

Haines Borough Energy & Sustainability Commission

Stephanie Scott, Coordinator
Coordinator's Monthly Report
January 20, 2009

Some Key Local Retail Energy Prices Decline

By January 14, Stove oil (#1) dropped 11% (from \$3.60 12/18/08 to \$3.20 1/14/09) but furnace oil (#2) remained the same at \$4.130/gallon. The price of propane has remained the same at \$3.73 since 11/17/08.

As January 14, 2009, the average price of unleaded gas in Haines was \$3.341, with a high of \$3.50 and a low of \$3.139. This represents a drop of 11% and 10% respectively and an average drop of 8.7%. The average price of unleaded gasoline nationally is \$1.86. The average in Alaska is \$2.511 and the average in Juneau is \$2.659.

The average price of diesel in Haines has fallen below the average in Juneau (\$3.713 versus \$4.199). Statewide the average for diesel is \$3.544; nationally the average is \$2.432. Diesel in Haines can be pumped for a high of \$3.90 or a low of \$3.139 depending on where you shop.

December 2008 Municipal Energy Bill

The Haines Borough Municipality and School District spent \$68, 419.41 on energy in December, compared to \$75,027.80 in November. Fewer gallons of heating fuel were delivered, but about 15,082 more kilowatt-hours were used. Every sector increased its use of electricity. Ports & Harbors significantly increased from 9429 KWH in November to 11,753 KWH in December.

Here is a comparative look across sectors to understand which sector consumes the greater portion of heating fuel compared to the total.

Haines Borough Energy Expenditures by Sector as a Percent of the Whole	Management & Safety	Community Buildings	Sewer & Water	School Buildings	Vehicle Fuel
August-08	1.20%	31.75%	1.26%	51.17%	14.62%
September-08	3.43%	12.75%	9.65%	26.76%	47.41%
October-08	8.27%	21.16%	8.92%	43.93%	17.72%
November-08	11.11%	19.93%	9.79%	49.87%	9.29%
Dec-08	16.01%	15.58%	16.51%	36.64%	15.26%

The chart on the next page shows the proportion of the total kilowatt-hours consumed by sector.

Haines Borough Energy Expenditures by Sector as a Percent of the Whole	Management & Safety	Ports & Harbors	Outdoor Lighting	Community Buildings	Sewer & Water	School Buildings
August-08	10.32%	14.62%	12.18%	11.28%	17.90%	33.71%
September-08	7.84%	9.99%	12.86%	7.76%	15.12%	46.44%
October-08	6.87%	8.83%	12.72%	6.11%	12.68%	52.78%
November-08	6.87%	5.26%	14.66%	7.69%	13.67%	51.85%
Dec-08	6.63%	6.05%	15.68%	7.29%	13.65%	50.69%

Annual Energy Consumption Comparisons 2008 v. 2007

Heating Fuel. Overall consumption declined 15% compared to 2007 despite the addition of the new school and the new public works building. Consolidation of the school district heating plants (from 5 to 2) and the multi-month closure of the swimming pool may account for most of the reduction in fuel consumption in the school buildings (24% decrease). The decrease may be even greater. Evidently, a significant amount of fuel was siphoned from the Mosquito Lake School fuel tank during the 2008 season.

The Visitor Center, the Sewer Plant, and the Water Treatment Plant all experienced significant decreases in heating fuel consumption. The Visitor Center decrease might be explained by the winterization of the adjacent bathrooms during 2008.

	Gallons Fuel Oil Delivered to Borough Facilities		
	2006	2007	2008
School Buildings: In Town	57,214.80	78,801.50	60,232.90
School Mosquito Lake	5,352.30	5,232.40	7,508.10
Sewer	7,593.00	9,057.50	6,656.80
Water	3,738.70	4,779.70	3,498.00
Public Works(Old)	4,116.10	4,303.60	3,774.50
Public Works (New)	0.00	0.00	1,490.40
Public Safety Building	5,385.30	4,306.80	3,775.40
Admin. Bldg.	949.90	1,035.10	1,142.91
Visitor Center	1,353.60	1,189.40	821.00
Museum & Museum Shed	2,797.70	2,682.31	3,620.80
Library	3,230.60	2,482.40	2,905.20
Chilkat Center	10,751.01	10,916.20	10,480.50
Annual Total	102,483.01	124,786.91	105,906.51
Percent Increase/decrease from previous year		21.76%	-15.13%

Kilowatt Consumption On the other hand, with the exception of the Sheldon Museum, the Administration Building, and the Public Safety Building, all sectors of the municipality consumed more kilowatt-hours in 2008 than in 2007.

