STRATEGIC ANALYSIS OF A PELLET FUEL OPPORTUNITY IN NORTHWEST BRITISH COLUMBIA

by

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ABSTRACT

The Haisla Business and Development Corporation (HBDC) is in the process of being incorporated. Its purpose is to create independence for the Haisla people by generating wealth and developing their people. The HBDC has access to many natural resources and has many opportunities to develop those resources to achieve their goals.

This project will evaluate the feasibility of building and operating a wood fuel pellet plant as one means to achieve early success for the HBDC. An industry analysis will provide an overview of the dynamics of the industry, including its attractiveness. The resources and expectations of the HBDC will be reviewed to ensure appropriate strategic decisions are aligned. Finally, the pellet plant opportunity is analysed through a detailed market analysis, a competitive position overview, and a detailed financial analysis. Finally, a recommendation is made based on the feasibility and the fit with HBDC objectives.

EXECUTIVE SUMMARY

A wood fuel pellet plant would be a natural ecological choice to supplement a logging operation that may produce a significant amount of waste wood and bark. The goal of this project is to provide details about the wood pellet industry and evaluate the feasibility and strategic fit of this opportunity with the HBDC goals.

The wood pellet industry is a relatively young industry and still experiencing rapid growth, mostly in Europe. The industry is reasonably attractive, especially since the demand for pellets is much greater than the supply. Wood pellets are becoming a recognised player in energy markets and have been displacing fossil fuels, for cost and environmental reasons.

The profitability of the wood pellet industry is largely dependent on the availability of low cost wood wastes, low utility costs, and economical methods of getting the pellets to market. British Columbia has plenty of cheap raw materials and utility prices for natural gas and power are relatively low. While transportation to market is a significant expense, high profits are still available to those who position their operations near low cost feedstock and port access. Although the HBDC logging operation will not provide adequate feedstock for an economic pellet plant, and their feedstock is likely unsuitable for pellet production due to its contact with salt water, there is expected to be an adequate source in Terrace. Due to the much higher cost to ship feedstock than pellets, a significant financial advantage exists to build in Terrace rather than Kitimat.

This opportunity is feasible financially either in Kitimat or Terrace. While Kitimat would be the ideal site when combined with options to use heat from Alcan, as well as utilise their

wharf, this scenario is dependent on many prerequisites, which cannot be determined at this point. Should that option prove infeasible, a Terrace site is recommended as the most profitable and least risky. While the Terrace option may not provide as much opportunity for employment, it does provide adequate opportunity for employment as well as a high rate of return. It is recommended that an 8 tonne per hour plant be built as a joint venture with an experienced pellet producer.

DEDICATION

To my wife Charlotte.

Thank you for the encouragement and support you have shown. I am very blessed to have you as a partner and I thank God for putting us together.

ACKNOWLEDGEMENTS

I would like to thank Alcan and Simon Fraser University for making this opportunity possible. I would also like to thank Steve Wilson and the Haisla Business and Development Corporation for allowing me to be a part of their business plan, and for all the time and information your staff supplied to me.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

GLOSSARY

CHP	Combined heating and power plant
HBDC	Haisla Business and Development Corporation
Hemaas	Haisla Hereditary Chiefs
Hembal	A profile of wood containing predominately hemlock and balsam species
KVC	Kitamaat Village Council, the governing body of the Haisla First Nation
Nuyem	Haisla law that was passed down orally from generation to generation

1 INTRODUCTION

1.1 Problem Statement

The Haisla Business and Development Corporation (HBDC) exists to create wealth and independence for the Haisla Nation. The HBDC owns the rights to some forest resources located in and around their territories, and have an interest in the possibility of utilising those resources to make wood fuel pellets. This paper will do a strategic evaluation of the wood pellet industry, an internal analysis of the HBDC, a financial analysis of the opportunity of getting into the pellet business, and offer a recommendation.

1.2 The Haisla Nation

The Haisla are a First Nation people who have lived in the Douglas Channel area of British Columbia from time immemorial. The Haisla have about 1500 members, about 700 of whom live in Kitamaat Village and they are governed by the Kitamaat Village Council (KVC). Most Haisla carry on traditional activities of hunting, fishing, berry picking and gathering, but these activities are no longer a primary source of income. They are experts at making white grease from oolichan, a fish that runs in the spring. The Haisla have been traders along the Pacific coast, and their oolichan grease was traded for other goods. The declining availability of fish and the tainting of the oolichan by local industry is having a visible economic effect on the nation.

