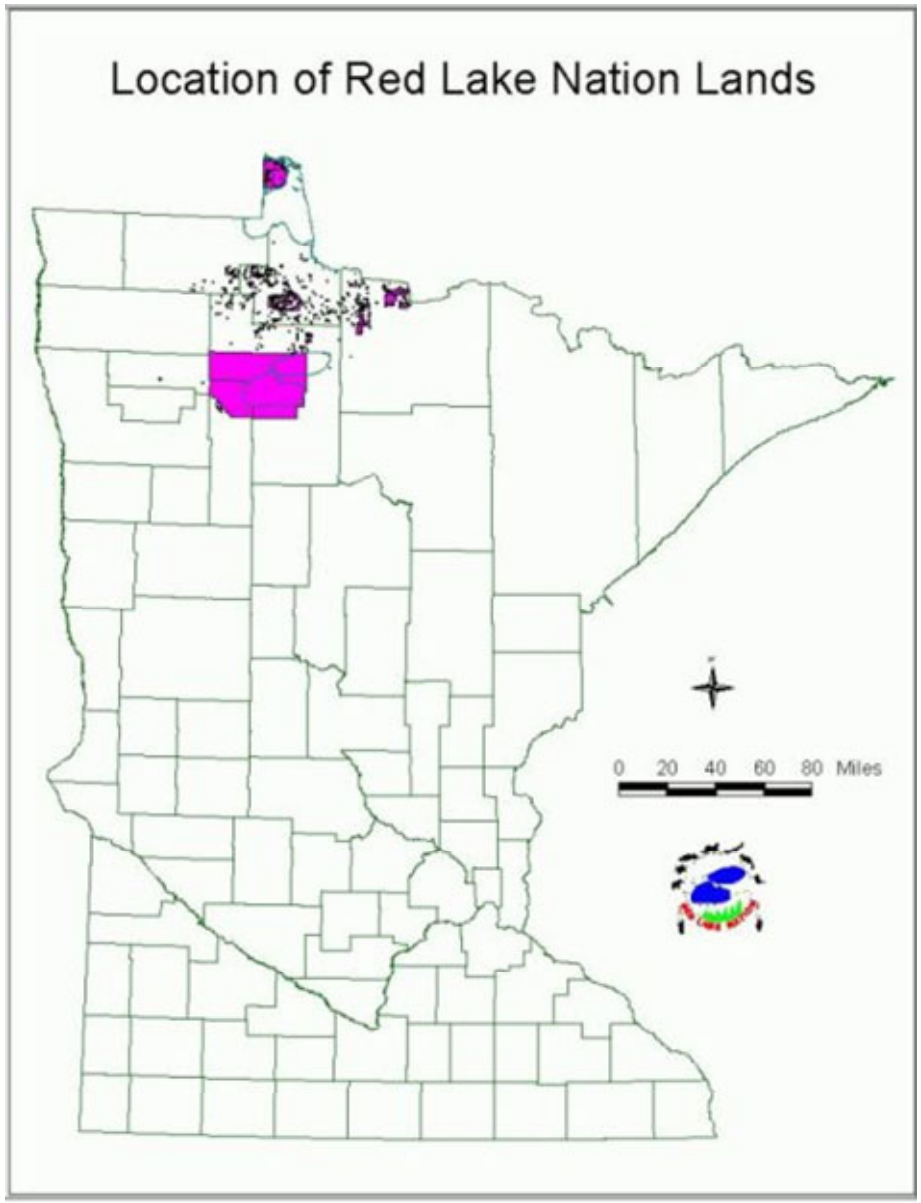
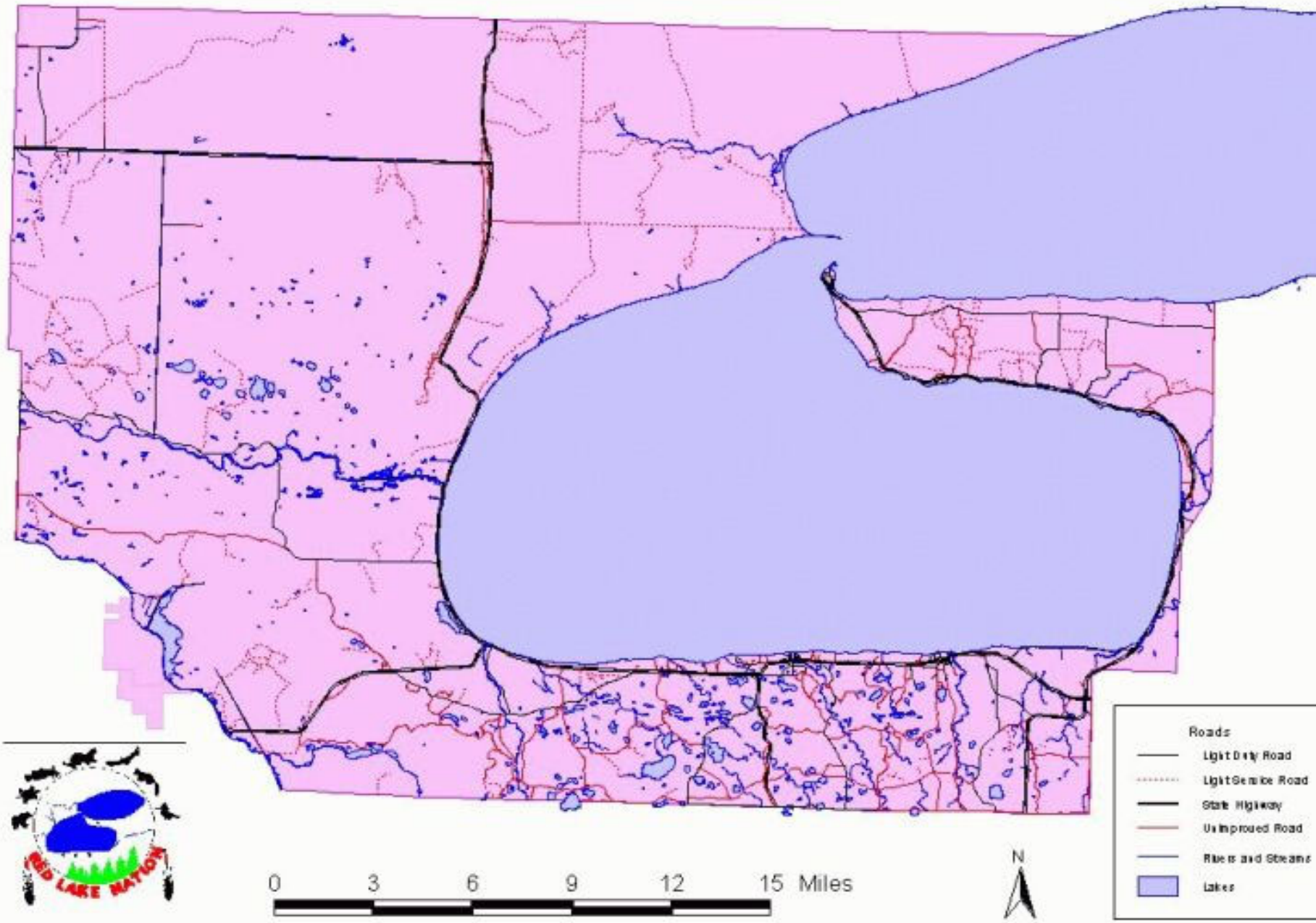
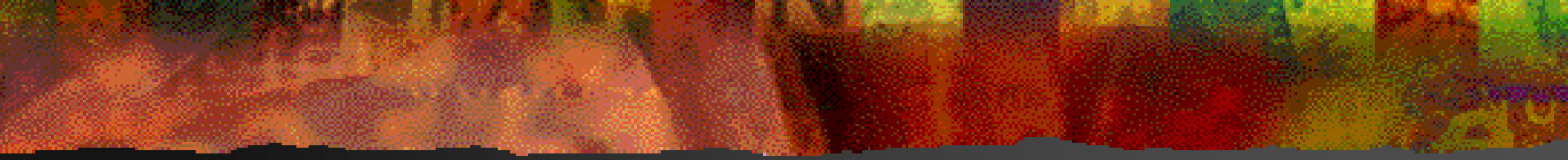
# PROJECT OVERVIEW