Kilowatt-Hour Consumption, Haines Borough & School District

	2006	2007	2008
School District	863,001	754,891	991,394
Sewer	180,164	203,482	236,642
Water	106,766	67,280	74,243
Streetlights & Parks	256,733	247,094	253,843
Harbor, Lutak, PC Lights, Ice House, NOAA	67,657	121,323	145,207
Public works	30,806	31,463	35,786
Public Safety Bldg., Radio Tower	87,952	84,613	80,774
Admin. Bldg.	35,644	35,082	32,599
Visitor Center	8,409	10,369	11,708
Museum	36,800	34,565	31,395
Library	63,360	61,160	63,000
Chilkat Center	33,920	30,960	38,720
Elem. School	0	0	2,240
	2006	2007	2008
Total KWH	1,771,212	1,682,282	1,997,551
Percent increase (decrease) from previous year		-5.02%	18.74%

Energy Relationship: School: Pool: The Haines Swimming Pool is yoked to the Haines School through the heating plant and the electric meter. It is possible to separate the cost of fuel consumed by the pool by converting the BTUs associated with the pool to gallons of fuel. Delta Western estimates the BTU content of a gallon of stove oil to be 135,000. I used the DOE figure of 139,000 to prepare the following information:

Estimate of Heating Fuel Oil Used by Haines Swimming Pool							
		Pool Fuel				School Fuel	
	2008	Convert to Gallons Fuel Oil	Gallons Delivered to k-12 School	Gallons delivered to High school	Total System Gallons	Less Pool BTU Gallons	% Total Fuel Consumed by Pool
	Pool BTUS	139,000					
<i>January</i>	98,342,496.00	707.50	4126.9	4118.4	8245.3	7,537.80	8.58%
<i>February</i>	97,712,773.00	702.97	5422.6	5927.1	11349.7	10,646.73	6.19%
<i>March</i>	106,728,194.00	767.83	3073	4859.6	7932.6	7,164.77	9.68%
<i>April</i>	91,089,491.00	655.32	1931.8	3697.9	5629.7	4,974.38	11.64%
<i>May</i>	72,011,724.00	518.07	3102.9	2050.2	5153.1	4,635.03	10.05%
<i>June</i>	37,409,572.00	269.13	826.1		826.1	556.97	32.58%
<i>July</i>	935,307.00	6.73	0		0	-6.73	
<i>August</i>	182,095.00	1.31	2152.4		2152.4	2,151.09	0.06%
<i>September</i>	45,196,097.00	325.15	1000.2		1000.2	675.05	32.51%
<i>October</i>	83,254,202.00	598.95	3350.2		3350.2	2,751.25	17.88%
<i>November</i>	112,869,077.00	812.01	3500.1		3500.1	2,688.09	23.20%
<i>December</i>	145,440,468.00	1,046.33	3349.8		3349.8		31.24%
Totals	891,171,496.00	6,411.31	31,836.00	20,653.20	52,489.20	43,774.43	12.21%
Diesel and Heating Oil Fuel Conversion							
1 gallon = 139,000 BTUs							
http://www.eia.doe.gov/kids/energyfacts/science/energy_calculator.html							

Community if KWH consumption of the pool separated from the school. The pool closed June 15 this past year and reopened September 20. Due to the way the meters are read, this means that the power bills for July, August, and September were affected by the pool closure. The problem is that this is also a "down" period for the school. If we assume that school was in session for the September billing and the pool reopening is reflected in the October billing, we might be able to infer that the difference between September and October 2008 monthly bills (18,720 KWH) represents the pool effect on the school electric billing - which is about 22%. This is a very very rough guess.

According to Sue Braaten, APT, the school will continue to qualify for the cheaper A3 bulk power rate even if the pool is withdrawn from its meter. This is good news, since the pool will then qualify for the lower rate created by the application of the Power Cost Equalization Credit. Let's say the pool is responsible for 18,000 KWH month (possibly a low-ball figure). The difference between the school rate (\$.1893) and the rate for community buildings (\$.1444) is \$808 per month.

Haines Biomass Heat Project for Community Buildings Success! The grant for Phase I reconnaissance and Phase II feasibility and 35% design has been recommended for funding by the Alaska Renewable Energy Fund. It is now up to the state legislature to allocate the funds. The Haines Borough grant application is for \$120,500 with a match of \$10,000.00 from the Jump-Start- Wood-to-Energy Program and a Borough match of \$10,000. The grant application is appended to this report. Susan Mitchell, of CE2 Engineers, writes, January 19, 2009:

Since we don't know what the legislature's schedule is for acting on or otherwise processing the recommendations, I would recommend taking a look at the (Alaska Energy Authority) Energy Plan and mining it for information. There is some big picture stuff on the direction the State is planning to head in as far as renewable resources. The section on Biomass (starts on page 120) is pretty detailed, and I'm sure you'll find some applicability to your local community. There were a total of 13 biomass projects recommended, including the two there in Haines. Your community is poised on the cutting edge of the biomass wave!:

Energy & Sustainability Commissioner Volunteers Analysis of Heat Loss in Borough Building Commissioner Dubber has prepared a memo regarding the heating system at the Senior Center. I am working with Senior Village manager Anne Hansen to formalize the information for transmission to the Borough manager.

LED Streetlights. We are awaiting a second estimate from Arctic Sales, Eagle River. The estimate has been delayed by weather events in the region. An estimate has been received from LEDtronics.

Energy Fair

In addition to the publication of a notice to vendors in the Chilkat Valley News, 13 local retailers were hand delivered invitations to participate in the Energy Fair.

Various presenters have agreed to participate including Rebecca Garrett (Alaska Energy Authority), Jodi Mitchel (Inside Passage Electrical Cooperative), Tim June (Tim June Energy Plan), Chilkat Environmental (demonstrating an electric car and a propane powered truck). Efforts are being made to bring in biomass presenters. Gary Lidholm and Leonard Dubber are working on this aspect of the Fair.

