

PEAT FUEL

Hotel McGrath, LLC
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Project Cost:	\$720,000
Funds Requested:	\$570,000
Match Committed:	\$150,000

Abstract

Technical Synopsis:

1. Project description-

Peat Fuel is a 30 year project designed to be a self-sustaining system to produce 3600 tons (60 Billion btu's) of peat pellets per season. A projected retail price of \$300/T (\$17/mbtu) as compared to local fuel oil at \$53/mbtu and wood at \$19/mbtu reduces residential heating cost by 66% as compared to fuel oil and 10% as compared to traditional wood heat. This project can replace 400 cords of wood (a resource becoming ever more depleted) and 25,000 gals. of fuel oil, for space heating in McGrath and four other villages of similar size. At commercialization this project will employ at least six seasonal employees and at least one full time position. The completed system can be relocated to any remote peat resource. Project cost is \$720,000 dollars.

Phase 1, spring 2012, (pilot scale) has a production capacity of 1 ton per hour. This system is operated with small diesel engines. Phase 1 has the main goal of producing 50 tons of pellets that will replace wood and oil heat for 1 year for about 6 thousand square feet of living and equipment storage space. Phase 1 is funded by Hotel McGrath. Phase 2, spring of 2013 will have a design capacity of 2 ton per hour. Phase 2 technology is unique in that a biomass gasifier will provide fuel for a bio/gas driven gen/set. This will power electric motors that operate the system while also providing gas for the bio/gas fired peat drier.

2. Project eligibility-

Producing peat fuel in pellets, briquettes or other forms is not new in the world, but in the U.S. and Alaska it's difficult to find any going operations. A reason might be that you can't compete with gas and oil prices in most of the U.S. In remote Alaska where fuel prices are high and options are few this is not an issue. The technology to produce peat fuel is mostly European, but the process equipment to produce pellets or briquettes is made in the U.S. for producing other products. To my knowledge of nearly 60 years in Alaska I have never seen or heard of a project similar to this one. It is mainly a transfer of technology.

3. Innovation and scientific concept-

Peat pellet fuel provides an improvement in fuel quality over wood and fuel oil. Peat fuel, when burnt in pellet stoves has fewer emissions than either wood or fuel oil. Peat with 80-95% mc is wet harvested, solar dried and thermal dried, reduced in size, pelletized and bagged for consumers. Using a modular system of tundra sleds the entire plant can be moved as production progresses across the peat bog. The peat fuel plant will utilize a peat fired gasifier to run its entire production line, reducing the need to use diesel fuel for equipment. The reclaimed land will be suitable for crop production including grasses for animal feed. Animal feed production can utilize the same system for making peat pellets. The motivation here is that we pay 200% more for shipping animal feed in than it costs to buy. This project can heat ourselves and feed ourselves. This same system can be used to pelletize wood in the winter when the system is not being used for peat production. With one primary product and two optional products the system can be used very efficiently. The system design can be used on any peat resource in remote Alaska.

4. Technology readiness-

Presently there are at least three locations that are operating a peat fuel system; Vancouver, BC and Latvia as well as an operation by Peat Resources Ltd., Ontario and Newfoundland, Canada that supplies peat pellets for power stations. The operation in BC is about the same production size and using a

similar system we are interested in. In past tests I have had pellets made from local peat using two distinctly different types of pellet machines. One machine by California Pellet Mills and the other machine in Anchorage using technology from China. The quality of equipment differs greatly and the end products are physically different but good to excellent quality in both cases. The pilot project will use the lesser quality equipment due to budget constraints. The full scale project will utilize equipment designed for 24/7 operation. All of the equipment to be used has been commercialized and proven to perform its intended function. Our challenge is to adapt the equipment to our local environment and remote location.

Technology Validation and Research Methodology:

Wet harvesting of peat will be accomplished using small scale basic earth moving equipment. Drying peat will utilize a combination of solar/wind and conventional drying equipment. Dried peat will be reduced to appropriate size in a hammer mill. KDS makes a combination drier/hammer mill that will work for our application; although it requires 150kw-175kw (for electric motors), it does not require a heat source for the drying. Micronex has tested the KDS4 pellet mill with similar materials and good success. The KDS4 operating at 4 tons/hr. of pellet production is in the range of equipment we will need for a commercial scale plant. Storage of pellets will be in one ton bulk bags and forty pound bags. Transportation will be carried out in late winter/early spring over an ice road from production site to McGrath. Distribution within McGrath will be delivery on request in bulk or small bags. All equipment used in this project has some history of use and reliability in similar scenarios.