Land is divided into watershed areas called wa'wais and ownership of these has been passed from generation to generation. Ownership included absolute authority over the use of the

land, but did not allow transfer outside of the clan. The owner was able to confer the "right to use" privilege to another for a period of time. Land transfers happened in public ceremonies with witnesses. Although the Haisla traditionally occupied about 4 million acres, the Canadian Federal government set aside 1640 acres for them in 1890. While many other provinces have negotiated treaty settlements with First Nations, British Columbia has been slow to do that. Recent court decisions have been supporting aboriginal rights and title claims, providing compensation to First Nations affected by development on their land by others.

The Haisla traditional rule for behaviour and conduct is called nuyem. It provides guidance for behaviour in all situations and has been passed down orally. It defines obligations to self, others, land and other living things. One specific rule is to know the land and the natural world and be good stewards of it. There is concern among some of the people that their heritage is disappearing. Many of the new generation do not even speak the language. The residential school experience was very disruptive to the cultural transmission of the nuyem. Even prior to the residential schools, missionaries affected the Haisla negatively, discouraging the use of their language and influencing them with capitalistic principals. Governments also were a negative influence by encouraging a welfare lifestyle. Today, the Haisla live with high unemployment in close proximity to a wealthy industrial town that has contributed to declining state of the natural resources on which the Haisla depend.

1.3 The Haisla Business and Development Corporation

The HBDC is in the process of being incorporated, and its key goal is to achieve financial independence for the Haisla nation. It is different from many other First Nation governments and businesses in that it separates business and politics. The KVC has no say, control or connection to the day-to-day operations of the HBDC. This allows the HBDC to act independently using experienced leaders from the business world, aided by Haisla Hereditary Chief appointees. These

appointees cannot be councillors. The Haisla are developing business partnerships with Alcan, West Fraser Timber, Triumph Timber, Delta Research and others. A business relationship with Brinkman & Associates has been developed to address opportunities derived from the signing of a forest and range agreement with the government of British Columbia in 2004. They are also working on training and development programs with Simon Fraser University and Skeena Native Development Society.

1.3.1 Ownership

There are 1000 shares held in trust. One share is a general partnership and is owned by the HBCD. The remaining 999 shares are a limited partnership and are owned by the Kitimat Village Council (KVC) in consideration of $1.5 million that was injected as start-up capital. This arrangement allows 99.9% of earnings to flow to the KVC tax free, while .1% is taxable in the hands of HBDC. It also protects the KVC by putting all the liability on the HBDC.

1.3.2 Control

The HBDC will have a Board of Directors consisting of 9 people, appointed by the KVC. Five of them are recognised as successful business leaders, with the requirement that one must be from the financial sector. The current board members from business include Milton Wong, Don Calder, Mauro Vascerra, Tom Olsen, and Gail Murray (Royal Bank of Canada). The other 4 will be appointed by the Haisla Hereditary Chiefs (Hemaas), and will include one representative from each clan. Each representative appointed by the Hemaas is selected from those who will be future clan leaders. The board will elect a president and chairman and vice president from the board membership.

The management team will be led by a Chief Executive Officer (CEO) who will be appointed by the Board of Directors by competition. The HBDC will take over current joint

ventures currently managed by the KVC and will be empowered to pursue opportunities that meet their goals through a combination of structures, including developing their own business opportunities, joint ventures, agency ventures, and investments in other business ventures.

1.3.3 Strategy

The strategy of the HBDC is centred on three key goals. The first, like most businesses, is related to profitability. This goal is about high returns, but even more about the long-term sustainability of the organisation in order to achieve its other two key goals. The second key goal is to develop the independence of the Haisla Nation through pursuit of employment opportunities, capacity development, and training and development. The third key goal of the HBDC is to preserve the environment respect nature through ecologically sensitive operations.