Locals have been contacted and requested to provide photos of renewable energy installations,

Publications have been ordered from Cooperative Extension Service 1/14/09, 50 each:

EEM - 01152 Comparative Unit Fuel Costs for Equivalent Dollar Net Heat Output

EEM-01256 Active Solar Heating Factsheet

EEM-01250 Woodstoves: A Safety checklist Factsheet

EEM-01352 Wind Power Factsheet

EEM-01454 Insulation Factsheet

EEM-04253 Heating Values of Fuels

EEM-04955 Keeping Your House Operating During a Cold Alaska Winter - Overcoming Utility Freeze Up Problems

Communication

Many ideas and comments have been brought to the Commission's attention. Generally, all comments are forwarded to the Commissioners as they come in.

Wind: Research Paper identified by John Norton and circulated to Commissioners: [A Problem with Wind Power](#), Eric Rosenbloom, September 5, 2006, Available on the Commission website or from <http://www.aweo.org/ProblemWithWind.html>

Picken's Plan, link to monthly oil imports provided by Commissioner Scott Hansen, <http://www.pickensplan.com/oilimports/>

Hydrogen: John Northon. This company makes various products from industrial size to vehicle refueling plants. They generated over \$11M in revenue in 3rd qtr of 2008 which leads me to believe that they are legitimate and successful. This seems to me to fit in with Dan Wackerman's idea of using hydro to make hydrogen for export/ local use. <http://www.hydrogenics.com/onsite/products.HySTAT-P.asp>

Wind Hydro Integration Study: Provided by Judy Ereckson This is a study of a very large project 50 megawatts <http://www.wapa.gov/ugp/PowerMarketing/WindHydro/Default.htm>.

Peak Oil Issues. Mike Denker has been forwarding information and links regarding this topic.

Connelly Lake Hydro Project. Written comments have been received from Kathleen Menke and George Figdor and forwarded to Commissioners.

Attachment: Haines Borough Renewable Energy Fund Grant Application

Grant Application

Renewable Energy Fund



Application Forms and Instructions

The following forms and instructions are provided for preparing your application for a Renewable Energy Fund Grant. An electronic version of the Request for Applications (RFA) and the forms are available online at http://www.akenergyauthority.org/RE_Fund.html

The following application forms are required to be submitted for a grant recommendation:

Grant Application Form	GrantApp.doc	Application form in MS Word that includes an outline of information required to submit a complete application. Applicants should use the form to assure all information is provided and attach additional information as required.
Application Cost Worksheet	Costworksheet.doc	Summary of Cost information that should be addressed by applicants in preparing their application.
Grant Budget Form	GrantBudget.xls	A detailed grant budget that includes a breakdown of costs by task and a summary of funds available and requested to complete the work for which funds are being requested.
Grant Budget Form Instructions	GrantBudgetInstr.pdf	Instructions for completing the above grant budget form.

- If you are applying for grants for more than one project, provide separate application forms for each project.
- Multiple phases for the same project may be submitted as one application.
- If you are applying for grant funding for more than one phase of a project, provide a plan and grant budget for completion of each phase.
- If some work has already been completed on your project and you are requesting funding for an advanced phase, submit information sufficient to demonstrate that the preceding phases are satisfied and funding for an advanced phase is warranted.
- If you have additional information or reports you would like the Authority to consider in reviewing your application, either provide an electronic version of the document with your submission or reference a web link where it can be downloaded or reviewed.

REMINDER:

- Alaska Energy Authority is subject to the Public Records Act, AS 40.25 and materials submitted to the Authority may be subject to disclosure requirements under the act if no statutory exemptions apply.
- All applications received will be posted on the Authority web site after final recommendations are made to the legislature.

SECTION 1 – APPLICANT INFORMATION		
Name <i>(Name of utility, IPP, or government entity submitting proposal)</i>		
Haines Borough		
Type of Entity: Municipal Corporation		
Mailing Address PO Box 1209, Haines, AK 99827		Physical Address 103 Third Avenue S., Haines, AK 99827
Telephone 907-766-2231	Fax 907-766-2716	Email tbolen@haines.ak.us
1.1 APPLICANT POINT OF CONTACT		
Name Tom Bolen		Title Haines Borough Manager
Mailing Address PO Box 1209, Haines, AK 99827		
Telephone 907-766-2231	Fax 907-766-2716	Email tbolen@haines.ak.us
1.2 APPLICANT MINIMUM REQUIREMENTS		
<i>Please check as appropriate. If you do not to meet the minimum applicant requirements, your application will be rejected.</i>		
1.2.1 As an Applicant, we are: (put an X in the appropriate box)		
	An electric utility holding a certificate of public convenience and necessity under AS 42.05, or	
	An independent power producer, or	
X	A local government, or	
	A governmental entity (which includes tribal councils and housing authorities);	
Yes	1.2.2. Attached to this application is formal approval and endorsement for its project by its board of directors, executive management, or other governing authority. If a collaborative grouping, a formal approval from each participant's governing authority is necessary. (Indicate Yes or No in the box)	
Yes	1.2.3. As an applicant, we have administrative and financial management systems and follow procurement standards that comply with the standards set forth in the grant agreement.	
Yes	1.2.4. If awarded the grant, we can comply with all terms and conditions of the attached grant form. (Any exceptions should be clearly noted and submitted with the application.)	

