

***Pre-feasibility Assessment for
Integration of Biomass Energy Systems***

in

Orofino, Idaho

February 28, 2006

Presented by

***CTA Architects Engineers
Nathan Ratz & Nick Salmon***

For

United States Department of Agriculture
Forest Service
Region One

In partnership with:

Clearwater Valley Hospital & Clinic

Idaho Department of Corrections

Idaho State Hospital North

Orofino School District

Idaho Department of Lands: Fuels For Schools Program

Bitter Root Resource and Conservation Development Area, Incorporated

CTA Project: BIOMSPFA_ORFIN

Executive Summary

The following assessment was commissioned to determine the technical and economic feasibility of integrating a wood chip heating system or wood pellet heating system in the existing Clearwater Valley Hospital & Clinic, Idaho Correctional Institution, Idaho State Hospital North and Orofino High School, all located in Orofino, Idaho.

The **Clearwater Valley Hospital & Clinic** is approximately 31,000 SF in size and is heated with a pair of fuel-oil fired steam boilers (the older hospital portion) and air to air heat pumps (the newer clinic). Steam from the boiler is used to produce heating hot water for fan coil units and is used to create domestic hot water for lavatories, showers, kitchen and laundry facilities. Steam to water heat exchangers are used in both cases. The boilers do run in the summer to produce the domestic hot water. The facility uses approximately 8,900 gallons of fuel oil each year at a current cost of \$1.90/gallon and 700,000 kwh for heating, air conditioning, power and lighting during a typical year at a current cost of \$.05081/kwh or \$35,500 per year. Demand charges on an average of 1,800 kw per year at a price of \$3.67/kw represent an additional \$6,600 per year.

The **Idaho Correction Institution** is approximately 128,000 SF in size and is heated with an electric hot water (A Block), electric steam boilers (McKelway Hall), and electric wall heaters (Givens Hall). All three buildings have their own electric domestic water heaters for lavatories, showers, kitchen and laundry facilities. The facility uses approximately 4,705,000 kwh for heating, limited air conditioning, power and lighting during a typical year at a current cost of \$.05081/kwh or \$239,000 per year. Demand charges on an average of 14,150 kw per year at a varied price of \$3.22-\$3.77/kw represent an additional \$46,700 per year.

Account #2526166 (Block A/McKelway Hall)	1,700,000 kwh/year	5150 kw demand/yr
Account #2526167 (Block A/McKelway Hall)	505,000 kwh/year	1500 kw demand/yr
Account #2526171 (Block A/McKelway Hall)	1,440,000 kwh/year	4500 kw demand/yr
Account #410018307 (Givens Hall)	<u>1,060,000 kwh/year</u>	<u>3000 kw demand/yr</u>

Total 4,705,000 kwh/year 14,150 kw demand/yr

The **Idaho State Hospital North** is approximately 65,000 SF in size and is primarily heated and cooled with fan coil units located in a mechanical chase above the corridor. These fan coil units have DX coils for cooling and electric coils for heating. Some have been replaced with air to air heat pump units. Domestic hot water for lavatories, showers and the kitchen are provided with 37 electric water heaters. There are plans to replace the multiple smaller water heaters with two larger water heaters and a recirculation system in each wing. The facility uses approximately 1,200,000 kwh for heating, air conditioning, power and lighting during a typical year at a current cost of \$.05081/kwh or \$61,000 per year. Demand charges on an average of 3,200 kw per year at a price of \$3.36/kw represent an additional \$10,700 per year.

The **Orofino High School** is approximately 150,000 SF in size and is primarily heated with unit ventilators located in each room. Each unit ventilator has an electric heating coil. Domestic hot water for lavatories, showers and the school kitchen are provided with electric hot water heaters in multiple locations. The facility uses approximately 825,000 kwh for heating, air conditioning, power and lighting during a typical year at a current cost of \$.051081/kwh or \$42,000 per year. Demand charges on an average of 4,400 kw per year at a price of \$3.25/kw represent an additional \$14,300 per year.

Energy Analysis:

Without a detailed energy analysis it is not possible to determine what portion of the annual electrical use can be attributed to heating and domestic hot water versus air conditioning, power and lighting. For the purpose of this investigation it is assumed that 50% of the annual electric consumption could be attributed to heating the facilities and producing domestic hot water, with the exception of the Clearwater Valley Hospital & Clinic where it is assumed that 25% of the annual electric consumption may be attributed to heating the Clinic. Modeling energy consumption or metering the electric boilers would establish a more precise rate of electric use for the heating and domestic hot water systems. The wood heating system would be sized to meet approximately 90% of the typical annual heating load of the building, using the existing boilers for additional capacity in peak load conditions.

Building & Site Constraints:

None of the boiler rooms appear to have adequate space for a wood pellet or wood chip boiler. Wood storage would be provided in an adjacent chip bin or pellet silo. Each of the facilities are located on steep hillsides, however large delivery vehicles currently access each site. Deliveries should be scheduled to minimize conflicts with other activities on each campus. The most appropriate location for a central heating plant would be on the ICI campus, between the parking lot and tennis courts or at the far southwest end of the parking lot.

Although the facilities are only 3,000 feet apart, specific routes to each facility and each boiler room would need to be determined, and are likely to result in greater than 6,000 linear feet of buried pipe (supply and return).

There does not appear to be any benefit to re-using the former central boiler plant below the Idaho State Hospital North. Re-using the boiler plant would only increase the project costs associated with the only strong project, a wood chip heating plant for the Idaho Correctional Institution.

Combined Heat & Power:

The combined load of the facilities is unlikely to generate a sustained demand for 10,000 pounds of steam per hour (the minimum steam flow necessary for a combined heat and power system). High pressure steam would be used to turn a turbine to generate power and reduce the steam pressure to the typical operating pressure of the Idaho Correctional Institution. Heat exchangers would be required to convert the steam to hot water for distribution to other facilities. A means of distributing power and selling excess power back to the grid would need to be determined. The cost of a small combined heat and power system is typically about equal to the cost of a large wood fired heating system. The scope of a detailed energy analysis could be expended to examine the combined heat and power potential of a central plant.

Air Quality Permits:

Air quality permit requirements in the State of Idaho should be reviewed in greater detail. It is likely the State will require air quality permits and emissions modeling.

Estimated Costs:

The total project costs including integration, contingency and escalation are estimated as noted below. Each wood fuel type includes two different total project cost estimates as a sensitivity analysis.

Wood Chip Options:

A.1 Clearwater Valley Hospital & Clinic

Chip Storage/ Boiler Building:	\$100,000
1 mmbtu Wood Heating & Wood Handling System:	\$150,000
100 LF of Buried Pipe	\$20,000
Boiler Room Integration:	\$75,000
6,000 SF Clinic Integration:	\$60,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$65,000</u>
Subtotal:	\$495,000
20% Contingency +/-:	<u>\$100,000</u>
Subtotal:	\$595,000
6% +/- Escalation to bid date (2/2007)	\$35,000
Total:	\$630,000

Option A.1.1: \$700,000.

A.2 Idaho Correctional Institution

Chip Storage/ Boiler Building:	\$150,000
4 mmbtu Wood Heating & Wood Handling System:	\$300,000
1000 LF of Buried Pipe	\$200,000
300 LF of Interior Pipe	\$30,000
Boiler Room Integration:	\$150,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$130,000</u>
Subtotal:	\$985,000
20% Contingency +/-:	<u>\$195,000</u>
Subtotal:	\$1,180,000
6% +/- Escalation to bid date (2/2007)	\$70,000
Total:	\$1,250,000

Option A.2.1: \$1,375,000.