The first phase (pilot scale) will begin this spring in late March or early April. The goal is to produce 50 tons of peat pellets. The equipment that we have available now will need to be moved on site while the ground and river is frozen. Other equipment for phase 1 will be brought over by boat during high water (only time for river access), in early May. Windrowing the live organic layer for the area to be harvested this summer will start while the ground is still frozen, mid-May. This live organic layer will be set aside for possible future reclamation of the area. Early June will start the process of pulling the partially drained and thawed peat away from the old river bank into one or more windrows for solar/wind drying. Each windrow will continue for 2500 feet parallel to the old river bank. This harvested area of 4 feet deep and 30 feet wide equates to about 60,000 tons of dry peat pellets. This operation will test the actual material condition, thawed or frozen and to what depth we can work the exposed river bank. This action also allows us to monitor the frozen peat and determine the extent of thawing in the summer sun so as to have some guideline for future harvesting of thawed peat. The windrowed peat will be worked (tuning it for better sun exposure) a couple of times a week to obtain a moisture content of around 50%. Peat at 50% moisture content is all that is required for firing a biomass dryer for phase 2. Further solar/wind drying tests will be continued to obtain a moisture content of 15%-10% required for feed into the pellet mill. With reasonable weather the solar/wind dried peat should be ready for pelleting by mid-July. Phase 2 will start in late August with the receipt of grant funds. Selected system components will be ordered and transportation will be confirmed in October. Throughout August further ground preparation for the next year will be taking place and harvested peat will be stockpiled for the next spring production run. Beginning in early September we will start to prepare the site for freeze-up. Pellets will be transported by boat from the project site to McGrath in bags. Test runs with the peat pellets will begin in September and run through the winter in two locations heating a total of 6000 square feet.

1. Site and/or Facilities

Peat resources are located 2 miles SW of McGrath on an oxbow of the Kuskokwim River. The depth of peat varies from 3-8 feet as seen along a one mile stretch of the old river bank. A chart of peat core

samples that had been taken in the early 1980's (UofA) shows this depth extending away from the river bank a considerable distance.

The capacity of the pellet production plant is expressed in dry tons per hr. of operation. In this case it will be designed to produce two dry tons per hr. for 120 days during the frost-free season. The two-ton per hour (TPH) system will be capable of supplying the equivalent of 400 cords of firewood and 25,000 gal. of #1 fuel oil, which is approximately the minimum of what McGrath will use on an annual basis. At 2 T/Hr. the system will also supply four other communities of equivalent size or serve as stored resource for possible poor production years. To achieve 2 T/Hr. of processed peat pellets, will require the removal of about 13.5 acres of peat four feet deep (3600T dry) per year. This works out to 405 acres of peat over a thirty-year life span. Considering the peat resource size of approximately 5760 acres, this project will utilize about 7.0% of that available resource. To achieve 2T/hr. will require the equivalent harvest of approximately 160 square feet three foot thick per day (160 cu. yd.).

Project Team Capabilities:

Project Team-

Initially the project will start with five employees with specific roles to include; Project Manager, Financial Manager, Field Supervisor, Operations Manager, Systems Specialist.

James Vanderpool, Project Manager has been doing personal research in peat fuels over the last 25 years. James has developed a thorough understanding of peat fuel development, peat bogs, peat processing equipment, markets, distribution and reclamation of peat lands.

Being an experienced business owner, James understands the business process for commercializing peat fuel. Grant management will be accomplished by James and Tonya.

Tonya V. Vanderpool, Financial Manager with eight years of accounting experience and achieving her CPA license in September 2011 will provide financial direction for the project.

Jeremiah Vanderpool, Field Supervisor benefits the project due to his 10+ years working in the oil fields as a supervisor and experience in directional drilling makes him competent to bring all the project components together to make a functional system.

Zebulon Vanderpool, Operations Manager is an asset to the project though his ability to see and understand, at a design level, how the processes are integrated and the right component for each aspect of plant design is best incorporated. His extensive experience on the oil fields has trained him to work with technical equipment and understand the value of technology related to the peat fuel industry.

Jerad J. Vanderpool, Systems Specialist is tasked with the duties of equipment maintenance and record keeping. His 7 years on the oil fields and experience in the Motor Man position has prepared him for the task of developing and carrying out a maintenance plan for all individual pieces of equipment.

Financing Plan/ Project Match-

Project cost- Phase 1 and Phase 2 total \$720,000

Phase 1- \$50,000 contributed by Hotel McGrath. No grant funds requested for phase 1. In order to operate this summer we need to get Phase1 equipment in place by the 1st of May, this grant will not be available that soon.

Phase 2- \$100,000 In-kind for labor and equipment/supplies.

Peat Fuel

Hotel McGrath, LLC

\$475,000 grant request subtotal
\$ 95,000 20% contingency

\$570,000 Total Grant Request

Phase 2 will start when grant funds are available in August and continue through October 2013.

Commercialization- Market:

Potential Market Defined-

All towns in the Kuskokwim River valley serve as potential customers. In reality we can produce 3600 tons of pellets annually or supply about 720 homes. Those customers closest to the source will be the most logical market.

Potential Market Size-

McGrath has a potential need for 2453 tons annually to replace wood and oil heat. Our system is designed for a maximum of 2 T/hr. Our market size is limited to about 720 homes. The actual potential market size is about 7000 homes in the Kuskokwim valley. Beyond our target market, the annual allowable harvest would have to be studied again.

Potential Public Benefit-

Peat pellet fuel provides a cleaner, more environmentally friendly biomass option than wood. Peat pellets will have a comparable price to wood without depleting our timber resources. Compared to oil we have a local industry, jobs, reliable source of fuel, no environmental contamination issues, carbon neutral and the dollars spent locally stay local for longer. This helps the local economy. Possible less State/Fed. dollars spent on heating subsidies.

Proof of Eligibility:

Hotel McGrath, LLC is a licensed business in the State of Alaska, located in McGrath. All employees in the Peat Fuel Project are natives of Alaska and reside in Alaska.

“By signature on this application, I certify that we are complying and will comply with the amount of matching funds being offered.” _____