Strategy is about making long term resource decisions that lead to achieved objectives and a sustainable competitive advantage. The HBDC is not yet incorporated and its strategy is still being developed. The HBDC has access to certain natural resources that it wishes to develop to achieve its three key objectives. The Haisla also have a competitive advantage over traditional businesses seeking to do business within the Haisla traditional territory. No development can occur in these areas without consultation with the Haisla. Third party development in the past often restricted the Haisla from full use of their traditional land. The courts have been examining this situation in the past 15 years, and are starting to turn things around. Now third party developers are required to consult with the Haisla on Aboriginal Rights and Title issues. This presents the Haisla with an opportunity to impact development, as well as to secure compensation for rights and title infringements. The HBDC strategy will focus on a wide variety of natural resource opportunities geographically located in their territories. The great variety of the natural resources will dictate a strategy of diversity, including many products going to many markets. Superior results in an operation often depend on a high level of expertise in that operation and a

specific strategy for that product that requires specific expertise to attain competitive advantages. History has shown that few companies are able to produce high returns with broad portfolios of their own. The HBDC strategy will be to continue to engage in joint ventures that will allow access to capital, markets, experience, and human resources to build stability and business acumen for future opportunities. In this way, the HBDC will partner with successful businesses that have their own success strategies, and will invest natural resources and capital so both parties can prosper.

The HBDC will begin by taking over a number of ventures and opportunities with which the KVC is currently involved. These include buying commercial salmon, roe exports, fish processing, shellfish aqua-culture, and an intention to take over fish hatchery operations. In the forestry sector, joint ventures are being developed with Brinkman and Associates, and may include a sawmill and wood pellet plant. In the area of finance, funding for business opportunities by individual Haisla members has been arranged from several sources by the HBDC. In the area of tourism, the development of a high-end destination lodge looks promising. Other opportunities exist to provide procurement services for local industry, and also develop a shipping agency. All joint ventures will be structured to include opportunities for Haisla people in the form of employment and training and development. The list of opportunities is extensive, and each will require evaluation to determine if, when, and how each will be developed.

To date, the existing ventures have not been a direct source of revenue for the KVC, but have contributed indirectly through employment for the Haisla, which increases available funds. The HBDC will evaluate all opportunities and invest in the most promising ones. The HBDC equity portion may be in the form of natural resource access, or capital, depending on the opportunity.

1.3.4 Stakeholders

The HBDC is a company with few shareholders but many stakeholders and participants. HBDC business involvement is centred on natural resources, which attract the interest of many groups. Each of these brings their own agenda and works to obtain their own objectives. By winning the support of the stakeholders, the HBDC will be better positioned to achieve their own goals.

1.3.4.1 Alcan

Alcan is the largest industry in the area, owns a great deal of the land in the Kitimat area, and owns a very low cost power plant in Kemano. The relationship between Alcan and the Haisla has improved in recent years, and Alcan has been supportive of the HBDC. Alcan was granted substantial amounts of land in the Kitimat area when they made a deal with the BC government to build a powerhouse and smelter in the Kitimat Valley in 1950, and has recently sold some land to the KVC. This land is being developed by the HBDC. Alcan also has several resources working on economic development initiatives in the area, some of which will involve the HBDC. Alcan has some interest in economic growth in the area because the District of Kitimat is blaming Alcan and its power sales for the declining population and economic conditions in Kitimat. Alcan has also partnered with the provincial government to create a $15 million Nechako-Kitamaat Development Fund, some of which could be used by the HBDC. Because Alcan is in a position to aid the HBDC in achieving its goals, the HBDC should foster a good relationship with Alcan.

1.3.4.2 Eurocan, West Fraser

Eurocan is the second largest industry in the Kitimat area, and their operation has negatively affected the Haisla by tainting oolichan in the Kitimat River. Eurocan has been working to rectify the problem and is compensating the Haisla for their loss. Some of this

compensation will be used as investment capital by the HBDC. West Fraser, the owner of Eurocan, is a major player in the forestry industry. The HBDC has a forest range agreement with the government of British Columbia, and opportunities may exist to mutually benefit from those resources in future business arrangements.

1.3.4.3 Other Industries

There are a number of potentially new industrial players that have an interest in development in the Kitimat area. Among these are Cascadia, Enbridge, and Kitimat LNG. Many of the proposed developments are related to the use of land and natural resources in the Haisla traditional territory and provide an opportunity for the HBDC to develop new partnerships. These opportunities will only proceed when the opportunities are beneficial to both parties. The HBDC must be proactive in creating win-win situations with these new potential players.