A.3 Idaho State Hospital North

Chip Storage/ Boiler Building:	\$100,000
2 mmbtu Wood Heating & Wood Handling System:	\$200,000
100 LF of Buried Pipe	\$20,000
Building Integration:	\$650,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$150,000</u>
Subtotal:	\$1,145,000
20% Contingency +/-:	<u>\$230,000</u>
Subtotal:	\$1,375,000
6% +/- Escalation to bid date (2/2007)	\$85,000
Total:	\$1,460,000

Option A.3.1: \$1,600,000.

A.4 Orofino High School

Chip Storage/ Boiler Building:	\$100,000
4 mmbtu Wood Heating & Wood Handling System:	\$300,000
100 LF of Buried Pipe	\$20,000
Building Integration:	\$300,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$80,000</u>
Subtotal:	\$745,000
20% Contingency +/-:	<u>\$150,000</u>
Subtotal:	\$895,000
6% +/- Escalation to bid date (2/2007)	\$55,000
Total:	\$950,000

Option A.4.1: \$1,050,000.

A.5 Central Plant (ICI & OHS)

Chip Storage/ Boiler Building:	\$200,000
6 mmbtu Wood Heating & Wood Handling System:	\$400,000
1000 LF of Buried Pipe (ICI)	\$200,000
2600 LF of Buried Pipe (OHS)	\$520,000
300 LF of Interior Pipe	\$30,000
Boiler Room Integration (ICI):	\$150,000
Building Integration (OHS):	\$300,000
Air Quality Permit:	\$50,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$275,000</u>
Subtotal:	\$1,750,000
20% Contingency +/-:	<u>\$350,000</u>
Subtotal:	\$2,125,000
6% +/- Escalation to bid date (2/2007)	\$125,000
Total:	\$2,250,000

Option A.5.1: \$2,500,000.

A.6 Central Plant (ICI & ISHN)

Chip Storage/ Boiler Building:	\$200,000
6 mmbtu Wood Heating & Wood Handling System:	\$400,000
1000 LF of Buried Pipe (ICI)	\$200,000
420 LF of Buried Pipe (ISHN)	\$84,000
Boiler Room Integration (ICI):	\$150,000
Building Integration (ISHN):	\$650,000
Air Quality Permit:	\$50,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$260,000</u>
Subtotal:	\$1,994,000
20% Contingency +/-:	<u>\$400,000</u>
Subtotal:	\$2,394,000
6% +/- Escalation to bid date (2/2007)	\$146,000
Total:	\$2,540,000

Option A.6.1: \$2,800,000.

A.7 Central Plant (ICI, ISHN & CVH&C)

Chip Storage/ Boiler Building:	\$250,000
8 mmbtu Wood Heating & Wood Handling System:	\$500,000
1000 LF of Buried Pipe (ICI)	\$200,000
420 LF of Buried Pipe (OHS)	\$84,000
3200 LF of Buried Pipe (CVH&C)	\$640,000
Boiler Room Integration (ICI):	\$150,000
Building Integration (ISHN):	\$650,000
Building Integration (CVH&C):	\$60,000
Air Quality Permit:	\$50,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$386,000</u>
Subtotal:	\$2,970,000
20% Contingency +/-:	<u>\$595,000</u>
Subtotal:	\$3,565,000
6% +/- Escalation to bid date (2/2007)	\$215,000
Total:	\$3,780,000

Option A.7.1: \$4,160,000.

Wood Pellet Options:

B.1 Clearwater Valley Hospital & Clinic

Wood Fuel Silo:	\$40,000
1 mmbtu Wood Heating & Wood Handling System:	\$150,000
100 LF of Buried Pipe	\$20,000
Boiler Room Integration:	\$75,000
6,000 SF Clinic Integration:	\$60,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$55,000</u>
Subtotal:	\$425,000
20% Contingency +/-:	<u>\$85,000</u>
Subtotal:	\$510,000
6% +/- Escalation to bid date (2/2007)	\$30,000
Total:	\$540,000

Option B.1.1: \$600,000.

B.2 Idaho Correctional Institution

Wood Fuel Silo:	\$60,000
4 mmbtu Wood Heating & Wood Handling System:	\$300,000
1000 LF of Buried Pipe	\$200,000
300 LF of Interior Pipe	\$30,000
Boiler Room Integration:	\$150,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$115,000</u>
Subtotal:	\$880,000
20% Contingency +/-:	<u>\$175,000</u>
Subtotal:	\$1,055,000
6% +/- Escalation to bid date (2/2007)	\$65,000
Total:	\$1,120,000

Option B.2.1: \$1,250,000.

B.3 Idaho State Hospital North

Wood Fuel Silo:	\$40,000
2 mmbtu Wood Heating & Wood Handling System:	\$200,000
100 LF of Buried Pipe	\$20,000
Building Integration:	\$650,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$140,000</u>
Subtotal:	\$1,075,000
20% Contingency +/-:	<u>\$215,000</u>
Subtotal:	\$1,290,000
6% +/- Escalation to bid date (2/2007)	\$80,000
Total:	\$1,370,000

Option B.3.1: \$1,500,000.

B.4 Orofino High School

Wood Fuel Silo:	\$40,000
4 mmbtu Wood Heating & Wood Handling System:	\$300,000
100 LF of Buried Pipe	\$20,000
Building Integration:	\$300,000
Air Quality Permit:	\$25,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$100,000</u>
Subtotal:	\$785,000
20% Contingency +/-:	<u>\$155,000</u>
Subtotal:	\$940,000
6% +/- Escalation to bid date (2/2007)	\$60,000
Total:	\$1,000,000

Option B.4.1: \$1,100,000.

B.5 Central Plant (ICI & OHS)

Wood Fuel Silo:	\$60,000
6 mmbtu Wood Heating & Wood Handling System:	\$400,000
1000 LF of Buried Pipe (ICI)	\$200,000
2600 LF of Buried Pipe (OHS)	\$520,000
300 LF of Interior Pipe	\$30,000
Boiler Room Integration (ICI):	\$150,000
Building Integration (OHS):	\$300,000
Air Quality Permit:	\$50,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$255,000</u>
Subtotal:	\$1,965,000
20% Contingency +/-:	<u>\$395,000</u>
Subtotal:	\$2,360,000
6% +/- Escalation to bid date (2/2007)	\$140,000
Total:	\$2,500,000

Option B.5.1: \$2,750,000.

B.6 Central Plant (ICI & ISHN)

Wood Fuel Silo:	\$60,000
6 mmbtu Wood Heating & Wood Handling System:	\$400,000
1000 LF of Buried Pipe (ICI)	\$200,000
420 LF of Buried Pipe (ISHN)	\$84,000
Boiler Room Integration (ICI):	\$150,000
Building Integration (ISHN):	\$650,000
Air Quality Permit:	\$50,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$240,000</u>
Subtotal:	\$1,834,000
20% Contingency +/-:	<u>\$366,000</u>
Subtotal:	\$2,200,000
6% +/- Escalation to bid date (2/2007)	\$130,000
Total:	\$2,330,000

Option B.6.1: \$2,575,000.

B.7 Central Plant (ICI, ISHN & CVH&C)

Wood Fuel Silo:	\$60,000
8 mmbtu Wood Heating & Wood Handling System:	\$500,000
1000 LF of Buried Pipe (ICI)	\$200,000
420 LF of Buried Pipe (OHS)	\$84,000
3200 LF of Buried Pipe (CVH&C)	\$640,000
Boiler Room Integration (ICI):	\$150,000
Building Integration (ISHN):	\$650,000
Building Integration (CVHC&C):	\$60,000
Air Quality Permit:	\$50,000
Fees, Building Permit, Miscellaneous Expenses:	<u>\$360,000</u>
Subtotal:	\$2,754,000
20% Contingency +/-:	<u>\$550,000</u>
Subtotal:	\$3,304,000
6% +/- Escalation to bid date (2/2007)	\$196,000
Total:	\$3,500,000

Option B.7.1: \$3,850,000.

