



District of Lillooet Recreation Centre Community Biomass Energy Project

What is Biomass?

Biomass is cordwood, wood chips, wood pellets, waste paper and other fibrous agricultural bi-products used as fuel for heat or energy production. It is a renewable, sustainable source of energy that is abundant in British Columbia.

In Lillooet's case we will be taking pelletized wood, burning it in a highly efficient furnace, not unlike a pellet stove seen in many homes throughout Lillooet. Modern pellet boiler systems are highly efficient. Compared to a modern cord wood stove which is rated at approximately 60% efficiency and high efficiency pellet stoves, rated at 80% efficiency, biomass plants can reach upwards of 90 – 93% efficiency, ensuring complete combustion and reducing emissions. The proposed system will produce more heat and fewer emissions per ton of biomass providing Lillooet with a clean & economical source of energy.



Pelletized Wood



Wood Chips



Hog Fuel

Project Details

The **Community Biomass Energy Project** consists of several components:

- Removal of asbestos covered boiler and piping;
- Removal of the old Cleaverbrooks 2.5 MBTU propane fired boiler;
- Redesign of the existing piping and water distribution system;
- Creation of a separate electrical room;
- Installation of a 1.2 MBTU pellet fire biomass furnace;;
- Linking of the existing .75 MBTU viseman propane boiler to the new biomass system as an auxiliary and back up heating system;
- Replacement of arena stands radiant heating system (optional);
- Linking of the Main Core hot water system with the arena hot water system (optional).

The Community Biomass Energy Project will not only replace our inefficient and oversized propane boiler but increase worker safety, remove the remaining asbestos located at the REC Centre, link our secondary boiler with the biomass system ensuring we have a backup heating system and replace other inefficiencies within the facility, saving tax payers thousands of dollars every year.

Emissions

When you look at your neighbor's wood stove and see a plume of smoke rising from the chimney you can only imagine what it is going to look like when a plant that is a 16 times larger is started up in the heart of Lillooet. Thankfully you will never see this kind of exhaust come from a modern biomass system. It is more likely that you will not even know that it is working, other than on the coldest day in winter.

These modern systems are extremely efficient and can not be compared with older wood stoves or the waste wood burner used at mill sites. The modern biomass systems are significantly cleaner for several reasons:

- Unlike woodstoves, there are virtually no visible emissions and odors;
- Modern systems emit far less particulate matter (smoke & ash);
- Pollution-control technologies are used to reduce emissions;
- The moisture content is less than 5% (pellets) compared to upwards of 40% to 50% for hog fuel and cord wood used at home.

This is not to say that there are no emissions generated. There are a number of emissions that come from all fuel sources. For biomass the main emission factors are Sulfur Oxides (SO₂), Nitrogen Oxides (NO_x), Carbon Monoxide (CO), Volatile Organic Compounds (VOCs) and Particulate Matter (PM₁₀). In terms of health impacts from wood combustion, PM₁₀ is of the greatest concern.

PM₁₀ emissions from wood combustion is significantly higher than that of fossil fuels. For this reason a sufficiently high stack is used to ensure effective dispersion of emissions is achieved. In addition, there are technologies now available that can further reduce PM₁₀ emissions. Today's biomass systems output less than 7% of the PM₁₀ emissions from a residential wood stove for the same level of fuel energy input.



Biomass Plant

Since wood burning is carbon neutral, when wood replaces fossil fuels the net impact is that CO2 emissions for heating are reduced by 75% - 90% depending on how much of the fossil fuel use is replaced.

To ensure we are meeting BC air quality standards the District is working with the Ministry of Environment, who will be conducting air modeling to ensure emission distribution and Interior Health to ensure there are no known risks to the health of the community.

Funding

Funding in the amount of \$467,000 from the Union of British Columbia Municipalities (UBCM) under the Gas Tax Agreement General Strategic Priorities Fund (GSPF) and Innovations Fund (IF) was granted to the District of Lillooet. Up to an additional \$147,000 of additional funding will be utilized from the REC Centre Capital Reserves to complete non-eligible costs associated with the modernization of the REC Centre boiler room. In addition, up to \$50,000 is available through the annual Gas Tax funds.

The anticipated cost recovery for the entire project, including the rebuild of the boiler room, is estimated at 2.5 - 3.5 years.



Existing Cleaver Brooks Boiler



Asbestos Covered Hot Water Tank



Containerized Biomass System

Benefits

For Lillooet the incorporation of a biomass energy system at the REC Centre is the right move.

Not only is the project funded almost entirely through a provincial grant, anticipated savings for Lillooet are estimated at, conservatively, \$30,000 - \$50,000 annually. In 2008, the REC Centre used over \$74,000 in propane, in 2009 this increased to almost \$80,000 and in 2010 we are forecasting propane costs to increase to upwards of \$85,000.

In today's market pellets are being sold for \$150 - \$200 per tone. With an estimated consumption of 50 - 75 tons annually the total cost for pellets is estimated at \$7,500 - \$15,000.

With ever increasing propane costs, switching to a wood fired biomass system is the right move. Although we will not eliminate all of the propane usage at the REC Centre, the incorporation of a biomass system will reduce our consumption by upwards of 50% - 75% annually. With over \$2,000,000 worth of anticipated work required at the REC Centre these savings are essential. The savings realized from this project will help the REC Centre build up its reserves for the next series of recreation infrastructure grants allowing Lillooet to leverage its reserves and complete needed repairs and upgrades to the facility in the near future.

Examples of Biomass in North America

In 2009, there are seven biomass plants that provide heat for public facilities. The City of Revelstoke which provides heat to all of their public buildings and some residential complexes; Baldy Hueghs and UNBC in Prince George, which provide heating to their rehab facilities and educational buildings, and Nakusp and Nazko which provide heat to the local elementary and secondary schools. Aside from Lillooet, Smithers is also looking at switching over to biomass to provide heat for their recreation facilities.

Aside from public systems there are many private systems through BC and North America. There are abundant case studies on biomass systems available through the Biomass Energy Resource Centre for individuals interested in examples of biomass systems.

Maintenance

Currently the District of Lillooet spends upwards of \$7,000 annually on the upkeep and servicing of our main 2.5 MBTU propane boiler. With the switch over to the new system, contractor maintenance will be significantly reduced.

Modern biomass systems require minimal oversight and maintenance. Manufacturers suggest approximately 15 - 30 minutes of oversight is required each week to ensure the system is working to its peak efficiencies. This time will be easily incorporated into our current maintenance schedule and have no additional cost to the REC Centre.

Semi-annual cleaning and maintenance is also completed, not unlike what is required with our current boiler systems. Servicing of our current Cleaverbrooks boiler requires semi-annual certification and examination above and beyond the annual repairs undertaken. The current cost of servicing the Cleaverbrooks boiler will simply shift to the biomass system and have no additional increase in costs to the REC Centre.