1.3.4.4 Government

The federal, provincial, regional and municipal levels of government each play a varying role in how they can influence the HBDC. Along with financial support, the various levels of government are able to affect the HBDC through land claims issues, natural resource decisions and provision of infrastructure. There is some debate about whether the governments have been help or hindrance to the Haisla. The federal government is seen as controlling, and is viewed as having the objective of assimilating the First Nations by destroying their culture and language. There is criticism by some that the HBDC is playing into the hands of the government by selling their natural resources to business. There is reluctance on the part of the District of Kitimat to take seriously the HBDC development plans for economic development in the area. Environmental issues in the area are of key importance to the HBDC, and protection of the land is critical to the success and continuation of Haisla tradition. Current dealings with Fisheries and

Oceans Canada are related to salmon allocations. Government decisions will greatly impact the HBDC, and it seems apparent that it will be some time before these issues are settled.

1.3.4.5 Non Governmental Organisations (NGOs)

Companies are becoming more sensitive to the concerns of all stakeholders as they carry out their day-to-day activities. Generally, it is better to hear the concerns of all parties in advance of going forward with activities, than to act and become involved in litigation later. Typically, NGOs have been environmental groups, but can also include other groups, each with their own agenda. These groups often have no formal role in the decision process but carry power in their ability to influence those with power. The HBDC is not exempt from criticism by groups like Ecotrust and Greenpeace, and must be aware of them and ensure that their concerns are well understood and satisfied. Often, negotiations can resolve conflicts before the courts get involved. Litigation can be expensive, especially if it could have been avoided by consulting with all parties in advance.

1.3.5 Summary

A wide variety of opportunities will be available for HBDC to consider as soon as they are incorporated. It will be important to achieve success early to establish a positive momentum. Among its strengths, the HBDC has a number of highly successful business leaders on its board, as well as access to natural resources. It is also located on tidal water, has the support of other local industries and has recently received land that can be used for development. Their weakness is a lack of business experience and as a result, a perceived lack of credibility. One existing opportunity is a 360,000 cubic meter forest range agreement that must be utilised within 5 years. The profile of the wood is known as Hembal in the industry and contains 70% hemlock and balsam, which are low value species. The HBDC has an interest in fully developing financial

opportunities with this wood, including the waste. It is expected that a wood fuel pellet plant would enable the HBDC to gain business experience as well as create employment for its people with a relatively small investment. Also, from an environmental aspect wood pellets are considered a renewable fuel and are carbon dioxide neutral, and do not contribute to the greenhouse effect. The HBDC would like to evaluate the feasibility of building a wood fuel pellet plant, which is the subject of this paper. The feasibility study will begin with an analysis of the wood fuel pellet industry.

2 INDUSTRY ANALYSIS

2.1 Wood Fuel Pellet Industry

An overview of the wood fuel pellet industry will provide an understanding of the factors that impact businesses competing in the industry. The wood fuel pellet industry competes primarily in the energy sector as a source for heat and electricity generation. Wood fuel pellets are part of the family of renewable products known as biomass fuels.

Biomass fuel refers to a broad range of short and medium cycle combustibles that are used as an energy source. A wide variety of fuels fit in this category, ranging from food garbage to wood pellets made from wood waste. Use of these fuels is still in its infancy stage, but one form of biomass fuel, wood pellets, has started to become recognised as a viable option to fossil fuels. As these biomass wastes decompose, gasses are released that are believed to contribute to the greenhouse gas effect. Some of those gasses are much more damaging than the carbon dioxide that is given off during combustion. Waste products are being burned to generate heat and electricity rather than being sent to landfills to decompose. In some cases, crops are being grown for the sole purpose of producing a fuel that is environmentally friendly. While some of the fuel is burned "as is", there is a growing trend to compress the fuel into pellet form. Pellets have a similar energy value to the raw material they are made from, but pellets are much more stable, easier to ship, less bulky, and burn more efficiently. Pellets can be formed from many types of biomass, including grass, straw, moss, food waste, and wood waste. Pellet appliances today are becoming sophisticated, efficient and are capable of providing heating with very little

intervention. These appliances range from residential space heating stoves and fireplace inserts that supplement other forms of heating, to industrial combined heat and power (CHP) plants.