SECTION 2 – PROJECT SUMMARY

Provide a brief 1-2 page overview of your project.

2.1 PROJECT TYPE

Describe the type of project you are proposing, (Reconnaissance; Resource Assessment/ Feasibility Analysis/Conceptual Design; Final Design and Permitting; and/or Construction) as well as the kind of renewable energy you intend to use. Refer to Section 1.5 of RFA.

The Haines Borough proposes a reconnaissance phase followed by a resource assessment / feasibility analysis / conceptual design phase for a renewable energy project. The energy project employs a wood-fired hydronic heating system that uses locally available wood biomass fuel.

2.2 PROJECT DESCRIPTION

Provide a one paragraph description of your project. At a minimum include the project location, communities to be served, and who will be involved in the grant project.

The Haines Borough proposes to explore the potential for use of low-emission nontoxic wood biomass as the source for wood-fired boilers to provide heat (through an insulated pipe distribution system) initially to four buildings located within the Borough: the K-12 School, the Voc-Ed Building, the Municipal Administration Building, and the Public Library. The Borough would begin to reduce our dependence on costly fossil fuels, while employing cleaner, renewable, and locally available resources, through the use of locally available wood biomass. The Haines Borough will contract qualified consultants to perform reconnaissance and feasibility studies, and guide us through the 35% concept design. Contracting will be in accordance with the Borough’s standard procurement policies.

2.3 PROJECT BUDGET OVERVIEW

Briefly discuss the amount of funds needed, the anticipated sources of funds, and the nature and source of other contributions to the project. Include a project cost summary that includes an estimated total cost through construction.

The preliminary estimate of project cost is provided in Attachment C. The Haines Borough anticipates receiving \$120,500 for Development Services from this grant. The Haines Borough received a grant of \$10,000 from the *Jump-Start Wood-to- Energy Program*, which will be used for this project, and the Haines Borough will match that \$10,000, for a total initial development budget of \$140,500.

2.4 PROJECT BENEFIT

Briefly discuss the financial benefits that will result from this project, including an estimate of economic benefits (such as reduced fuel costs) and a description of other benefits to the Alaskan public.

These are the first two phases of a four-phase project to use wood biomass to replace oil as the primary heating fuel for selected Haines Borough buildings. The goal is to displace 85-90% of the oil used for heating in the Haines K-12 school, Voc-Ed Building, Administration Building, and Public Library with local wood biomass heat. Depending on findings from Phases 1 and 2, operational cost savings are estimated to range from 25 to 50% of present oil costs. While the capital cost of a high-efficiency, low-emission wood-fired hydronic heating system is higher than an oil-fired system, with the cost of oil far outstripping the cost of wood fuel, the system will pay for itself in as little as 12 years.

Wood is a renewable resource, in plentiful supply in the Haines area. The US Forest Service has determined that the carbon dioxide (CO₂) emitted during the burn process is typically 90% less than burning fossil fuel if the wood is harvested on a sustainable basis. Use of clean fuel is important to our community. Replacing most oil consumption with wood biomass will create additional positive economic benefits to the citizens of Haines Borough through stimulation of the local economy and employment by buying wood biomass locally. In short, money would circulate within the community rather than going out to external fuel oil suppliers.

2.5 PROJECT COST AND BENEFIT SUMMARY

Include a summary of your project’s total costs and benefits below.

2.5.1 Total Project Cost (Including estimates through construction.)	\$ 2,090,500
2.5.2 Grant Funds Requested in this application.	\$ 120,500

2.5.3 Other Funds to be provided (Project match)	\$ 20,000
2.5.4 Total Grant Costs (sum of 2.5.2 and 2.5.3)	\$ 140,500
2.5.5 Estimated Benefit (Savings)	\$ 108,717 (annual)
2.5.6 Public Benefit (If you can calculate the benefit in terms of dollars please provide that number here and explain how you calculated that number in your application.)	\$ 4,049,524. in savings over a 20-year period, using a conservative 5% annual fuel oil cost increase. This is shown in the Simple Cost Worksheets in Attachment F.

SECTION 3 – PROJECT MANAGEMENT PLAN

Describe who will be responsible for managing the project and provide a plan for successfully completing the project within the scope, schedule and budget proposed in the application.

3.1 Project Manager

Tell us who will be managing the project for the Grantee and include a resume and references for the manager(s). If the applicant does not have a project manager indicate how you intend to solicit project management support. If the applicant expects project management assistance from AEA or another government entity, state that in this section.

Haines Borough is currently soliciting for a Director of Public Facilities. We provided a copy of the position description in Attachment A. The director will function as the project manager and will be the primary coordinator with AEA, who will provide project management support, and the engineering design consultants, and construction managers throughout the course of the project.

3.2 Project Schedule

Include a schedule for the proposed work that will be funded by this grant. (You may include a chart or table attachment with a summary of dates below.)

A preliminary Project Schedule outlining tasks in Phase I and Phase II is provided in Attachment G.

3.3 Project Milestones

Define key tasks and decision points in your project and a schedule for achieving them.