Results of Evaluation

The cash flow analysis assumes electric costs at \$.05081/kw, demand charges of \$3.25/kw, wood chips at a locally delivered price of \$30 per green ton and a pellet fuel price of \$124 per ton delivered from Lignetics in Sandpoint, Idaho. As noted above, the specific electrical consumption associated with the electric boilers is not known.

Wood Chip Options:

Option A.1 Clearwater Valley Hospital & Clinic: Appears to achieve positive accumulated cash flow (PAC) in 15 years with a subsidy of \$315,000. The project may achieve PAC in 23 years without subsidy. 30 years savings are approximately \$850,000.

Option A.1.1 Clearwater Valley Hospital & Clinic: Appears to achieve positive accumulated cash flow (PAC) in 16 years with a subsidy of \$350,000. The project may achieve PAC in 25 years without subsidy. 30 years savings are approximately \$800,000.

Option A.2 Idaho Correctional Institution: Appears to achieve positive accumulated cash flow (PAC) in 4 years with a subsidy of \$625,000. The project may achieve PAC in 15 years without subsidy. 30 years savings are approximately \$3,900,000. Reducing the Total Project Costs from \$1,250,000 to \$1,175,000 results in PAC in year one.

Option A.2.1 Idaho Correctional Institution: Appears to achieve positive accumulated cash flow (PAC) in 7 years with a subsidy of \$687,500. The project may achieve PAC in 16 years without subsidy. 30 years savings are approximately \$3,800,000.

Option A.3 Idaho State Hospital North: Appears to achieve positive accumulated cash flow (PAC) in 27 years with a subsidy of \$730,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$240,000.

Option A.3.1 Idaho State Hospital North: Appears to achieve positive accumulated cash flow (PAC) in 28 years with a subsidy of \$800,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$150,000.

Option A.4 Orofino High School: Appears to achieve positive accumulated cash flow (PAC) in 26 years with a subsidy of \$475,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$160,000.

Option A.4.1 Orofino High School: Appears to achieve positive accumulated cash flow (PAC) in 28 years with a subsidy of \$525,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$95,000.

Option A.5 Central Plant (ICI & OHS): Appears to achieve positive accumulated cash flow (PAC) in 13 years with a subsidy of \$1,125,000. The project may achieve PAC in 21 years without subsidy. 30 years savings are approximately \$4,100,000.

Option A.5.1 Central Plant (ICI & OHS): Appears to achieve positive accumulated cash flow (PAC) in 14 years with a subsidy of \$1,250,000. The project may achieve PAC in 22 years without subsidy. 30 years savings are approximately \$3,900,000.

Option A.6 Central Plant (ICI & ISHN): Appears to achieve positive accumulated cash flow (PAC) in 13 years with a subsidy of \$1,270,000. The project may achieve PAC in 21 years without subsidy. 30 years savings are approximately \$4,300,000.

Option A.6.1 Central Plant (ICI & ISHN): Appears to achieve positive accumulated cash flow (PAC) in 14 years with a subsidy of \$1,400,000. The project may achieve PAC in 23 years without subsidy. 30 years savings are approximately \$4,100,000.

Option A.7 Central Plant (ICI, ISHN & CVH&C): Appears to achieve positive accumulated cash flow (PAC) in 15 years with a subsidy of \$1,890,000. The project may achieve PAC in 24 years without subsidy. 30 years savings are approximately \$4,800,000.

Option A.7.1 Central Plant (ICI, ISHN & CVH&C): Appears to achieve positive accumulated cash flow (PAC) in 16 years with a subsidy of \$2,080,000. The project may achieve PAC in 25 years without subsidy. 30 years savings are approximately \$4,600,000.

Wood Pellet Options:

Option B.1 Clearwater Valley Hospital & Clinic: Appears to achieve positive accumulated cash flow (PAC) in 20 years with a subsidy of \$270,000. The project may achieve PAC in 29 years without subsidy. 30 years savings are approximately \$400,000.

Option B.1.1 Clearwater Valley Hospital & Clinic: Appears to achieve positive accumulated cash flow (PAC) in 22 years with a subsidy of \$300,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$380,000.

Option B.2 Idaho Correctional Institution: Appears to achieve positive accumulated cash flow (PAC) in 15 years with a subsidy of \$560,000. The project may achieve PAC in 22 years without subsidy. 30 years savings are approximately \$2,100,000.

Option B.2.1 Idaho Correctional Institution: Appears to achieve positive accumulated cash flow (PAC) in 16 years with a subsidy of \$625,000. The project may achieve PAC in 23 years without subsidy. 30 years savings are approximately \$2,000,000.

Option B.3 Idaho State Hospital North: The project does not achieve PAC in 30 years with or without subsidy.

Option B.3.1 Idaho State Hospital North: The project does not achieve PAC in 30 years with or without subsidy.

Option B.4 Orofino High School: The project does not achieve PAC in 30 years with or without subsidy.

Option B.4.1 Orofino High School: The project does not achieve PAC in 30 years with or without subsidy.

Option B.5 Central Plant (ICI & OHS): Appears to achieve positive accumulated cash flow (PAC) in 21 years with a subsidy of \$1,250,000. The project may achieve PAC in 30 years without subsidy. 30 years savings are approximately \$1,700,000.

Option B.5.1 Central Plant (ICI & OHS): Appears to achieve positive accumulated cash flow (PAC) in 22 years with a subsidy of \$1,375,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$1,500,000.

Option B.6 Central Plant (ICI & ISHN): Appears to achieve positive accumulated cash flow (PAC) in 20 years with a subsidy of \$1,165,000. The project may achieve PAC in 28 years without subsidy. 30 years savings are approximately \$2,000,000.

Option B.6.1 Central Plant (ICI & ISHN): Appears to achieve positive accumulated cash flow (PAC) in 21 years with a subsidy of \$1,287,500. The project may achieve PAC in 29 years without subsidy. 30 years savings are approximately \$1,900,000.

Option B.7 Central Plant (ICI, ISHN & CVH&C): Appears to achieve positive accumulated cash flow (PAC) in 23 years with a subsidy of \$1,750,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$1,800,000.

Option B.7.1 Central Plant (ICI, ISHN & CVH&C): Appears to achieve positive accumulated cash flow (PAC) in 24 years with a subsidy of \$1,925,000. The project does not achieve PAC in 30 years without subsidy. 30 years savings are approximately \$1,600,000.

Accumulated cash flow is the primary evaluation measure that is implemented in this report and is similar to simple payback with the exception that accumulated cash flow takes the cost of financing and fuel escalation into account. For many building owners, a positive accumulated cash flow of about 10 years maximum is considered necessary for implementation. Positive accumulated cash flow in year one indicates a strong project. Positive accumulated cash flow in year 20 or more indicates a challenged project.

Project Funding:

Facility owners and managers could consider a 50% grant from the US Forest Service/Idaho Department of Lands "Fuels For Schools" Program. The grant may support 50% of the total project costs including required integration costs, but not upgrades to heat distribution. The grant requires that 50% of the wood fuel be derived from forest thinning projects on private, state, tribal or federal lands for the first two years of the project.

