PROJECT OVERVIEW

- To develop the capacity to conduct energy audits
- Implement energy efficiency measures into Tribal homes
- Develop a Tribally administered Energy Efficiency Program and business
PROJECT PARTICIPANTS

- Red Lake Housing Employees
- Energy Cents Coalition Staff
- Red Lake Band Members
The Red Lake Band of Chippewa Indians recognizes the need to develop a more sustainable, affordable and autonomous energy future for Tribal members.

- Nearly 60% of the 1,621 housing units on the reservation lack adequate insulation, ventilation, and efficient and safe furnaces and appliances.
The current DOE Weatherization Assistance Program (WAP) provides funding sufficient to insulate 18 homes a year. Must rely on outside organization to provide WAP services.
RELEVANT BACKGROUND INFORMATION

- This project will allow the Tribe to administer WAP directly.
- Enable Tribe to build the capacity to offer more energy efficiency to Tribal members.
OBJECTIVES

- Training for Red Lake Housing staff on how to conduct energy audits
- Extensive training on how to implement energy conservation program
- Looking at the future business plan that will be written
OBJECTIVES

- Enhance Tribal energy expertise
- Reduce Tribal energy consumption
- Implement energy measures
OBJECTIVES

- Secure additional funding for energy conservation
- Achieve significant energy savings in Tribal homes
- Promote economic and environmental opportunities to sustain the Tribes energy efficiency efforts through the development of a Tribal energy services business
Red Lake Band of Chippewa Indians
BIA / MAP Biomass Assessment

October 2006
Alberta Van Wert / Jack Whittier
Objectives

- Extend DOE-sponsored work to most promising areas
- Analyze greenhouse energy consumption
- Assess bio-oil production capability and market assessment
Area 1: Forestry Greenhouse

- Technical analysis
- Preliminary design of heating system
- Initial steps for fuel procurement including specifications
- Economic analysis
Proposed Forestry Greenhouse

- 3 greenhouses for production of seedlings for re-forestation
- ~15,000 square feet, ~9 MMBtu/yr
Projected Annual Greenhouse Heating Energy Comparison

- Biomass chips: $38,281
- Pellets: $54,688
- Cord wood: $61,250
- Fuel Oil: $136,111
- Bio-oil: $136,719
- Propane: $167,167
Area 2: Bio-Oils

- Pyrolysis oils, not biodiesel
- Compare / contrast with fuel oil
- Applications
  - Heating
  - Low-speed diesel (power)
  - Transportation blends
  - Specialty chemicals
Bio-Oil Basics

- Produced by pyrolysis of biomass material, for Red Lake this means wood
- Bio-oil is a fuel with properties similar to fuel oil #2 or #6 depending on quality
- Btu content about 80,000 Btu/gal
- pH ~2.7 (means corrosion resistant containers)
Why Bio-Oil?

- Renewable fuel
- Liquid fuel allows for variety of applications de-coupled from production
- Can use most of existing infrastructure
- Density is much greater than for other biomass forms thereby reducing transportation costs
- Air emissions lower than fossil emissions
Enhancing the Value Proposition (courtesy Dynamotive)

STAGE 1: Base Fuels – Heat & Power
Industrial Focus - Forestry, Sugar, Agricultural & Industrial Biomass Residues

STAGE 2: Transportation Fuels
Blends, Syngas, Bio-Methanol

STAGE 3: Chemical Refining
Derivative Products

Value Added
Higher
Lower

Time
Pyrolysis Feedstock Considerations

- Biomass must be dried to a moisture content of <10%
- Biomass must be sized to 6mm or below—depends on technology
  - Requires grinding / hammermill step
- Energy for these processes can come from resulting gas or char or from the bio-oil
Bio-Oil Challenges

- Limited commercial experience
- Cost
  - Higher than petroleum fuels, highly dependent upon feedstock cost
- Lack of fuel standards
  - Variability in fuel between producers
  - Consumer confidence issues
- Storage issues
  - Length
  - Corrosion resistant tank
Federal Bio-oil Incentives, Tribal Challenge

- Accelerated depreciation
  - 2 yr MACRS
- Tax credit
  - $1/gallon
- PTC
  - Power production only
- Because of tax status, Tribes cannot easily take advantage of incentives leading to creative project financing structures
Regional Bio-Oil Market Assessment

- Regional fuel oil demand, industrial users within 250 miles plus Tribal use
  - ~4 million gallons/yr.
  - ~150 dtpd facility, exceeds supply
- Growth
  - ~2%/yr
  - Not heavily seasonal or weather related (process use)
- Price
  - Varies but ~$1.25/gallon
Firms offering Bio-Oil Technology

Commercial:
- Dynamotive (Canadian)
- Ensyn (Canadian)

Near Commercial:
- Renewable Oil International (US)
- Advanced Biorefinery (Canadian)
- Biomass Technology Group (Malaysian)
Remaining Work

- Complete economic analysis
- Present to Energy Task Force
- Present to Tribal Council
- Anticipated completion by 1st quarter ‘07
Thank you

Jack Whittier
McNeil Technologies Inc.
143 Union Blvd. Suite 900
Lakewood, CO 80228
303-273-0071