Wood fuel pellets are considered the premium quality biomass fuel. Pellets are highly compressed and are much less bulky to transport than their raw material. They have a high-energy value, and can be burned in highly automated appliances. They are made from wood waste products such as sawdust, wood chips and other wood materials. The Pellet Fuels Institute sets standards for wood fuel pellets in North America, where two grades exist, the only difference being the ash content. Ninety five percent of current North American production is the premium grade. The standard grade requires a special appliance that is designed to burn pellets that contain up to three percent ash. In Europe, each country has its own standards. Pellets are sometimes classified as "white", meaning they do not contain bark, or "brown". The quality of the pellets is of prime importance for several reasons. High ash pellets require more maintenance, as the ash must be removed more frequently. While pellets are reasonably sturdy, they can break up with handling and produce dust or cause feeding problems. Impurities in the pellets can increase pollution and can also damage a stove if the impurities are corrosive. High quality pellets can be burned in any stove, while pellets with higher impurities may require special treatment that is usually found in larger installations that are able to remove the impurities before releasing the gases to the atmosphere. Pellets also can be turned into powder and burned in injection systems similar to the ones that burn natural gas.

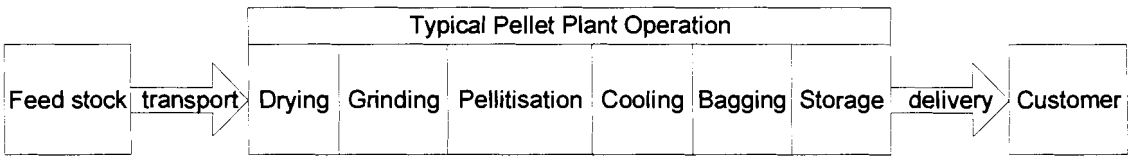
2.2 Supply Chain Analysis

Companies earn profits by selling products and services that are of value to their customers. The value created by a wood pellet producer is shared with its suppliers in the form of payments for raw materials and services. The customer also shares in the value by benefiting from the pellets it purchases, whether it resells the pellets for a profit, or uses the pellets as fuel.

Finally, the value that the firm is able to capture is returned to the shareholders in the form of profits.

The process of converting wood waste into useful fuel pellets is described below. Each step in the process can add value in excess of its cost. Support activities apply to the entire value chain and the costs are included in the general operation costs. While there is some variability within the operation itself, based on plant layout, type of feedstock, and utility prices, those variations are small compared with the variations in the cost of feedstock, transportation, and delivery which often determine the profitability of a particular pellet plant. For example, feedstock can represent over 50% of the cost to a European producer, and be free to some North American producers. On the other hand, delivery can be 50% of the cost of a North American company delivering to Europe, and be minimal for a European producer. Companies that can optimise the process by minimising these costs are rewarded with higher margins and higher profits.

Figure 2.1 Supply Chain



Source: Author

2.2.1 Feedstock

Feedstock for the pellet plant comes in the form of sawdust and other waste wood products. Cost of the feedstock can range from free to $30CDN per tonne in North America, depending on the source and type. In areas where there is competition for the feedstock, the

prices can be quite high. The cost to pelletise softwood is about 30-50% less than the cost to pelletise hardwood. Bark can be included in the feedstock, and will increase the heat value but will also increase the ash content of the pellets. Chips and dry sawdust can be pelletised without drying, thus reducing costs. Softwood is preferrable to hardwood due to its higher lignin content and ease of pressing. The source of raw material should be near the plant to reduce transportation costs.

The varieties of wood available have varying parameters when it comes to the pellets produced. The energy per tonne ranges from 18.0 to 20.5 gigajoules (GJ), depending on the feedstock and processing. This compares favourably to straw or reed canary grass which rate at 14.4 GJ/tonne. The quality of the feedstock will affect the quality of the pellets.

Chemical composition can include impurities that are not acceptable by smaller installations due to varying factors. Trees near ocean water (next to the shoreline) may contain high concentrations of salt that can result in pellets that have high corrosive properties. Pellets made from treated lumber may contain carcinogens that release into the atmosphere when burned. Customers with larger operations may purchase these types of pellets at a lower cost, as they may have the resources to treat the exhaust.

The current pine beetle infestation in BC may be a source of raw material with low "standard" value. Pellet quality is not affected by the presence of this disease. An increase in the supply and activities related to this type of wood, which is not suitable as standard lumber, will almost certainly help all industries that use waste wood products in the near term. Companies should not rely on this source in the long term.