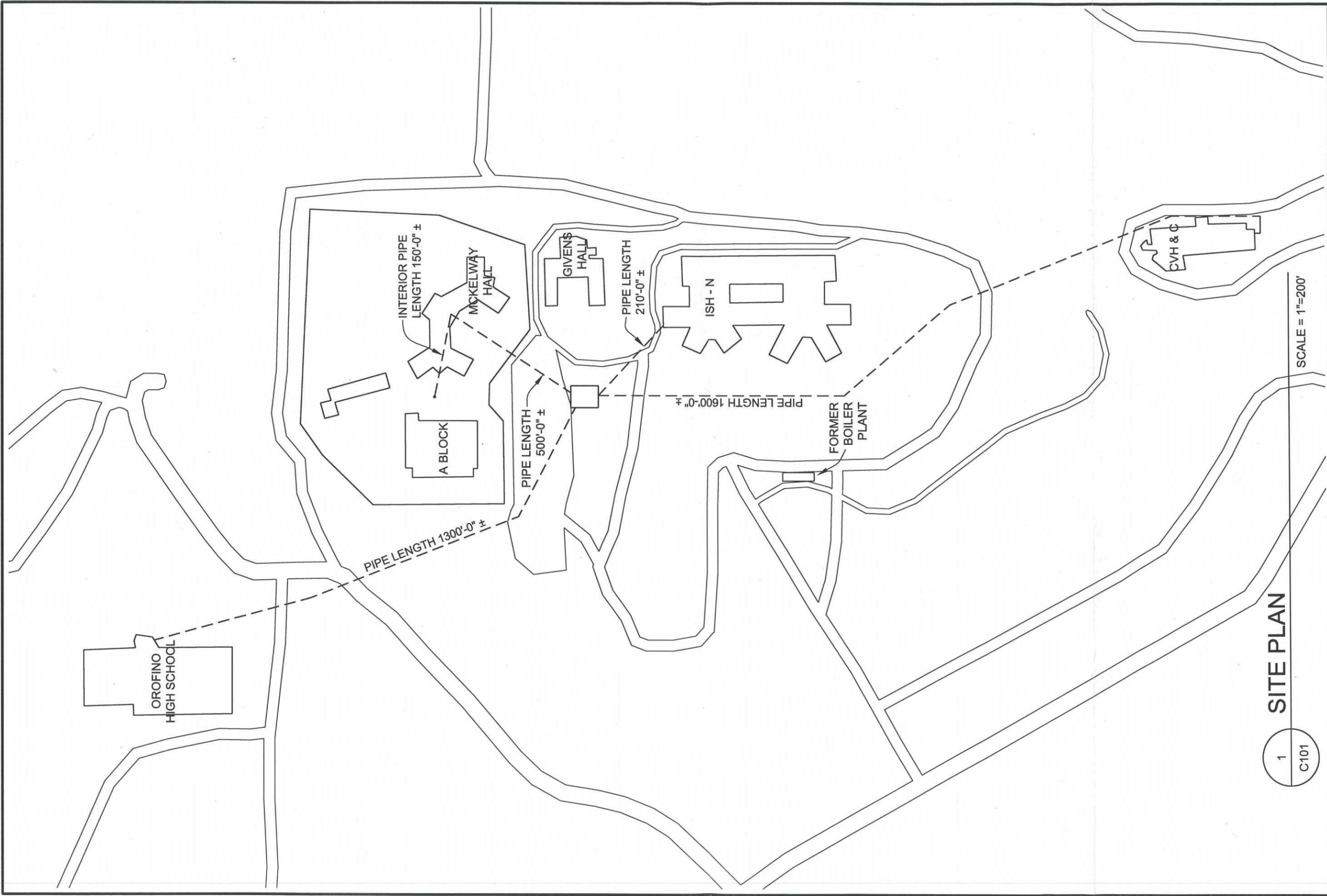
The project might be of interest local rural electric cooperatives. Rural electric cooperatives have the ability to provide a portion of the project financing through the Rural Economic Development Loan and Grant (REDLG) program.

The School District may chose to raise the remaining funds for the project using a Maintenance Levy.

The school district, State of Idaho and hospital could enter into a performance contracts for the project. Companies such as Siemens, McKinstry, Johnson Controls and Chevron have expressed an interest in participating in funding projects of all sizes across the state. This allows the facility owner to pay for the project entirely from the guaranteed energy savings, and to minimize the project funds required to initiate the project.

Next Steps:

The Idaho Correctional Institution appears to be the best candidate for the use of a wood biomass heating system. Modeling the energy use and/or installing a meter on the electric boilers and hot water heaters would establish the appropriate size and energy savings associated with the boiler. It is recommended that a detailed energy analysis and cost estimate be developed to refine the project economics before requesting grant support from the Fuels For Schools program.



1
C-101

SITE PLAN

SCALE = 1"=200'

Drawn By KMC
 Checked By NS
 Date 02-28-06
 CTA # XXXX
 Cadd File: XXX



architects engineers
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WOOD HEAT PROJECT
OROFINO, IDAHO

SHEET#

A.1 Clearwater Valley Hospital & Clinic-90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	250,000	0	8,900
Annual Heating Costs:	\$12,703	\$0	\$16,910

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	853,250,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	853,250,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Chips: Elec	Chips: Oil
\$30.00	\$30.00
65%	65%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400	5400
122	141

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$630,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$315,000
Amount of Grants	\$315,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$40,005
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-31 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		250000 kw		\$12,703	\$18,080	\$18,803	\$26,762	\$39,615
Displaced heating costs: Fuel Oil	\$1.90		8900 gallons		\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	122 tons		\$3,282	\$3,922	\$4,000	\$4,781	\$5,828
	\$30.00	90%	141 tons		\$3,798	\$4,539	\$4,630	\$5,533	\$6,745
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	250000 kw		\$1,270	\$1,808	\$1,880	\$2,676	\$3,961
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$20,263	\$30,574	\$31,979	\$47,646	\$73,461
Financed Project Costs - Principal and Interest					(40,005)	(40,005)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(19,743)	(9,431)	31,979	47,646	73,461
Cumulative Cash Flow					(19,743)	(148,758)	(116,778)	245,036	854,735

A.1.1 Clearwater Valley Hospital & Clinic-90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	250,000	0	8,900
Annual Heating Costs:	\$12,703	\$0	\$16,910

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	853,250,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	853,250,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Chips: Elec	Chips: Oil
\$30.00	\$30.00
65%	65%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400	5400
122	141

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$700,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$350,000
Amount of Grants	\$350,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$44,450
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-35 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		250000	kw	\$12,703	\$18,080	\$18,803	\$26,762	\$39,615
Displaced heating costs: Fuel Oil	\$1.90		8900	gallons	\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	122	tons	\$3,282	\$3,922	\$4,000	\$4,781	\$5,828
	\$30.00	90%	141	tons	\$3,798	\$4,539	\$4,630	\$5,533	\$6,745
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	250000	kw	\$1,270	\$1,808	\$1,880	\$2,676	\$3,961
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$20,263	\$30,574	\$31,979	\$47,646	\$73,461
Financed Project Costs - Principal and Interest					(44,450)	(44,450)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(24,188)	(13,876)	31,979	47,646	73,461
Cumulative Cash Flow					(24,188)	(193,208)	(161,228)	200,586	810,285

A.2 Idaho Correctional Facility- 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,350,000	0	0
Annual Heating Costs:	\$119,404	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	8,020,550,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	8,020,550,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Wood Chips	Wood Pellets
\$30.00	\$124.00
65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
1,143	