Project milestones begin with Notice to Proceed from AEA on December 19, 2008. Other key milestones include:

- Phase I - Wood Heat Report: February 18, 2009
 - Define the wood source, and determine if we continue on to Phase II.
- Phase II - Feasibility Study: May 5, 2009
 - Evaluate project viability; favorable results will take us to the next task
- Phase II - Conceptual Design: June 17, 2009
 - Move to a design that fits our needs using our locally available wood source.
- Phase II – Concept Design Approval: July 8, 2009
 - Community and Agency approval of conceptual design will take us to the next phase of funding for Phase III – Final Design, and Phase IV - Construction.

Key milestones are noted on the Schedule provided in Attachment G.

3.4 Project Resources

Describe the personnel, contractors, equipment, and services you will use to accomplish the project. Include any partnerships or commitments with other entities you have or anticipate will be needed to complete your project. Describe any existing contracts and the selection process you may use for major equipment purchases or contracts. Include brief resumes and references for known, key personnel, contractors, and suppliers as an attachment to your application.

Haines Borough Key Personnel initially includes: the Haines Borough Director of Public Facilities (to be identified) and Tom Bolen, Haines Borough Manager. The Haines School District has a three person and plans to hire one more person. We will need, at a minimum, a design engineer and bulk wood heating specialist, and possibly a forestry consultant. We have consulted with the State’s Wood Energy Task

Force in Juneau, and will continue to seek their expertise. We have also consulted with CE2 Engineers, Inc. for preliminary feasibility data as required for this application. CE2's Statement of Qualifications is provided in Attachment A, along with the Position Description for the Director of Public Facilities and Mr. Bolen's résumé.

Financial accountability will be performed by the Borough Finance Department. The selection process for major equipment purchases or contractual agreements is stipulated by Haines Borough Code (HBC) Chapter 3.60, Purchasing. The Assembly may authorize single-item purchases or contracts between ten and twenty-thousand dollars provided whenever possible, be based on no fewer than three written bids, quotations, or statements of interest from potential suppliers. Except as set out in HBC 3.60.170, the bid is awarded to the lowest responsible bidder in accordance with the standards set in HBC 3.60.160. If a contract or purchase is estimated to exceed \$20,000 and not exempt from competitive sealed bid as provided in 3.60.170, purchase shall be through competitive sealed bid. See HBC 3.60.090 through 3.60.170 for sealed bid process.

3.5 Project Communications

Discuss how you plan to monitor the project and keep the Authority informed of the status.

The project will be monitored through formal weekly written communication between the Project Manager and the Borough Manager. The Project Manager will provide status reports to the Alaska Energy Authority through the Borough Manager and Clerk's office. Monthly written reports will be provided to document project progress, even in the planning stages, at minimum. Written reports will include photo-documentation of construction progress, during the construction phase.

3.6 Project Risk

Discuss potential problems and how you would address them.

Risk 1: We have to find a sustainable source of suitable fuel in the local area. To mitigate the risk: there are 700 MBF being used annually, and a sizeable amount of that material would be scrap, which may be suitable for use as fuel. This will be investigated.

Risk 2: Is there a decent pool of suitable contractors that can supply the necessary fuel within the specifications required for compatibility with the heating units? Risks can be minimized by developing designs that are flexible enough to accept fuels with differing moisture contents.

Risk 3: Availability of local talent to properly operate the systems. This can be mitigated by identifying suitable local talent during Phase 2 of the study. We can provide O&M training for promising candidates.

SECTION 4 – PROJECT DESCRIPTION AND TASKS

- *Tell us what the project is and how you will meet the requirements outlined in Section 2 of the RFA. The level of information will vary according to phase of the project you propose to undertake with grant funds.*
- *If you are applying for grant funding for more than one phase of a project provide a plan and grant budget for completion of each phase.*
- *If some work has already been completed on your project and you are requesting funding for an advanced phase, submit information sufficient to demonstrate that the preceding phases are satisfied and funding for an advanced phase is warranted.*

4.1 Proposed Energy Resource

Describe the potential extent/amount of the energy resource that is available.

Discuss the pros and cons of your proposed energy resource vs. other alternatives that may be available for the market to be served by your project.

Local wood biomass resources include the Haines State Forest, which has an allowable harvest of 5.88 million board feet annually. Currently, this resource is under-used. There are a minimum of eight local wood suppliers that may be able to supply wood biomass material for the system. Other suppliers in southeast Alaska and nearby Canada may be available as alternative suppliers. The vast amount of potentially usable biomass in the Haines State Forest must be evaluated as to suitability and accessibility. This is one of the purposes of Phases I and II of this project. The pros include use of a renewable resource

with a nearly neutral carbon footprint, lower operational costs, and economic stimulation through business opportunities. The cons include a more complicated heating system than existing oil-fired system alone, possible resistance by local environmental groups, and a significant impact on the local fuel oil supplier. The Feasibility Study will address the pros and cons. Haines Borough could continue to use diesel fuel, which is reliable technology, but a non-renewable resource with a high cost and heavy carbon footprint. We believe that our community would be better served by using locally available wood biomass fuel from our own forest.

4.2 Existing Energy System

4.2.1 Basic configuration of Existing Energy System

Briefly discuss the basic configuration of the existing energy system. Include information about the number, size, age, efficiency, and type of generation.