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


Location of Red Lake Nation Lands
0 20 40 60 80 Miles

# Red Lake Indian Reservation





# PROJECT PARTICIPANTS

- Red Lake Housing Employees
- Energy Cents Coalition Staff
- Red Lake Band Members

# RELEVANT BACKGROUND INFORMATION

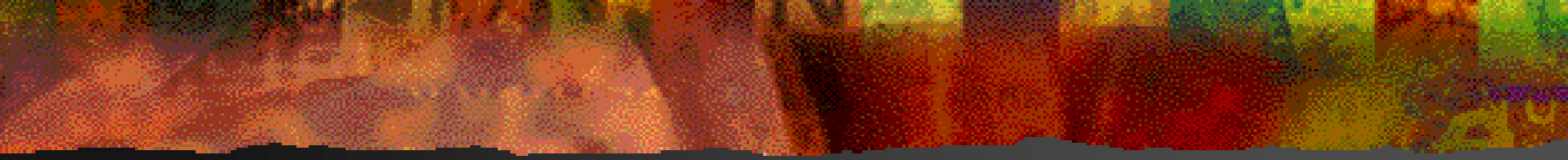
- The Red Lake Band of Chippewa Indians recognizes the need to develop a more sustainable, affordable and autonomous energy future for Tribal members
- Nearly 60% of the 1,621 housing units on the reservation lack adequate insulation, ventilation, and efficient and safe furnaces and appliances.

