Introduction:
With an increase in demand for cleaner sources of energy and also with the current incentives to produce energy using biomass, this project illustrates the manufacture of crude diesel from biomass. The available feedstock consist of 90,000 tons/yr of dry wood chips and produces 15,000 tonnes/yr of crude diesel. The process can be divided into two parts; where the biomass is converted to syngas first, and then to crude diesel using the Fischer Tropsch process.

Plant Layout & Location:
The Process Plant is located in Elko, British Columbia

Environmental Health & Safety:

1. Transportation
   Fuel emissions

2. Combustion
   Carbon Dioxide emissions

3. Gas Cleaning
   Liquid Waste Stream:
   H2O, Diethanolamine, H2S
   Gaseous Waste Stream:
   CO2, H2O, H2S

4. Fischer-Tropsch
   Cobalt Catalyst

Economic Analysis:

Total Capital Investment: $72,600,000
- Gasification (PFD 100): $21,500,000
- Gas Cleaning (PFD 200): $4,710,000
- Fischer-Tropsch (PFD 300): $46,300,000

Total Product Cost: $33,600,000/yr
- Utilities: $13,300,000 - More than 60% from Gas Cleaning
- Distribution & Selling Costs: $4,470,000
- Plant Overhead Costs: $3,360,000

Cashflow: IRR = 3.9%

1. Wood Waste and Processing
   Biomass is received from Elko Sawmill and stored until use

2. Gasification and Combustion
   Biomass is converted into raw syngas using a dual fluidized bed gasifier at 10 atm and 800 Celsius. Sand is circulated to conserve heat

3. Gas Cleaning
   Removal of contaminants such as Sulfur and balancing of CO and H2O using Diethyl Amine

4. Fischer-Tropsch
   Using iron cobalt catalyst, the fischer tropsch process is used to convert syngas to liquid carbon chains

5. Diesel and Byproducts
   After distillation, diesel is maximized as the product but byproducts also include gasoline, jet fuel, and heavy hydrocarbon chains which can also be sold.