All four of these buildings are presently heated by oil-fired boilers, as detailed below.

Location	K-12 School	Voc-Ed Bldg	Public Library	Admin Bldg
Number of boilers	3	1	1	1
Rated boiler capacity	4.2mm btu/hr combined	219,000 btu/hr	397,000 btu/hr	500,000 btu/hr
Boiler Type	Weil-McClain 80	Hydro Therm 580	Weil-McClain 80	Ultimate PFO-5T
Boiler Age	2 yrs	27 yrs	5 yrs	12-15 yrs
Boiler Efficiency	78%	70%	78%	74%

4.2.2 Existing Energy Resources Used

Briefly discuss your understanding of the existing energy resources. Include a brief discussion of any impact the project may have on existing energy infrastructure and resources.

Currently the Haines Borough pays a local vendor for delivery of outside fuel oil to fire the boilers used to heat the buildings. While the price of oil has increased steadily over the last decade or two, oil prices rose drastically in the last 12 months. Our project calls for displacement of up to 90% of the fuel oil currently consumed for heating by the four buildings, and replaces the costly foreign fuel with locally available wood biomass. There are currently a minimum of 8 local suppliers in the wood industry that can immediately begin to provide local material to meet 90% of our fuel energy needs for heating, using the existing infrastructure in the state forest.

4.2.3 Existing Energy Market

Discuss existing energy use and its market. Discuss impacts your project may have on energy customers.

The existing energy market in our community relies heavily on expensive, non-local (outside) fuel oil deliveries. The proposed wood biomass project will significantly reduce heating costs for the School District and Borough buildings, while increasing employment and stimulating the local economy through use of locally available wood provided by local vendors. The cost savings and environmental benefits of using our own resources are most attractive to our community and will be steps in our goal toward achieving energy independence in the Haines Borough. The significant drop in fuel oil consumption as a result of moving to wood biomass fuel could have an impact on other customers, should the local fuel oil supplier increase or reduce prices as a result of the lower demand. This will be addressed in the Feasibility Study.

4.3 Proposed System

Include information necessary to describe the system you are intending to develop and address potential system design, land ownership, permits, and environmental issues.

4.3.1 System Design

Provide the following information for the proposed renewable energy system:

- *A description of renewable energy technology specific to project location*

- *Optimum installed capacity*
- *Anticipated capacity factor*
- *Anticipated annual generation*
- *Anticipated barriers*
- *Basic integration concept*
- *Delivery methods*

The proposed system will be a central wood chip-fired boiler system and chip storage building that will provide heat to four Borough buildings. The buildings will be connected with underground, insulated piping from the central boiler building and will be separated from the central heat system and each other by heat exchangers. A proposed Site Plan is provided in Attachment H. A conceptual plan of the boiler building also provided in Attachment H.

The optimum boiler size is approximately 60% of the connected load of the building. Typical load profiles show that approximately 90% of the boiler run hours occur at 60% of the peak load or less. Sizing the boiler at this smaller size allows the boiler to operate at the medium- and high-fire range more often, which optimizes efficiency and reduces emissions. An energy model of the facility will be developed to determine the final optimum boiler size, during the design process. The optimum installed size for the biomass boiler is estimated to be approximately 2.2 MM btu/hr. The Preliminary Boiler Sizing Data (provided in Attachment H) shows the connected boiler load summary, biomass boiler Size, and School Heating System capacity factors.

Anticipated capacity factor for the wood boiler is 0.35, compared to the overall capacity factor of 0.14 for the existing boiler systems. The wood boiler capacity factor is over twice that of the oil heat, so the wood boiler should run in a more efficient operational range than the existing oil-fired boilers.

Anticipated annual generation of heat is 4.00 billion btu, of which 90% is wood biomass, and 10% is fuel oil. The biomass boiler is anticipated to use 512 green tons of wood annually.

Anticipated barriers include obtaining sustainable quantities of compatible biomass fuel (to be determined in the Feasibility Study), and the possibility of environmentalist objections to using wood biomass (which will require Haines Borough to provide public education on the current technology). Access to the wood during the winter is a potential barrier that needs to be addressed.

Basic integration concept: heat will be transferred from the central boiler system using a primary circulating loop to the buildings. Heat will be transferred through heat exchangers into the return side of each building's hydronic system. This provides reliability and isolation of each building heating system, so the failure of one hydronic system (such as a piping break) will not take the whole system down. Heat will be delivered using propylene glycol hydronic systems (two pipe) with circulating pumps. The system will be designed for low head operation to keep pumping cost as low as possible.

Delivery method: The biomass boiler building would be constructed similar to any other Haines Borough capital project. The building and systems would be designed by licensed professionals who generate construction documents to be bid out to contractors. The successful bidder would mobilize to construct the building.

4.3.2 Land Ownership

Identify potential land ownership issues, including whether site owners have agreed to the project or how you intend to approach land ownership and access issues.

The Haines Borough owns the land where we plan to install the wood-fired heat system.

4.3.3 Permits

Provide the following information as it may relate to permitting and how you intend to address outstanding permit issues.