# RELEVANT BACKGROUND INFORMATION

- 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

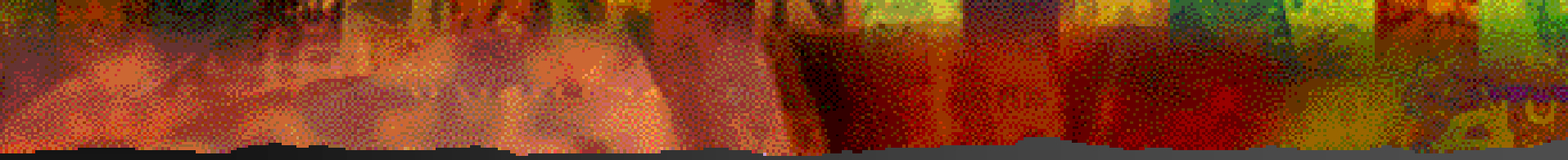


# OBJECTIVES

- 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

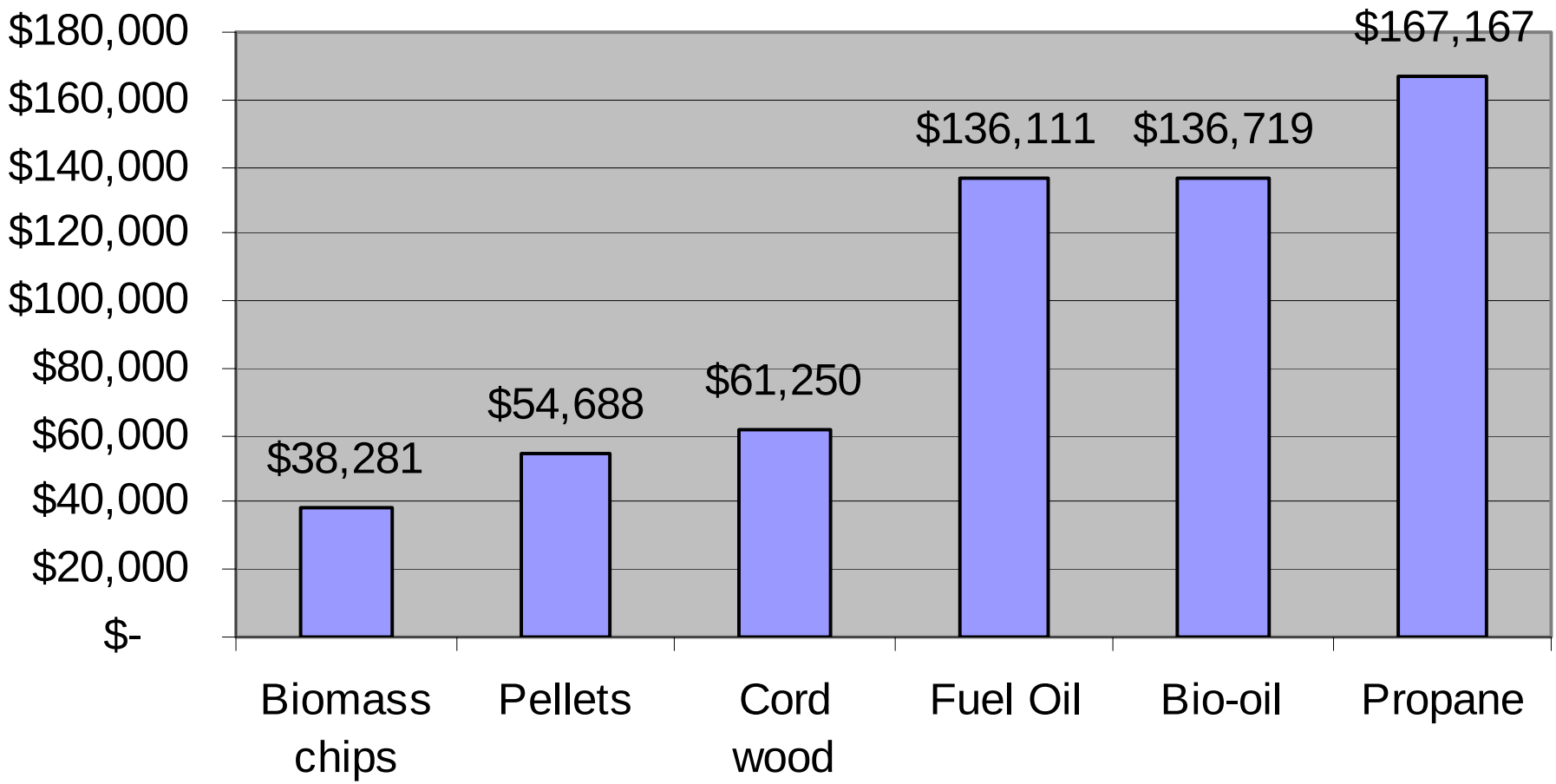
# Area 1: Forestry Greenhouse

- 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