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$1,250,000**

Project Financing Information

Percent Financed	50%
Amount Financed	-\$625,000
Amount of Grants	\$625,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$79,376
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-17 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2350000	kw	\$119,404	\$169,948	\$176,746	\$251,565	\$372,378
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1143	tons	\$30,848	\$36,867	\$37,604	\$44,940	\$54,782
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2350000	kw	\$11,940	\$16,995	\$17,675	\$25,157	\$37,238
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$75,615	\$114,782	\$120,124	\$179,715	\$278,002
Financed Project Costs - Principal and Interest					(79,376)	(79,376)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(3,761)	35,407	120,124	179,715	278,002
Cumulative Cash Flow					(3,761)	147,214	267,338	1,629,888	3,934,278

A.2.1 Idaho Correctional Facility- 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,350,000	0	0
Annual Heating Costs:	\$119,404	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	8,020,550,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	8,020,550,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Wood Chips Wood Pellets

\$30.00 \$124.00 Modify for local conditions
65% 70%

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400 8200
1,143

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$1,375,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$687,500
Amount of Grants	\$687,500
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$87,313
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-18 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2350000	kw	\$119,404	\$169,948	\$176,746	\$251,565	\$372,378
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1143	tons	\$30,848	\$36,867	\$37,604	\$44,940	\$54,782
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2350000	kw	\$11,940	\$16,995	\$17,675	\$25,157	\$37,238
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$75,615	\$114,782	\$120,124	\$179,715	\$278,002
Financed Project Costs - Principal and Interest					(87,313)	(87,313)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(11,698)	27,469	120,124	179,715	278,002
Cumulative Cash Flow					(11,698)	67,839	187,963	1,550,512	3,854,902

A.3 Idaho State Hospital North- 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	600,000	0	0
Annual Heating Costs:	\$30,486	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	2,047,800,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	2,047,800,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Wood Chips Wood Pellets

\$30.00 \$124.00 Modify for local conditions
 65% 70%

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400 8200
 292

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$1,460,000**

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$730,000
Amount of Grants	\$730,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$92,711
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-79 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		600000	kw	\$30,486	\$43,391	\$45,127	\$64,229	\$95,075
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	292	tons	\$7,876	\$9,413	\$9,601	\$11,474	\$13,987
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	600000	kw	\$3,049	\$4,339	\$4,513	\$6,423	\$9,508
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$18,561	\$28,334	\$29,669	\$44,579	\$69,224
Financed Project Costs - Principal and Interest					(92,711)	(92,711)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(74,149)	(64,376)	29,669	44,579	69,224
Cumulative Cash Flow					(74,149)	(695,396)	(665,727)	(328,314)	244,622

A.3.1 Idaho State Hospital North- 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	600,000	0	0
Annual Heating Costs:	\$30,486	\$0	\$0

Notes:
 Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	2,047,800,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	2,047,800,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
292	

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$1,600,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$800,000
Amount of Grants	\$800,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$101,601
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-86 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		600000	kw	\$30,486	\$43,391	\$45,127	\$64,229	\$95,075
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	292	tons	\$7,876	\$9,413	\$9,601	\$11,474	\$13,987
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	600000	kw	\$3,049	\$4,339	\$4,513	\$6,423	\$9,508
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$18,561	\$28,334	\$29,669	\$44,579	\$69,224
Financed Project Costs - Principal and Interest					(101,601)	(101,601)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(83,040)	(73,266)	29,669	44,579	69,224
Cumulative Cash Flow					(83,040)	(784,297)	(754,628)	(417,215)	155,721

A.4 Orofino High School- 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	400,000	0	0
Annual Heating Costs:	\$20,324	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	1,365,200,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	1,365,200,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Wood Chips Wood Pellets

\$30.00 \$124.00 Modify for local conditions
 65% 70%

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400 8200
 194

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$950,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$475,000
Amount of Grants	\$475,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$60,325
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-79 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		400000 kw		\$20,324	\$28,927	\$30,084	\$42,820	\$63,383
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	194 tons		\$5,251	\$6,275	\$6,401	\$7,649	\$9,325
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	400000 kw		\$2,032	\$2,893	\$3,008	\$4,282	\$6,338
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$12,041	\$18,455	\$19,331	\$29,135	\$45,364
Financed Project Costs - Principal and Interest					(60,325)	(60,325)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(48,285)	(41,871)	19,331	29,135	45,364
Cumulative Cash Flow					(48,285)	(452,602)	(433,271)	(213,016)	162,040

A.4.1 Orofino High School- 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil	
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90	
3-year Annual Average Fuel Usage:	400,000	0	0	
Annual Heating Costs:	\$20,324	\$0	\$0	

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	1,365,200,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	1,365,200,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Wood Chips Wood Pellets

\$30.00	\$124.00
65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
194	

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$1,050,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$525,000
Amount of Grants	\$525,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$66,676
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-87 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		400000	kw	\$20,324	\$28,927	\$30,084	\$42,820	\$63,383
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	194	tons	\$5,251	\$6,275	\$6,401	\$7,649	\$9,325
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	400000	kw	\$2,032	\$2,893	\$3,008	\$4,282	\$6,338
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$12,041	\$18,455	\$19,331	\$29,135	\$45,364
Financed Project Costs - Principal and Interest					(66,676)	(66,676)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(54,635)	(48,221)	19,331	29,135	45,364
Cumulative Cash Flow					(54,635)	(516,102)	(496,771)	(276,517)	98,539

A.5 Central Plant (ICI & OHS) 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,750,000	0	0
Annual Heating Costs:	\$139,728	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	9,385,750,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	9,385,750,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
1,337	0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$2,250,000**

Project Financing Information

Percent Financed	50%
Amount Financed	-\$1,125,000
Amount of Grants	\$1,125,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$142,876
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-25 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2750000	kw	\$139,728	\$198,876	\$206,831	\$294,385	\$435,761
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1337	tons	\$36,099	\$43,142	\$44,005	\$52,589	\$64,106
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2750000	kw	\$13,973	\$19,888	\$20,683	\$29,438	\$43,576
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$88,656	\$134,542	\$140,799	\$210,603	\$325,722
Financed Project Costs - Principal and Interest					(142,876)	(142,876)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(54,220)	(8,334)	140,799	210,603	325,722
Cumulative Cash Flow					(54,220)	(325,674)	(184,875)	1,411,992	4,112,143

A.5.1 Central Plant (ICI & OHS) 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,750,000	0	0
Annual Heating Costs:	\$139,728	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	9,385,750,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	9,385,750,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Wood Chips Wood Pellets

\$30.00 \$124.00 Modify for local conditions
65% 70%

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400 8200
1,337

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$2,500,000**

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$1,250,000
Amount of Grants	\$1,250,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$158,751
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-28 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2750000	kw	\$139,728	\$198,876	\$206,831	\$294,385	\$435,761
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1337	tons	\$36,099	\$43,142	\$44,005	\$52,589	\$64,106
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2750000	kw	\$13,973	\$19,888	\$20,683	\$29,438	\$43,576
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$88,656	\$134,542	\$140,799	\$210,603	\$325,722
Financed Project Costs - Principal and Interest					(158,751)	(158,751)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(70,095)	(24,209)	140,799	210,603	325,722
Cumulative Cash Flow					(70,095)	(484,425)	(343,626)	1,253,241	3,953,391

