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Project: Retail Fuel Wood: A Supporting Document for Business Planning

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Model Forest of Newfoundland and Labrador

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Introduction

Wood as a fuel for heating and cooking has a long history in Canada and all around the world, and is one of the oldest forest based commodities. The information presented in this document is intended to aid in the development of a mechanized retail fuel wood processing facility in Western Newfoundland. The information presented has outlines the North American fuel wood industry, with emphasis on the local conditions. Fuel wood in this document refers to solid wood cut and processed to specified requirements and burned as a fuel for heating, cooking or recreational purposes. This document will deal with fuel wood processing post harvest and delivery to a designated processing yard (i.e. it will not cover issues regarding the harvest of the raw material). It will outline the common equipment used in fuel wood processing, and it will discuss some of the potential constraints associated with the industry.

The Fuel Wood Industry

Wood energy has been a significant source of energy since colonial times (EIA, 2001). In general there has been a decline in fuel wood burning due to the intense labour and mess associated with wood and due to the availability of more *convenient* energy sources such as electricity, natural gas and fuel oil. However, with increasing costs associated with fossil fuels, the incentives for burning wood have increased (Pneumatics, 2002). Throughout the United States, Canada and locally, fuel wood is sold to consumers largely by individuals selling on a small scale for supplementary income but also by commercial operations that produce fuel wood at a large scale capacity. Due to the unregulated and largely undocumented nature of the small scale *pickup truck* load type sales, it is hard to get a true estimate of the size and value of the fuel wood market. Many private, small scale sales are undocumented by the seller and the measurements are often unverified. Prices are variable in these sales and the quality of the product highly variable. Often the raw materials used for fuel wood are derived from logging residues or low quality timber from forest operations, waste from saw milling operations or

from underutilized tree species are harvested specifically for fuel wood production (e.g. white birch (*Betula papyrifera*) in Newfoundland).

United States

In the United States the use of wood as a main heat source has declined. This is primarily due to the newer, less labour intensive heat sources that are available. However there is a relationship between fossil fuel prices and the popularity of burning wood as a heat source. In 2002 it was estimated that 46 million cubic metres (m³) of fuel wood was consumed in the United States. It is estimated that 1 in 5 households burn wood for either primary heating or aesthetic enjoyment. In 2007, 1.5 million households in the US used wood as their *main* heating source (EIA, 2008). With the recent increase in fossil fuel prices the demand for fuel wood has increased and some suppliers have not been able to keep up with the demand. Many fuel wood merchants listed out of stock products on their websites at the time of research. Prices from official fuel wood retailers ranged from \$45/m³ to \$150/m³ US for bulk fuel wood. The prices are highly dependent on the location and the specific product. Many fuel wood processors cater to the bagged wood market and sell their products as wholesale items.

Canada

According to the Canadian Office of Energy Efficiency, 2.4 million households have a wood burning appliance, with 1.7 million households burning wood as a primary heat source (OEE, 2008). Markets are strong for fuel wood retailers; many suppliers are unable to meet the demand for fuel wood especially as fossil fuel prices increase. Many businesses report a healthy demand for fuel wood; for example, the market is doing extremely well in parts of Ontario. According to Leo Hall, manager of Opeongo Forestry Service, the potential for growth in the firewood market is unlimited. Wade Knight, the executive director for the Ontario Woodlot Association stated that the demand for fuel wood in some parts of Eastern Ontario is so high that customers have to sign up on a waiting list to purchase wood (Cadera, 2008).

According to the Renewable Energy in Canada Status Report, an impediment to fuel wood usage is the lack of large fuel wood suppliers, and also that the industry in Canada is not resource constrained; therefore opportunity for growth in the industry exists. The prices for fuel wood in Canada are quite variable; prices as high as \$350/1 m³ were noted, but on average the current price is approximately \$83/m³. As in the United States, prices are highly dependent on geographic location.

Newfoundland and Labrador

Domestic wood harvesting for fuel wood and saw logs has been an important part of the subsistence tradition in Newfoundland since settlement (Saunders, 2003). The concentration of residential homes burning wood in Canada is highest in Atlantic Canada, especially in Newfoundland and Labrador (Pneumaticos, 2002). A survey conducted in 2001 estimated that 44% of households in Newfoundland and Labrador use wood for heating. This translates into approximately 439 000 m³ of timber going into the fuel wood industry (DNR, 2003). While many people go out and harvest fuel for themselves, there are consumers who do not want to go through the labourious task of harvesting and processing their own fuel and are willing to pay for wood.

The province of Newfoundland and Labrador released a *Provincial Sustainable Forest Management strategy* in 2003 and recognized that there was an opportunity to supply fuel wood processing facilities with underutilized or low quality materials through the establishment of pilot wood sorting yards. This would not only create a source for fuel wood, but create jobs and distribute benefits from the forest to other smaller scale activities (DNR, 2003). Local harvesting contractors, specifically those with commercial harvesting licenses are also a potential source of raw materials for fuel wood production. Despite potential competition with other industries such as wood pellet, pulp wood, and saw log production, there will still be material that does not meet quality specifications and therefore, be available for fuel wood production (Pilgrim, 2010). A local contractor already sees a demand for fuel wood, and he

currently sells wood as unprocessed logs in 2.5 metre (m) lengths for approximately \$28/m³. By further processing the wood it could increase the sale price of the fuel wood significantly. It was difficult to determine the actual market value of fuel wood in Newfoundland due the numerous private sellers selling at different and unregulated volumes. One company, Newfoundland Firewood caters to the bagged fuel wood market selling wholesale to parks and box stores. The majority of sellers are selling by the pickup truck load and the price ranged from \$65 per load for green mixed wood (softwood/hardwood) to \$85-\$100 per pickup truck load for seasoned products. A pickup load can range in capacity from .70 -1.5 m³, but is rarely specified when fuel wood is being sold. A quote from Central Newfoundland was for \$83/m³ for pure seasoned birch.

