

Expression of Interest – Biomass Industry

Business Operations:

1. Please describe your business's operations. Is your business capable of providing?
 - a. supply & delivery of fuel for biomass heating systems? Please provide details including type (chips, pellets, cord, etc.), material (beetle kill, fire kill, green wood, etc.).

Yukon Wood Products Association has the following capacity.

Yukon's largest logging company currently produces 10,000 cords or 22,000m³ of firewood per year. In addition this company estimates that producing 20,000 cords of firewood is possible over the next five years. As noted previously there is an estimated 2,500 tonnes' of wood waste that can be chipped for biomass boilers. There is an additional 12,000 tons of logging waste and residue stock piled that will soon be burned because of regulatory requirements reduce fire risk in the bush. This highlights the need for more wood chip boilers in the Yukon, to date there are only 2.

this company also owns two 20 tonne walking floor trailers capable of delivering 80 tons of wood chips to the Whitehorse market each day. In addition to this the company owns an 8 tonne covered delivery truck with dump and ram capacity.

All of the timber described above is generated from spruce bark beetle damaged forests. As the industry expands more demand will necessitate the harvesting of green timber for fuel. This timber will require air drying and there is a research paper on the YWPA website that provides information on how this part of the timber supply will be managed for the production of wood chips.

Please refer back to the tables outlined in the cover letter. In the tables it is clear that the number of companies already producing biomass is large and the capacity of these companies is growing.

This company owns a whole tree grinder and large chip screen that can produce 30 tonne's of wood chips per hour. A 100 kWh biomass boiler uses a nominal 50 tonne's of chips a year.

- b. maintenance services to ensure compliance to standards for biomass heating systems (hopper, feeding system, boiler)?

YWPA lists 5 companies that can and do supply biomass boilers. this sector includes wood chip boilers and cordwood gasification boilers. Three are located in Yukon and two are located in BC.

please refer to the YWPA website for the members contact information. each of these companies has a website and their products are found on them.

<https://www.yukonwoodproducts.org/>

2 members sell gasification cordwood boilers rated at about 75 kWh

4 members sell wood chip boilers that range in size from 50 kWh to a megawatt depending on the dealer and manufacturing company they work with.

these companies have professionals and red sealed trades working for them and have installed boilers in both Canada and the USA. please feel free to contact each of them for their information.

there are two companies located in Yukon that provide supply chain services from the stump to heat in the building. One is a combined heat and power distributor who will sell both heat and electricity to the consumer. one is a heat supply company that does not sell electricity.

there is a development corporation located in one of the communities that supplies heat for buildings it either owns or operates on behalf of the local First Nations government. this operation receives logs then chips them for delivery to the biomass boilers for consumption. this system is a stump to heat in the building operation.

- o How many full time technicians can conduct this work?

YWPA estimates that there are approximately 20 skilled trades that conduct this work. many of them reside outside Yukon with the members located in BC.

- What are their qualifications?

there are electricians, pipe fitters, steam engineers, hvac technicians and hydronic heat technicians

2. What would be the minimum length of contract your company would require?

the YWPA membership can provide the entire supply chain for biomass boilers.

the range of services include:

Firewood, wood chips, delivery of wood chips, systems design and engineering, biomass heat systems appropriate to the building, installation, commissioning, operation and maintenance of the system once installed.

if you add in the non-members there are 53 licensee listed as commercial operators at Forest management branch. only one private sector operation has the capacity to produce the chip fuel for boilers Whitehorse region. The machinery required to produce chips is expensive and the market will not support more than one private sector chip producer at this time. when more boilers are installed others may enter the market.

there are only two private sector companies in the Yukon that offer heat sales options. they are located in Watson Lake and Whitehorse and will likely operate within their local market in the near term. there may be others who will express interest in this model but it is uncertain if they will locate in the Yukon until the economies of scale justify expansion beyond installations. it would be advisable to contact each company listed in the members section of the YWPA website for specifics on this question.

3. What other products or services can your company currently provide?

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4. How much **logs** (cords) can your company provide for wood boilers in commercial buildings in a year?