A.6 Central Plant (ICI & ISHN) 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,950,000	0	0
Annual Heating Costs:	\$149,890	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,068,350,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,068,350,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:	Wood Chips	Wood Pellets
	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
1,434	0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$2,540,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$1,270,000
Amount of Grants	\$1,270,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$161,291
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-27 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2950000	kw	\$149,890	\$213,339	\$221,873	\$315,795	\$467,453
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1434	tons	\$38,724	\$46,279	\$47,205	\$56,414	\$68,769
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2950000	kw	\$14,989	\$21,334	\$22,187	\$31,579	\$46,745
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$95,176	\$144,422	\$151,137	\$226,047	\$349,583
Financed Project Costs - Principal and Interest					(161,291)	(161,291)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(66,115)	(16,870)	151,137	226,047	349,583
Cumulative Cash Flow					(66,115)	(428,767)	(277,630)	1,436,395	4,334,426

A.6.1 Central Plant (ICI & ISHN) 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,950,000	0	0
Annual Heating Costs:	\$149,890	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,068,350,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,068,350,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Wood Chips Wood Pellets

\$30.00 \$124.00 Modify for local conditions
65% 70%

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400 8200
1,434

0 =Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$2,800,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$1,400,000
Amount of Grants	\$1,400,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$177,801
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-29 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2950000	kw	\$149,890	\$213,339	\$221,873	\$315,795	\$467,453
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1434	tons	\$38,724	\$46,279	\$47,205	\$56,414	\$68,769
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2950000	kw	\$14,989	\$21,334	\$22,187	\$31,579	\$46,745
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$95,176	\$144,422	\$151,137	\$226,047	\$349,583
Financed Project Costs - Principal and Interest					(177,801)	(177,801)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(82,625)	(33,380)	151,137	226,047	349,583
Cumulative Cash Flow					(82,625)	(593,868)	(442,731)	1,271,294	4,169,325

A.7 Central Plant (ICI, ISHN & CVH&C) 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

	Electric	Propane	Fuel Oil
Existing Fuel Type:			
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	3,200,000	0	8,900
Annual Heating Costs:	\$162,592	\$0	\$16,910

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,921,600,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,921,600,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Chips: Elec	Chips: Oil
\$30.00	\$30.00
65%	65%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400	5400
1,556	141

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$3,780,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$1,890,000
Amount of Grants	\$1,890,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$240,032
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-32 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		3200000	kw	\$162,592	\$231,419	\$240,676	\$342,557	\$507,068
Displaced heating costs: Fuel Oil	\$1.90		8900	gallons	\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1556	tons	\$42,006	\$50,201	\$51,205	\$61,195	\$74,596
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	3200000	kw	\$3,798	\$4,539	\$4,630	\$5,533	\$6,745
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$116,439	\$176,300	\$184,460	\$275,446	\$425,400
Financed Project Costs - Principal and Interest					(240,032)	(240,032)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(123,593)	(63,731)	184,460	275,446	425,400
Cumulative Cash Flow					(123,593)	(953,414)	(768,953)	1,320,949	4,849,383

A.7.1 Central Plant (ICI, ISHN & CVH&C) 90% Wood Chips- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

	Electric	Propane	Fuel Oil
Existing Fuel Type:			
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	3,200,000	0	8,900
Annual Heating Costs:	\$162,592	\$0	\$16,910

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,921,600,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,921,600,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Chips: Elec	Chips: Oil
\$30.00	\$30.00
65%	65%
5400	5400
1,556	141

Modify for local conditions
=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

nearest \$50,000

Total Project Cost **-\$4,160,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$2,080,000
Amount of Grants	\$2,080,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$264,162
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-36 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		3200000	kw	\$162,592	\$231,419	\$240,676	\$342,557	\$507,068
Displaced heating costs: Fuel Oil	\$1.90		8900	gallons	\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$30.00	90%	1556	tons	\$42,006	\$50,201	\$51,205	\$61,195	\$74,596
	\$30.00	90%	141	tons	\$3,798	\$4,539	\$4,630	\$5,533	\$6,745
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	3200000	kw	\$16,259	\$23,142	\$24,068	\$34,256	\$50,707
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$116,439	\$176,300	\$184,460	\$275,446	\$425,400
Financed Project Costs - Principal and Interest					(264,162)	(264,162)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(147,723)	(87,862)	184,460	275,446	425,400
Cumulative Cash Flow					(147,723)	(1,194,716)	(1,010,255)	1,079,647	4,608,082

B.1 Clearwater Valley Hospital & Clinic-90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	250,000	0	8,900
Annual Heating Costs:	\$12,703	\$0	\$16,910

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	853,250,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	853,250,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Pellets: Elec	Pellets: Oil
\$124.00	\$124.00
65%	65%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

8200	8200
80	93

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

Total Project Cost **-\$540,000**

Project Financing Information

Percent Financed	50%
Amount Financed	-\$270,000
Amount of Grants	\$270,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$34,290
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-67 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		250000 kw		\$12,703	\$18,080	\$18,803	\$26,762	\$39,615
Displaced heating costs: Fuel Oil	\$1.90		8900 gallons		\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	80 tons		\$8,933	\$10,675	\$10,889	\$13,013	\$15,863
	\$124.00	90%	93 tons		\$10,338	\$12,355	\$12,602	\$15,060	\$18,358
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	250000 kw		\$1,270	\$1,808	\$1,880	\$2,676	\$3,961
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$8,072	\$16,005	\$17,119	\$29,886	\$51,811
Financed Project Costs - Principal and Interest					(34,290)	(34,290)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(26,219)	(18,285)	17,119	29,886	51,811
Cumulative Cash Flow					(26,219)	(225,094)	(207,975)	5,980	417,324

B.1.1 Clearwater Valley Hospital & Clinic-90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:

Current Annual Fuel Cost:

3-year Annual Average Fuel Usage:

Annual Heating Costs:

Electric	Propane	Fuel Oil
0.05081	\$0.00	\$1.90
250,000	0	8,900
\$12,703	\$0	\$16,910

Notes:

Fuel type highlighted

Current year average \$/gallon or \$/kw

3-year year average kw or gallon

Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):

Assumed efficiency of existing heating system (%):

Net Annual Fuel Usage (btu):

853,250,000	0	1,234,341,000
100%	80%	80%
853,250,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:

Assumed efficiency of wood heating system (%):

Pellets: Elec Pellets: Oil

\$124.00 \$124.00

65% 65%

Modify for local conditions

8200 8200

80 93

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

PROJECTED FUEL USAGE

Assumed btu content of wood fuel

Tons of wood fuel to create net equivalent of 100% annual heating load

nearest \$50,000

Modify for local conditions

Represents a quick look at project viability

Total Project Cost **-\$600,000**

Project Financing Information

Percent Financed **50%**

Amount Financed **-\$300,000**

Amount of Grants **\$300,000**

Interest Rate **4.60%**

Term **10**

Annual Finance Cost (years) **-\$38,100**

Simple Payback: Total Project Cost/Year One Operating Cost Savings:

-74 (years)

Inflation Factors

O&M Inflation Rate **3%**

Current Fuel Inflation Rate **4%**

Wood Fuel Inflation Rate **2%**

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		250000	kw	\$12,703	\$18,080	\$18,803	\$26,762	\$39,615
Displaced heating costs: Fuel Oil	\$1.90		8900	gallons	\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	80	tons	\$8,933	\$10,675	\$10,889	\$13,013	\$15,863
	\$124.00	90%	93	tons	\$10,338	\$12,355	\$12,602	\$15,060	\$18,358
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	250000	kw	\$1,270	\$1,808	\$1,880	\$2,676	\$3,961
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$8,072	\$16,005	\$17,119	\$29,886	\$51,811
Financed Project Costs - Principal and Interest					(38,100)	(38,100)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(30,029)	(22,095)	17,119	29,886	51,811
Cumulative Cash Flow					(30,029)	(263,194)	(246,076)	(32,121)	379,224