- *List of applicable permits*
- *Anticipated permitting timeline*
- *Identify and discussion of potential barriers*

The Haines Borough will obtain all necessary permits, which may include: a Coastal Management Plan review, and a State Fire Marshall review and permit. There are currently no applicable ADEC regulations

for a system of the size that we propose to install. Permitting will occur in future phases. We do not anticipate any barriers as the project location is on existing developed land owned the Haines Borough.

4.3.4 Environmental

Address whether the following environmental and land use issues apply, and if so how they will be addressed:

- *Threatened or Endangered species*
- *Habitat issues*
- *Wetlands and other protected areas*
- *Archaeological and historical resources*
- *Land development constraints*
- *Telecommunications interference*
- *Aviation considerations*
- *Visual, aesthetics impacts*
- *Identify and discuss other potential barriers*

The following potential environmental issues have been reviewed and determined to have no impact:

- Threatened or Endangered species: none in the area where the boilers will be installed.
- Habitat issues: not applicable to the area where the boilers will be installed.
- Wetlands and other protected areas: not applicable to the area where the boilers will be installed.
- Archaeological and historical resources: not applicable, but will be monitored as needed.
- Land development constraints; not applicable, but will be monitored as needed.
- Telecommunications interference: not applicable.
- Aviation considerations: not applicable.
- Visual, aesthetics impacts: these will be considered during system design.

While Haines is home to the Chilkat Bald Eagle Preserve, this protected area is not open for timber sales, so it will have no impact on the acquisition of wood biomass fuel. There is the potential barrier of local environmental group(s) to resist the project based on lack of familiarity with cleaner technology that was developed in the latest generation wood heating systems. We will need to educate the community about the merits of the low-emission, high efficiency systems and their cleaner burning characteristics.

4.4 Proposed New System Costs (Total Estimated Costs and proposed Revenues)

The level of cost information provided will vary according to the phase of funding requested and any previous work the applicant may have done on the project. Applicants must reference the source of their cost data. For example: Applicants Records or Analysis, Industry Standards, Consultant or Manufacturer's estimates.

4.4.1 Project Development Cost

Provide detailed project cost information based on your current knowledge and understanding of the project. Cost information should include the following:

- *Total anticipated project cost, and cost for this phase*
- *Requested grant funding*
- *Applicant matching funds – loans, capital contributions, in-kind*
- *Identification of other funding sources*
- *Projected capital cost of proposed renewable energy system*
- *Projected development cost of proposed renewable energy system*

Total anticipated project cost, through construction, is \$2,090,500 which is further broken down below:

- Cost for Phase I – Reconnaissance estimated at \$39,000.
- Cost for Phase II – Feasibility Study and Concept Design (35%) estimated at \$101,500.
- Initial project development cost for Phases I and II total \$140,500.

Haines Borough is requesting \$120,500 from AEA for this Renewable Energy Fund Grant. We have received a \$10,000 grant from the State's *JumpStart Wood-to-Energy* program that we will apply to this project, and Haines Borough will provide matching funds of \$10,000. The projected capital cost of the proposed renewable energy system is \$1,850,000, with another \$100,000 estimated in additional project development costs to take the concept design to 100%. The total projected development cost is \$240,500. At this time, the Haines Borough requests \$120,500 in funding under AEA's Renewable Energy Fund

grant. Additional development funds will be requested once we have demonstrated that the project is an economically feasible and sustainable project.

4.4.2 Project Operating and Maintenance Costs

Include anticipated O&M costs for new facilities constructed and how these would be funded by the applicant.

- *Total anticipated project cost for this phase*
- *Requested grant funding*

Estimated O&M funding costs are approximately \$3,000 per year, which will be funded by the Haines Borough. The O&M costs are shown in the Simple Cost Worksheets in Attachment F. Costs in this worksheet were derived from consumption data derived from the Haines Borough's vendor invoice records for each building for the 12-month period from September 2007 through August 2008.

4.4.3 Power Purchase/Sale

The power purchase/sale information should include the following:

- *Identification of potential power buyer(s)/customer(s)*
- *Potential power purchase/sales price - at a minimum indicate a price range*
- *Proposed rate of return from grant-funded project*

Not applicable to the proposed wood-fired heat project.

4.4.4 Cost Worksheet

Complete the cost worksheet form which provides summary information that will be considered in evaluating the project.

Download the form, complete it, and submit it as an attachment. Document any conditions or sources your numbers are based on here.

The completed Cost Worksheet is provided in Attachment B. We have also provided three versions of a simple cost worksheet in Attachment F. These estimates use a modest 5%, realistic 8%, and high-end 10% cost escalation to estimate the cost savings for the proposed Haines Borough Biomass District Heat System. Each of these worksheets contains preliminary cost estimates based on projects in other similar locations in Alaska, and uses data generated from the Haines Borough fuel vendor records. The preliminary estimates only to give an idea of the scope of this proposed project.

4.4.5 Business Plan

Discuss your plan for operating the completed project so that it will be sustainable. Include at a minimum proposed business structure(s) and concepts that may be considered.