# Area 2: Bio-Oils

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

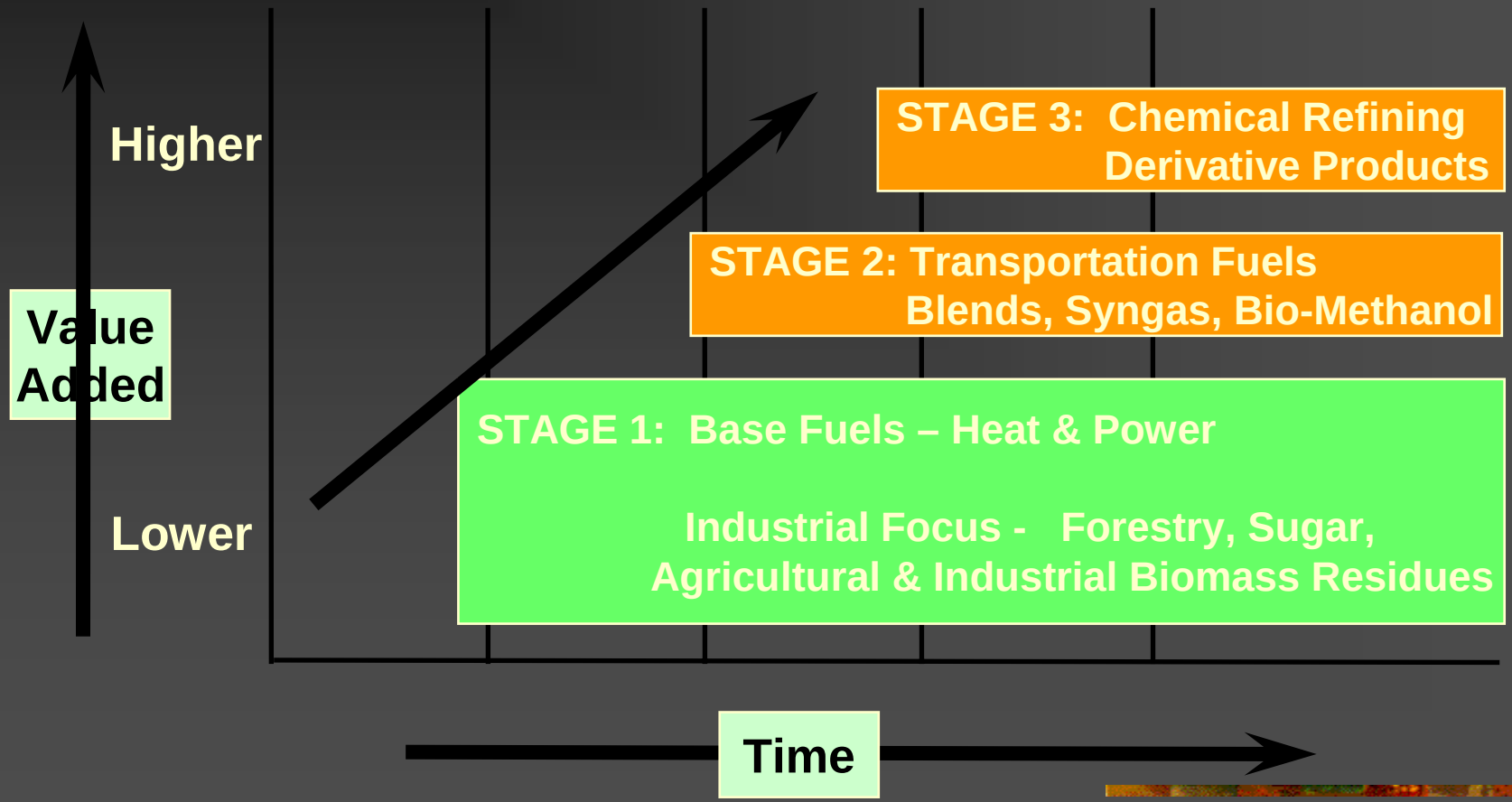
# Bio-Oil Basics

- 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)



# 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

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