B.2 Idaho Correctional Facility- 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,350,000	0	0
Annual Heating Costs:	\$119,404	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	8,020,550,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	8,020,550,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	1,143	699

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$1,120,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$560,000
Amount of Grants	\$560,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$71,121
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-39 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2350000	kw	\$119,404	\$169,948	\$176,746	\$251,565	\$372,378
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	699	tons	\$77,970	\$93,181	\$95,045	\$113,587	\$138,462
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2350000	kw	\$11,940	\$16,995	\$17,675	\$25,157	\$37,238
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$28,493	\$58,468	\$62,683	\$111,068	\$194,321
Financed Project Costs - Principal and Interest					(71,121)	(71,121)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(42,627)	(12,653)	62,683	111,068	194,321
Cumulative Cash Flow					(42,627)	(286,203)	(223,520)	567,509	2,105,198

B.2.1 Idaho Correctional Facility- 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,350,000	0	0
Annual Heating Costs:	\$119,404	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	8,020,550,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	8,020,550,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	1,143	699

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$1,250,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$625,000
Amount of Grants	\$625,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$79,376
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-44 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2350000	kw	\$119,404	\$169,948	\$176,746	\$251,565	\$372,378
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	699	tons	\$77,970	\$93,181	\$95,045	\$113,587	\$138,462
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2350000	kw	\$11,940	\$16,995	\$17,675	\$25,157	\$37,238
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$28,493	\$58,468	\$62,683	\$111,068	\$194,321
Financed Project Costs - Principal and Interest					(79,376)	(79,376)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(50,882)	(20,908)	62,683	111,068	194,321
Cumulative Cash Flow					(50,882)	(368,753)	(306,070)	484,959	2,022,647

B.3 Idaho State Hospital North- 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	600,000	0	0
Annual Heating Costs:	\$30,486	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	2,047,800,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	2,047,800,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	292	178

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost	-\$1,370,000
---------------------------	---------------------

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$685,000
Amount of Grants	\$685,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$86,996
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-210 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		600000	kw	\$30,486	\$43,391	\$45,127	\$64,229	\$95,075
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	178	tons	\$19,907	\$23,791	\$24,267	\$29,001	\$35,352
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	600000	kw	\$3,049	\$4,339	\$4,513	\$6,423	\$9,508
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$6,530	\$13,956	\$15,003	\$27,052	\$47,859
Financed Project Costs - Principal and Interest					(86,996)	(86,996)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(80,465)	(73,039)	15,003	27,052	47,859
Cumulative Cash Flow					(80,465)	(769,982)	(754,979)	(563,486)	(186,303)

B.3.1 Idaho State Hospital North- 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil	
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90	
3-year Annual Average Fuel Usage:	600,000	0	0	
Annual Heating Costs:	\$30,486	\$0	\$0	

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	2,047,800,000	0	0	
Assumed efficiency of existing heating system (%):	100%	80%	80%	
Net Annual Fuel Usage (btu):	2,047,800,000	0	0	

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	292	178

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$1,500,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$750,000
Amount of Grants	\$750,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$95,251
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-230 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		600000	kw	\$30,486	\$43,391	\$45,127	\$64,229	\$95,075
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	178	tons	\$19,907	\$23,791	\$24,267	\$29,001	\$35,352
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	600000	kw	\$3,049	\$4,339	\$4,513	\$6,423	\$9,508
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$6,530	\$13,956	\$15,003	\$27,052	\$47,859
Financed Project Costs - Principal and Interest					(95,251)	(95,251)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(88,721)	(81,294)	15,003	27,052	47,859
Cumulative Cash Flow					(88,721)	(852,533)	(837,529)	(646,037)	(268,854)

B.4 Orofino High School- 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	400,000	0	0
Annual Heating Costs:	\$20,324	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	1,365,200,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	1,365,200,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Wood Chips	Wood Pellets
\$30.00	\$124.00
65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
194	119

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost	-\$1,000,000
---------------------------	---------------------

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$500,000
Amount of Grants	\$500,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$63,500
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-249 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		400000 kw		\$20,324	\$28,927	\$30,084	\$42,820	\$63,383
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	119 tons		\$13,271	\$15,861	\$16,178	\$19,334	\$23,568
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	400000 kw		\$2,032	\$2,893	\$3,008	\$4,282	\$6,338
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$4,020	\$8,869	\$9,554	\$17,450	\$31,121
Financed Project Costs - Principal and Interest					(63,500)	(63,500)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(59,480)	(54,631)	9,554	17,450	31,121
Cumulative Cash Flow					(59,480)	(572,176)	(562,622)	(439,648)	(195,094)

B.4.1 Orofino High School- 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	400,000	0	0
Annual Heating Costs:	\$20,324	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	1,365,200,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	1,365,200,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Wood Chips	Wood Pellets
\$30.00	\$124.00
65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

5400	8200
194	119

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost	-\$1,100,000
---------------------------	---------------------

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$550,000
Amount of Grants	\$550,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$69,851
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-274 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		400000 kw		\$20,324	\$28,927	\$30,084	\$42,820	\$63,383
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	119 tons		\$13,271	\$15,861	\$16,178	\$19,334	\$23,568
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	400000 kw		\$2,032	\$2,893	\$3,008	\$4,282	\$6,338
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$4,020	\$8,869	\$9,554	\$17,450	\$31,121
Financed Project Costs - Principal and Interest					(69,851)	(69,851)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(65,830)	(60,981)	9,554	17,450	31,121
Cumulative Cash Flow					(65,830)	(635,677)	(626,123)	(503,148)	(258,595)

B.5 Central Plant (ICI & OHS) 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,750,000	0	0
Annual Heating Costs:	\$139,728	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	9,385,750,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	9,385,750,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:	Wood Chips	Wood Pellets
	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	1,337	818

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$2,500,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$1,250,000
Amount of Grants	\$1,250,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$158,751
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-75 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2750000	kw	\$139,728	\$198,876	\$206,831	\$294,385	\$435,761
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	818	tons	\$91,241	\$109,042	\$111,223	\$132,921	\$162,030
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2750000	kw	\$13,973	\$19,888	\$20,683	\$29,438	\$43,576
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$33,513	\$68,642	\$73,581	\$130,271	\$227,798
Financed Project Costs - Principal and Interest					(158,751)	(158,751)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(125,238)	(90,110)	73,581	130,271	227,798
Cumulative Cash Flow					(125,238)	(1,088,217)	(1,014,636)	(86,570)	1,716,377

B.5.1 Central Plant (ICI & OHS) 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

	Electric	Propane	Fuel Oil
Existing Fuel Type:			
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,750,000	0	0
Annual Heating Costs:	\$139,728	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	9,385,750,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	9,385,750,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	1,337	818

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$2,750,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$1,375,000
Amount of Grants	\$1,375,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$174,626
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-82 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2750000	kw	\$139,728	\$198,876	\$206,831	\$294,385	\$435,761
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	818	tons	\$91,241	\$109,042	\$111,223	\$132,921	\$162,030
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2750000	kw	\$13,973	\$19,888	\$20,683	\$29,438	\$43,576
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$33,513	\$68,642	\$73,581	\$130,271	\$227,798
Financed Project Costs - Principal and Interest					(174,626)	(174,626)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(141,113)	(105,985)	73,581	130,271	227,798
Cumulative Cash Flow					(141,113)	(1,246,968)	(1,173,387)	(245,321)	1,557,626

B.6 Central Plant (ICI & ISHN) 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,950,000	0	0
Annual Heating Costs:	\$149,890	\$0	\$0