The wood products industry in Yukon is in the biomass energy production business. Of the 18,029m³ of commercial harvest less than ten percent of this timber was harvested for sawmilling. This amounts to approximately 16,226m³ or 7,375 cords of firewood harvest by commercial operators. In addition to this harvesting there are 1,193 permits issued to individuals for harvesting. The vast majority of these permits are for firewood. If you assume 5 cords of wood per permit this amounts to an additional 5,965 cords of firewood harvested. The total of commercial and personal permits comes 22,191 cords or 48,820m³ of firewood. It is not commonly understood that cordwood is biomass. There is a significant and growing biomass industry operating in the Yukon right now. Progressive members of the commercial fuelwood sector are looking to expand their market base by expanding into the wood chip supply business. What is missing is the customer base for biomass boiler systems that utilize wood chips for fuel.

It must be kept in mind that in addition to this level of harvesting there is actually an additional 15 to 25% volume being left in the bush. This volume is not accounted for as it is waste that accumulates as a normal part of harvesting operations. Waste and residue generated from logging and wood cutting operations is in the form of small diameter tops, broken chunks and branches. This material is ideal for chipping into fuel for biomass boiler systems.

a. Are there permit-related issues that may restrict your company's capacity to provide sufficient fuel for commercial buildings?

not that YWPA is aware of.

b. Is this expected to change in the next 5 years?

no if anything it will improve and greater volumes will be made available.

5. How much **wood pellets** (tonne's) can your company provide for wood boilers in commercial buildings in a year?

there are no wood pellet producers in the Yukon. if wood pellets were to be used they would have to be imported in the same way that fossil fuels are. The closest pellet mill to the Yukon in Smithers BC.

YWPA does not support the installation of wood pellet boilers.

BC produces in excess of 1.6 million tonne's of wood pellets a year. the vast majority of these pellets are exported to Europe and Asia to offset coal fired electrical generation. This raises the question; why are the provinces that produce this renewable carbon neutral energy not utilizing it where it is produces?

a. Are there permit-related issues that may restrict your company's capacity to provide sufficient fuel for commercial buildings?

not at this time

b. Is this expected to change in the next 5 years?

No

6. How much **wood chips** (tonne's) can your company provide for wood boilers in commercial buildings in a year?

see the discussion above. the timber resource is available and the capacity to produce chips will exceed the capacity of boilers to consume them all for a long time. YWPA members have stated that we already have enough biomass available to supply fuel for 250 100 kWh boilers.

in addition to the current wood producers there are sources of wood fiber that have not been discussed.

they include:

fuel abatement biomass for fire hazard risk mitigation

agricultural land clearing

subdivision clearing

highways rights of way and gravel pits

power lines and utilities

the amount of biomass harvested and currently burned or wasted likely surpasses the total harvesting being done by commercial and personal firewood cutters.

a. Are there permit-related issues that may restrict your company's capacity to provide sufficient fuel for commercial buildings?

for loggers wanting to build their logging capacity there is a problem with lack of access to long term forest harvesting tenures. these tenures can be used as security to finance purchase of logging equipment

b. Is this expected to change in the next 5 years?

there is some hope that longer term timber harvesting tenure will become available to logging operations.

c. Fuel Qualifications

7. Can your business provide wood products that are certified to the [standards established by NRCAN \(CAN/CSA-ISO 17225\)](#)? If so, please specify type of wood product and what grade would they be certified to:

a. Moisture content, ash content, particle sizes, etc.

Yes, the wood chip produced by YWPA members are currently being burned in all of the biomass boilers installed in the Yukon.

all chips meet or exceed the boiler manufacture's minimum size; shape and moisture content (9.5%). with screening oversize pieces are removed from the chips and auger jams are eliminated.

b. If not currently able, is certification something that your business could comply with in the future?

this is not an issue the capacity it present in all corners of the Yukon to produce high quality biomass fuel

8. How does your company assure consistent quality in your product?

for the purchasers of chips they know their minimum requirements for chip fuel and if the supplier does not meet the predetermined standard for chips they can refuse delivery or not pay for them. this is managed through the purchase agreement.

