Woodshed Renewables

Biomass Pelleting Enterprise

Preliminary Feasibility Analysis

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The purpose of the following analysis is to gauge the feasibility of a biomass pelleting business located at Woodshed Renewable's Finley, North Dakota, facility. The analysis includes estimates of baseline returns to a pelleting enterprise and a sensitivity analysis of returns on the basis of feedstock and pellet prices. The pelleting feasibility model allows users to see the financial impact of alternative assumptions on returns.

The baseline analysis uses conservative feedstock prices (higher than expected prevailing levels) and pellet prices (lower than current levels). For example, the baseline analysis uses pellet prices of $150/ton while recent supply contracts have priced pellets at $155/ton fob the plant. Despite the conservative assumptions, estimated returns are attractive.

The analysis is expected to provide budget estimates within 30% of the true value. This range will be reduced by updating equipment prices and other costs with vendor prices and bids. The largest sources of variability in the estimates are feedstock and pellet price. Additional effort is being conducted to estimate feedstock supply schedules.

The assumptions for the analysis are presented in Table 1. The analysis is based on a 400-HP pellet mill, the industry standard. The plant is expected to run 24/6 50 weeks of the year. Delivered feedstock costs are estimated to be $65 per ton. There is interest in utilizing multiple biomass feedstocks who prices may differ. Future analyses may accommodate variations in feedstock price and quantity.

Table 1. Pellet Enterprise Assumptions

Pellet mill size (HP)	400
Hourly production (tons)	4
Annual full-production hours	7,200
Average moisture content	10%
Feedstock required (tons)	28,800
Feedstock price delivered	$65
Pellets produced (tons)	28,800
Pellet price per ton	$155
Capital costs	$3,089,417
Debt %	60%
Debt financing	$1,853,650
Interest rate	6%
Equity investment	$1,235,767
Year 0 budget plus interest due	$125,354
Total initial equity required	$1,361,120
Working Capital Interest Rate	8%
Depreciation (yrs, equipment)	10
Depreciation (other eq)	5
Kwh annual	3,996,000
Elec price/kwh	0.05
Bags - cost per ton	$10
Marketing per ton	8%
Marketing per ton	$12.40

Capital costs, estimated at $2.4 million, are listed by item in Table 2. Major capital costs include the construction of a storage building, a grinder, a dryer, the pellet mill, as well as conveyor system and tanks.

Table 2. Capital Costs

Site Acquisition	$250
Loose storage building	$493,000
Grinder	$650,000
Dryer	$192,000
Feedstock shaker/screener	$18,300
Hammermill	$31,200
Conditioner/Feeder	$43,900
Pellet Mill	$235,000
Pellet Cooler	$31,800
Pellet Shaker/Screener	$18,300
Bagging/Palleting System	$40,000
Conveyor, Tanks, Other	$790,000
	$2,543,750

Salary and fringe benefits for plant labor and management are estimated to be $932,880 annually. Labor requirements are presented in Table 3. The plant is expected to employ a manager, three foreman, three lead operators, six floor operators, three wheel loader operators, one floating operator, and one maintenance employee.

Table 3. Labor Requirements

	Per Shift	Shifts per Week	Annual Hours	Hourly Rate	With Benefits	Annual Cost
Manager	1	1	2080	$22	$29	$59,488
Foreman	1	3	6240	$21	$27	$170,352
Lead operator	1	3	6240	$24	$31	$194,688
Floor operators	2	3	12480	$18	$23	$292,032
Three laborers	0	4	0	$15	$20	$0
Wheel loader operator	1	3	6240	$15	$20	$121,680
Floating operator	1	1	2080	$15	$20	$40,560
Maintenance	1	1	2080	$20	$26	$54,080
						$932,880

Returns to pelleting operations are calculated in Table 4. Annual gross income is estimated to be $4.46 million dollars. Total annual expenses are expected to be $4.2 million dollars. Net income is estimated to be $246,408 and a return on investment of 18%.

Table 4. Income Statement

Gross Income	$4,464,000
Expenses	
Biomass feedstock	$1,872,000
Plant wages, taxes, and benefits	$932,880
Electricity	$199,800
Dies, rollers, and other parts	$72,000
Contract plant repairs	$12,000
Wheel loader operations/maintenance	$39,168
Forklift operations/maintenance	$6,518
Bags, pallets, and wrap	$276,000
Marketing	$357,120
Depreciation	$282,375
Interest on working capital	$56,512
Interest on long-term debt	$111,219
Total Expenses	$4,217,592
Net Income	$246,408
Return on Initial Equity	18%

Sensitivity Analysis

A sensitivity analysis is conducted to determine changes in return on initial equity based on the spread between the price of feedstock and pellets. The current spread of $90 ($155/ton pellets, $65/ton feedstock) would result in returns of about 30%.

Table 5. Sensitivity Analysis

ROI	Pellet-Feedstock Price Spread
10%	$82.75
20%	$87.33
30%	$91.91
40%	$96.49
50%	$101.07

Risk Analysis

Feedstock and pellet prices are the greatest source of uncertainty for the business. Securing long term feedstock supply and offtake agreements would dramatically reduce the risk. Long-term feedstock supply agreements may be possible. Pellet contracts are typically for the current season. The ability to construct a hedge using an alternative fuel, for example heating oil, may provide protection against downside pellet price risk.