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,068,350,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,068,350,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

	Wood Chips	Wood Pellets
\$/ton:	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	1,434	877

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$2,330,000**

nearest \$50,000

Project Financing Information

Percent Financed	50%
Amount Financed	-\$1,165,000
Amount of Grants	\$1,165,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$147,956
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-65 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors

O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2950000	kw	\$149,890	\$213,339	\$221,873	\$315,795	\$467,453
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	877	tons	\$97,877	\$116,972	\$119,312	\$142,588	\$173,814
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2950000	kw	\$14,989	\$21,334	\$22,187	\$31,579	\$46,745
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$36,024	\$73,729	\$79,030	\$139,873	\$244,537
Financed Project Costs - Principal and Interest					(147,956)	(147,956)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(111,933)	(74,227)	79,030	139,873	244,537
Cumulative Cash Flow					(111,933)	(943,120)	(864,090)	132,494	2,068,071

B.6.1 Central Plant (ICI & ISHN) 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

Existing Fuel Type:	Electric	Propane	Fuel Oil
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	2,950,000	0	0
Annual Heating Costs:	\$149,890	\$0	\$0

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,068,350,000	0	0
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,068,350,000	0	0

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:	Wood Chips	Wood Pellets
	\$30.00	\$124.00
Assumed efficiency of wood heating system (%):	65%	70%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel	5400	8200
Tons of wood fuel to create net equivalent of 100% annual heating load	1,434	877

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$2,575,000**

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$1,287,500
Amount of Grants	\$1,287,500
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$163,514
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-71 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs	\$0.05081		2950000	kw	\$149,890	\$213,339	\$221,873	\$315,795	\$467,453
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	877	tons	\$97,877	\$116,972	\$119,312	\$142,588	\$173,814
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	2950000	kw	\$14,989	\$21,334	\$22,187	\$31,579	\$46,745
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$36,024	\$73,729	\$79,030	\$139,873	\$244,537
Financed Project Costs - Principal and Interest					(163,514)	(163,514)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(127,490)	(89,785)	79,030	139,873	244,537
Cumulative Cash Flow					(127,490)	(1,098,696)	(1,019,666)	(23,082)	1,912,495

B.7 Central Plant (ICI, ISHN & CVH&C) 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

	Electric	Propane	Fuel Oil
Existing Fuel Type:			
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	3,200,000	0	8,900
Annual Heating Costs:	\$162,592	\$0	\$16,910

Notes:

Fuel type highlighted
Current year average \$/gallon or \$/kw
3-year year average kw or gallon
Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,921,600,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,921,600,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
Assumed efficiency of wood heating system (%):

Pellets: Elec Pellets: Oil

\$124.00	\$124.00
65%	65%
8200	8200
1,025	93

Modify for local conditions

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

nearest \$50,000

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
Tons of wood fuel to create net equivalent of 100% annual heating load

Total Project Cost **-\$3,500,000**

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$1,750,000
Amount of Grants	\$1,750,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$222,252
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-93 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		3200000 kw		\$162,592	\$231,419	\$240,676	\$342,557	\$507,068
Displaced heating costs: Fuel Oil	\$1.90		8900 gallons		\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	1025 tons		\$114,339	\$136,645	\$139,378	\$166,570	\$203,048
	\$124.00	90%	93 tons		\$10,338	\$12,355	\$12,602	\$15,060	\$18,358
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	3200000 kw		\$16,259	\$23,142	\$24,068	\$34,256	\$50,707
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$37,566	\$82,041	\$88,315	\$160,544	\$285,335
Financed Project Costs - Principal and Interest					(222,252)	(222,252)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(184,685)	(140,211)	88,315	160,544	285,335
Cumulative Cash Flow					(184,685)	(1,639,244)	(1,550,929)	(417,644)	1,827,480

B.7 Central Plant (ICI, ISHN & CVH&C) 90% Wood Pellets- 50% Electrical Usage Assumption

Orofino, Idaho

Date(Revision Date): February 28, 2006

Analyst: CTA-Architects Engineers- Nick Salmon

EXISTING CONDITIONS

	Electric	Propane	Fuel Oil
Existing Fuel Type:			
Current Annual Fuel Cost:	0.05081	\$0.00	\$1.90
3-year Annual Average Fuel Usage:	3,200,000	0	8,900
Annual Heating Costs:	\$162,592	\$0	\$16,910

Notes:

Fuel type highlighted
 Current year average \$/gallon or \$/kw
 3-year year average kw or gallon
 Chart will automatically convert

ENERGY CONVERSION (to 1 mmbtu, or 1 dka)

Current Annual Fuel Volume (btu):	10,921,600,000	0	1,234,341,000
Assumed efficiency of existing heating system (%):	100%	80%	80%
Net Annual Fuel Usage (btu):	10,921,600,000	0	987,472,800

Chart will automatically convert

Chart will automatically convert

WOOD FUEL COST

\$/ton:
 Assumed efficiency of wood heating system (%):

Pellets: Elec	Pellets: Oil
\$124.00	\$124.00
65%	65%

Modify for local conditions

PROJECTED FUEL USAGE

Assumed btu content of wood fuel
 Tons of wood fuel to create net equivalent of 100% annual heating load

8200	8200
1,025	93

=Net Annual Fuel Usage/10.8 or 16.4 mmbtu/Assumed efficiency of wood heating system

Total Project Cost **-\$3,850,000**

nearest \$50,000

Project Financing Information	
Percent Financed	50%
Amount Financed	-\$1,925,000
Amount of Grants	\$1,925,000
Interest Rate	4.60%
Term	10
Annual Finance Cost (years)	-\$244,477
Simple Payback: Total Project Cost/Year One Operating Cost Savings:	-102 (years)

Modify for local conditions

Represents a quick look at project viability

Inflation Factors	
O&M Inflation Rate	3%
Current Fuel Inflation Rate	4%
Wood Fuel Inflation Rate	2%

Cash flow Descriptions	Unit Costs	Heating Source Proportion	Annual Heating Source Volumes	Heating Units	Year 1	Year 10	Year 11	Year 20	Year 30
Existing Heating System Operating Costs									
Displaced heating costs: Electric	\$0.05081		3200000	kw	\$162,592	\$231,419	\$240,676	\$342,557	\$507,068
Displaced heating costs: Fuel Oil	\$1.90		8900	gallons	\$16,910	\$24,068	\$25,031	\$35,627	\$52,736
Displaced Operation and Maintenance Costs					\$500	\$652	\$672	\$877	\$1,178
Biomass System Operating Costs									
Wood Fuel (\$/ton, delivered to boiler site, btu/lb) (90% of total heat reqmnt)	\$124.00	90%	1025	tons	\$114,339	\$136,645	\$139,378	\$166,570	\$203,048
	\$124.00	90%	93	tons	\$10,338	\$12,355	\$12,602	\$15,060	\$18,358
Small load existing fuel (10% of total heat reqmnt)	\$0.05081	10%	3200000	kw	\$16,259	\$23,142	\$24,068	\$34,256	\$50,707
Operation and Maintenance Costs					\$1,500	\$1,957	\$2,016	\$2,630	\$3,535
Annual Operating Cost Savings					\$37,566	\$82,041	\$88,315	\$160,544	\$285,335
Financed Project Costs - Principal and Interest					(244,477)	(244,477)			
Displaced System Replacement Costs (year one only)									
Net Annual Cash Flow					(206,911)	(162,436)	88,315	160,544	285,335
Cumulative Cash Flow					(206,911)	(1,861,496)	(1,773,180)	(639,895)	1,605,228