YWPA recommends that buyers and sellers of chips have a purchase agreement that specifies moisture content, maximum size of wood chips, what percent of fines in the load are acceptable, rules on oversized pieces and rules with respect to no contaminants such as soil, rocks, metal etc

the purchaser must do quality control and if the load is not meeting contract specifications then the load is rejected or sold at a reduced price. it won't be long and the chip seller will improve quality.

a. How often is this monitored and documented?

depends upon the purchase agreement. this can be done for every load or on random spot check basis. documentation is up the buyer.

9. What would be the required lead time for the production of wood fuel required to heat a small, medium, and large commercial building for one year?

the largest logger in the Yukon is currently building a storage facility at his property. delivery times will vary depending on the amount and season. if you were to order 20 tonne's of chips today you could expect delivery within 48 hours.

Other Questions

10. HPW is interested in heat purchasing pricing models (i.e.: rate of heat energy generated) instead of by tonnage to avoid paying for poor quality fuel. Are there any concerns with this rate structure?

a heat sales agreement is just that. you would only be purchasing heat. the quality of the fuel would not be your concern. The heat sales company will ensure the fuel they purchase is the best quality possible. If the moisture content is high the boiler still produces heat it is simply not as efficient. This means the heat sale company is not optimizing boilers efficiency. This would have a direct effect on the revenue stream and the heat sales company will rectify the problem.

As discussed above the chip purchase agreement should have quality control standards and penalties for poor quality fuels built in. The simplest model is to set the fuel standard based upon the boiler manufactures specifications for size, moisture and %fines. By testing loads of fuel as they arrive the operator of the boiler will be able to accept the load, reject the load or pay a reduce rate per tonne.

Calculating the heat value of a dry chip as compared to a wet chip is a necessarily complicated math exercise. The load either meets the specifications for moisture or it doesn't.

11. Which community(s) can you provide services to?

YWPA members with chippers are located in Dawson, Watson Lake Teslin, Whitehorse and Haines Junction. these locations can deliver chips to almost every community except Old Crow

12. What should Government of Yukon consider when selecting the types of hardware? (hopper, feed system, boiler) to reduce operational risks and maintenance?

As mentioned in the cover letter there are engineering companies and independent engineers that are committed to designing biomass systems. In addition to them there are four members that have dealership rights for four different biomass systems. All of them are proven technology. This distribution, installation companies have all designed and installed systems in western Canada and Alaska. They can provide YG with a lot of good information with regard to the best system for the application. The engineers, boiler sales and installation companies would work together to ensure the same reliability that YG currently experiences with fossil fuel systems.

a. What types of hardware are your products and services limited to?

four distribution and installation companies are members of YWPA

ACS Mechanical, Whitehorse use Hargassner boilers from Austria

Biomass North, Watson Lake use Volter a Finnish combined heat and power unit

Fink Machine, Enderby BC use Viesman boilers from Germany

Ventek Energy Systems, Kamloops BC use Ekogen Oy from Finland

For greater detail each of these systems can be found on line

13. Please also provide any suggestions you may have that may help HPW develop standardized requirements for biomass systems.

Talk directly to the logging companies and others who may be in the upstream harvesting and wood manufacturing business.

There are two established mid-stream firewood processing companies that have the capacity to purchase wood from various sources including firewood cutters and fuel management contractors. If the market grows to its potential these mid-stream companies may invest in chippers, chip storage and chip delivery trucks.

There are two Yukon based and two BC based downstream energy biomass systems sales companies currently interested in expanding their business in the Yukon. They need opportunities to provide systems to the largest purchaser of heat in the Yukon. That is the property management branch.

By talking directly to these companies they would be more than pleased to educate your organization with regard to the capacity of the industry to meet heating needs for buildings.

The key is to keep the process for installing and managing biomass systems simple. They are more hands on than fossil fuel systems this does not mean they are unreliable. There are thousands of biomass boilers installed and operating across Europe and North America. By installing biomass systems the economic loss of revenue to the USA through imported fossil fuels is diverted to made in the Yukon heating solutions. This results in wealth creation right here. By converting to biomass heat two industries will be created; logging and sawmilling and biomass heat trades. In addition to this biomass is carbon neutral and renewable energy that can be consumed within 200 kilometers of where it is produced. The "200 km energy diet".