In the case of a Western Newfoundland processing facility the key market would be a local market where local consumers would come to a central distribution yard, purchase and pickup their firewood. Pallets can be loaded on trucks or trailers removing the need to hand load the wood. This also ensures that the volumes of wood sold are uniform. Single deliveries can be offered for additional fees to consumers however this would add significant overhead costs to the operation (truck, fuel, labour etc...). Wholesale bulk fuel wood sales to larger markets can also be developed throughout Western Newfoundland.

Recommended Equipment

Traditionally fuel wood has been processed using an extremely labour intensive method of manually cutting each piece of firewood with a chainsaw and then splitting with a splitting device such as axes, wedges and in some cases with small splitting machines followed by moving the wood to a desired location, stacking and seasoning the wood for at least one year. There are several tools that can increase productivity and reduce the bulk of intensive labour associated with the traditional method of processing fuel wood. For retail fuel wood processing operations productivity is important to keeping up with supply demands. The key tools for

boosting productivity include mechanized fuel wood processors, drying kilns and pallet wrapping machines.

A mechanized fuel wood processor accepts full length logs and can cut them to a desired length and split the junked wood to a variety of sizes based on preference. These machines significantly increases productivity to fuel wood processing with some higher end models (e.g. Multitek 3040XP2) processing up to 19 m³ of processed fuel wood per hour. However, high productivity is associated with high purchase costs (Lindroos, 2008). A midrange fuel wood processor such as the Multitek 2025LDCS has a base price of \$75,000 US.

A drying kiln is used to dry fuel wood to a moisture content that is optimal for burning in wood heating appliances. The desired moisture content is below 20%. The drying kiln removes the wait for the traditional method of seasoning fuel wood. Fuel wood dries slowly and may take more than a full year to properly season (CMHC, 2008). A kiln can reduce the drying time from over a year to just a few days. This will obviously allow for quicker processing and turnover of processed wood. Drying kilns also remove insects and other pests from fuel wood. This is beneficial for several reasons: It reduces the potential for insects, mold and mildew from entering the homes of consumers; it prevents the spread of invasive insect species from one geographical location to another; it can open up markets for exporting processed wood; the wood burns cleaner, longer and with higher BTU output. Once again adding this valuable tool to a processing operation has a significant purchasing cost. A kiln with a capacity of 50 m³ has an approximate price tag of \$28,500 US (e.g. Global Energy Firewood Kilns).

A mechanized pallet wrapping machine will create an end product that is neat and easy to ship with a premeasured volume. It would allow processed wood to be measured, stacked and stored in inventory on a pallet in an efficient manner. When the pallet of fuel wood is purchased it is simply loaded onto a trailer or truck and brought to a delivery point, or picked up by consumers. A wrapping machine allows for efficient and secure packaging of the end

product. The cost of a mid range pallet wrapping machine is approximately \$12,000 US (Phoenix Models).

Other equipment that would be beneficial to a fuel wood operation but are not used exclusively for such an operation include delivery vehicles (if delivery service is offered), and a small front end loader capable of moving loaded pallets and logs.

Constraints

There are some constraints associated with retail fuel wood processing facilities. The constraints identified for establishing and maintaining a fuel wood processing facility are the source of raw materials, competition with upcoming bioenergy technologies, emissions standards and transportation distances to markets.

While there is an abundance of forest resource in Canada, finding a reliable source of raw material is a common recurring issue with many fuel wood processors. In Newfoundland and Labrador any wood purchased (unprocessed) would have to come from commercial operations unless it is coming from private land. Materials that could come from commercial operations include low quality logs not suitable for saw logs, pulp wood and in some cases for pellet production. Raw material may also be obtained as waste from saw milling operations. Domestic cutting permits on crown land and on Corner Brook Pulp and Paper Limited limits are only for personal use and the wood cannot be resold or bartered. A commercial timber purchase license is required for the purchase or acquisition of crown timber for the purpose of reselling. Many fuel wood processors believe it is necessary to secure multiple sources for raw material to ensure they can keep up with demand.

The fuel wood industry may end up in competition with upcoming bioenergy technologies such as wood pellet production. It may be in competition on 2 fronts; for the availability of raw materials and for a share in the market place. As the pellet industry grows there will be a higher

demand for raw materials for production. While there are different quality specifications (e.g. domestic pellets require higher quality raw materials) for each of the products, overlap may still occur. In the market pellet stoves tend to be cleaner and less labour intensive to use. This may appeal to new consumers, and even current wood burning consumers.

New by-laws and regulations enforcing emissions standards may deter consumers from investing in wood burning appliances, or upgrading their current burners. Many jurisdictions have implemented emissions standards with regards to wood burning appliances including Newfoundland and Labrador. Some jurisdictions have even outright banned the use of wood burning appliances. In Newfoundland and Labrador all new residential wood burning appliances must be US EPA (Environmental Protection Agency) or CSA B415.1 certified.

Transportation costs are a limiting factor for fuel wood retailers. Distance to the processing facility from the source and delivery distances to the market place have a direct impact on the profitability of the operation. The consumer can be charged for delivery but there is a limit to how much consumers will pay for the product. A local domestic pick up yard with bulk transport to larger markets tend to be more profitable.

Conclusion

Given the history of fuel wood usage and the anticipated increase in fossil fuel prices in the future it would be expected that the demand for wood as an energy source will at least be maintained and likely increase. In Canada there is an unrestricted source of raw material to maintain and grow a fuel wood industry. With an investment into processing equipment, a small scale fuel wood operation can add significant value and capacity to its operations.

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