The capital costs for the system will be covered through this AEA grant, our State of Alaska *JumpStart Wood-to-Energy Grant*, and the Haines Borough's matching funds. The operating costs for this facility will be 100% offset by the savings generated as a result of reducing our consumption of costly diesel fuel. The renewable wood fuel will be significantly less expensive than fuel oil. Sustainability of this project is demonstrated in the Simple Cost worksheets provided in Attachment F. The surrounding Haines State Forest contains a plentiful supply of wood biomass fuel. State forester Roy Josephson has stated that there is plenty of timber available for a wood-heat program. "There's a surplus of wood on the Haines State Forest that could easily provide the volume of wood that would be necessary to heat a building the size of a new school," he said, noting that 74 percent of the forest's annual allowable harvest of 5.88 million board feet, on average, has been uncut during the past 10 years.

A high defect rate makes much of the local timber unusable as saw logs, but utility logs would work in a wood heat project, Josephson said. "A local demand for this type of low-grade wood would provide an avenue for the purchasers of these sales to sell some of their low value logs locally without that added barging costs that adds to their deficit value." There are currently eight businesses providing wood locally in Haines. We are considering our supply options, which may include the use of a contract price adjustment clause to lock in the starting price with a yearly escalation factor linked to the Consumer Price Index.

The Haines Borough Department of Public Works oversees operation of the wood-fired hydronic system. The Haines School District maintenance staff will perform daily stoking and routine maintenance of the system.

4.4.6 Analysis and Recommendations

Provide information about the economic analysis and the proposed project. Discuss your recommendation for additional project development work.

The economic analysis is shown in the Simple Cost Worksheets provided in Attachment F, using inflation factors ranging from very conservative values of fuel oil inflation at 5% to a realistic expectation of 8% and a high inflation rate of 10%. Payback time, taking inflation into account, varies from 10 – 12 years. Wood fuel cost was figured at \$100/green ton, which should be a high value. This appears to be a very viable project, but will be properly evaluated in Phase II, prior to final design.

SECTION 5– PROJECT BENEFIT

Explain the economic and public benefits of your project. Include direct cost savings, and how the people of Alaska will benefit from the project.

The benefits information should include the following:

- *Potential annual fuel displacement (gal and \$) over the lifetime of the evaluated renewable energy project*
- *Anticipated annual revenue (based on i.e. a Proposed Power Purchase Agreement price, RCA tariff, or avoided cost of ownership)*
- *Potential additional annual incentives (i.e. tax credits)*
- *Potential additional annual revenue streams (i.e. green tag sales or other renewable energy subsidies or programs that might be available)*
- *Discuss the non-economic public benefits to Alaskans over the lifetime of the project*

Project benefits are expected to include:

- Estimated annual fuel displacement of 38,340 gallons of fuel oil and savings of up to \$8.5 million over the 30-year project service life of the wood-fired boilers.
- Anticipated annual revenue - Not applicable for this wood heat project.
- Potential additional annual incentives (i.e. tax credits) – Not applicable to this wood heat project.
- Potential additional annual revenue streams (i.e. green tag sales or other renewable energy subsidies or programs that might be available) – Not applicable to this wood heat project.

The non-economic public benefits to Alaskans over the lifetime of the project: This wood biomass project will help Haines Borough achieve greater energy independence from fossil fuels, while stimulating our local economy with jobs and increased business opportunities. This project will be mainly carbon-neutral and will produce heat energy from a local sustained natural resource. Letters of support for this project have been written by the Chilkoot Indian Association and the State of Alaska Division of Forestry. Copies are provided in Attachment I.

SECTION 6 – GRANT BUDGET

Tell us how much your total project costs. Include any investments to date and funding sources, how much is requested in grant funds, and additional investments you will make as an applicant.

Include an estimate of budget costs by tasks using the form - GrantBudget.xls

Provide a narrative summary regarding funding sources and your financial commitment to the project.

The total project costs for Phase I and Phase II is \$140,500. This will define the wood source and estimate costs, and take the system design to a 35% complete plan set. Haines Borough has committed \$7,000 of Borough funds for preparation of this application, which will **not** come out of grant funds. In addition, we have received a State grant of \$10,000 which will be applied to Phase I and Phase II, along with a match of \$10,000 from Borough funds should this grant be awarded. Our proposed grant budget is provided in the required format in Attachment C.

The Haines Borough is committed to this important project and will provide necessary support and resources to ensure the project succeeds.

SECTION 7 – ADDITIONAL DOCUMENTATION AND CERTIFICATION
SUBMIT THE FOLLOWING DOCUMENTS WITH YOUR APPLICATION:

- A. Resumes of Applicant’s Project Manager, key staff, partners, consultants, and suppliers per application form Section 3.1 and 3.4**
- B. Cost Worksheet per application form Section 4.4.4**
- C. Grant Budget Form per application form Section 6.**
- D. An electronic version of the entire application per RFA Section 1.6**
- E. Governing Body Resolution per RFA Section 1.4**

Enclose a copy of the resolution or other formal action taken by the applicant’s governing body or management that:

- authorizes this application for project funding at the match amounts indicated in the application
- authorizes the individual named as point of contact to represent the applicant for purposes of this application
- states the applicant is in compliance with all federal state, and local, laws including existing credit and federal tax obligations.

F. CERTIFICATION

The undersigned certifies that this application for a renewable energy grant is truthful and correct, and that the applicant is in compliance with, and will continue to comply with, all federal and state laws including existing credit and federal tax obligations.

Print Name	Thomas K. Bolen
Signature	
Title	Borough Manager
Date	October 7, 2008