-back rates
 - power needs, load growth
 - green set asides, green premium
- Transmission availability and charges



MN Biomass Experience

- 368 MW operational
- Biomass legislative mandate
 - Modified early 2005 to relax closed loop requirement
 - 100MW needed to fulfill mandate
 - 50MW turkey litter being built
 - Hibbing and Virginia building 35 MW
 - Will pay \$28/bdt delivered
 - 150 miles from Red Lake
- Potlatch OSB, Bemidji
 - 12.5 MW, sell power to Otter Tail and 5 MW to Minnkota
 - “free” fuel



Regional Biopower Summary

- Minnkota buy back rate for QF, ~\$0.02/kWh
- Capacity payment, ~\$21/kW-yr.
- Beltrami lines could handle about 5 MW of power
- IRP's don't mention biomass
- There are existing low cost biomass producers
- Legislative mandate little help to Red Lake



Local Situation

- Match biomass supply to demand, typically want at least 2x supply
- There are no large industrial facilities on the Reservation
 - No year round thermal load
- 5 MW load on reservation
- Several small commercial facilities
- Existing wood product markets
 - Pulp and OSB
 - Sets price competition for biomass



Biopower
Technologies

- **Combustion**
 - Commercial technology
 - Inefficient but reliable
 - Emissions are a concern
- **Gasification, pyrolysis**
 - Next generation, near commercial
 - Highly efficient
 - Cleaner burning, versatile end uses
 - Fuel specifications more stringent

3 MW Chiptec Gasifier Unit – Commercial Technology





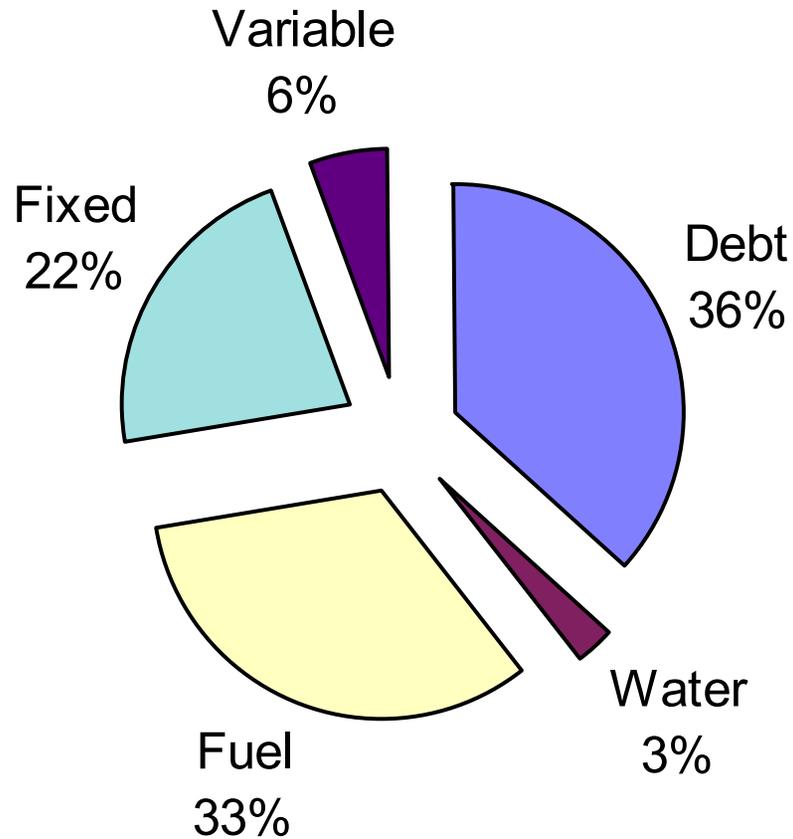
Economic Analysis

- Pro Forma Cash Flow (20 years)
 - Economic inputs confidential to tribe
 - Allows for sensitivity analyses
- Performance Parameters
 - NPV, LCOE, DSCR

Biopower Economic Analysis, 5MW

Category	Units	Base	Optimistic
Capital Cost	\$	\$ 12,697,072	\$ 6,374,032
Fuel Cost	\$/BDT	\$30.00	\$15.00
PTC	\$/kWh	\$0.000	\$0.009
Green Tag	\$/kWh	\$0.000	\$0.025
Selling Price	\$/kWh	\$0.020	\$0.040
Levelized Cost	\$/kWh	\$0.070	\$0.046
NPV	\$	(\$295,230,467)	\$85,633,150

Distribution of Operating Costs, Base Case, 5MW





Red Lake Biopower Summary

- Application only for stand alone power production (no CHP potential)
- Sell to grid
- Buy back \$0.02/kWh
- No green set asides applicable
- Biomass resource is relatively expensive
- Biopower pro forma economics suggest uneconomic for 5MW



Contact

Jack Whittier
McNeil Technologies, Inc.
1155 University Blvd. SE
Albuquerque, NM 87106
Phone: 505-843-4265
Email: jwhittier@mcneiltech.com
www.mcneiltech.com