The pellet industry competes with pulp mills, oriented strand board, and particle board producers for some types of feedstock. Some demand for wood chips comes from the livestock industry that uses wood chips for animal bedding. Current pricing of wood chips makes them too

costly to use in the pellet industry in some areas. There is a growing trend to use co-generation plants that use wood waste, which may affect the availability and cost of feedstock for the pellet industry.

2.2.2 Transportation

Transportation of the feedstock to the pellet plant can be a significant portion of the cost of manufacturing pellets. The feedstock is bulky and awkward to handle. Plants located near feedstock supplies have a significant competitive advantage of lower transportation costs. Transportation is often by vehicle that uses fossil fuel; therefore, transporting the feedstock large distances somewhat diminishes the renewable nature of pellet fuel.

2.2.3 Storage

The feedstock arrives in "batches" via truck or train, but the process is continuous. In order to ensure the ability to run a continuous operation, a supply of raw material must be stored on site. It is important to keep the feedstock dry to avoid decomposition and reduce drying costs. For this reason, the storage is usually in a covered building. Automated delivery from the storage supply to the process can reduce labour effort.

2.2.4 Drying

The raw material to produce pellets is generally dried to less than 12% water. Some raw materials such as wood chips and dry sawdust do not require drying, and may bypass this step. A plant that has access to sufficient dry feedstock could have a competitive advantage in the form of lower capital costs, drying costs and maintenance.

The drying is usually accomplished by passing the raw material through a rotating heated drum. If the drying process is done using natural gas as a fuel, the neutrality of pellets as a

greenhouse gas fuel is compromised. Many European installations dry their raw material using biomass. Some European companies are able to reuse the excess heat for district heating while others benefit from heat given off in CHP plants to dry their feedstock. Both situations offer competitive advantages.

2.2.5 Grinding

This process is sometimes called milling or comminutation. Some producers perform the grinding before the drying process to enable a more consistent drying process. The material is ground with a hammer mill to a size less than the diameter of a pellet, but not too small that it loses its fibre nature. Additional moisture is extracted due to the heat generated in the hammer mill.

2.2.6 Conditioning

Many pellet manufacturers treat the raw material with superheated steam to heat it and prepare it for the pellet press. This conditioning reduces the pellet press maintenance costs by softening the raw material. Conditioning also produces stronger pellets. Some pellet machines come with a built-in conditioning unit.

2.2.7 Pelletisation

There are two common presses used for compressing the raw material into pellet form. One consists of a flat die, with material being pressed from the top through the die and exiting the bottom. The other type contains a rotary die with 2 rotary presses inside which force the material from the inside to the outside. The process must be fine-tuned and is very dependent on the type of raw material. This tuning includes adjusting the clearances of the equipment and the specifications of the dies. A delicate balance is required to produce quality pellets without

incurring high maintenance costs. No additives are required because the natural lignin in the wood, which is released under the heat and pressure of the process, binds the pellets together when cooled. Some producers use additives to improve the binding properties of the wood, but these additives can add to the impurities. Some European countries do not allow the use of pellets with additives. The pellet mill generally has an adjustable blade that cuts the pellets to the desired length. Some pellet machines combine several of the processes, including grinding, conditioning, pelletising and cooling.

2.2.8 Cooling

Pellets leave the press at 90-95° C. The pellets remain soft and fragile until they are cooled. Cooling makes the pellets hard and enables packaging and storage without breaking them up. The pellets are cooled by passing them through an enclosed conveyor, with cold air being injected at the end furthest from the press. The nearer the press, the warmer the air, resulting in a gradual cooling effect. The pellets are screened after cooling and small material is reprocessed.

2.2.9 Bagging

If the pellets are for resale in the home market, they are bagged and palletised. Bags are generally 18KG (40 pound), with 50 bags to a pallet. Bagging is labour intensive and adds to the final cost. Larger bags are sometimes used for bulk sales in Europe. Since 95% of the western Canadian product is presently exported to Europe in bulk form, this step is optional. Future market opportunities may require varying forms of packaging or delivery.

2.2.10 Storage

Pellet producers must have adequate storage, and be prepared to maintain high levels of inventory at times. The demand for pellets is seasonal, and therefore a pellet plant supplying a

local market may require a substantial storage area for the final product. Shipments to foreign markets are often in quantities of 5,000 to 20,000 tonnes and require storage. Some pellet producers maintain storage space for up to 40% of their annual production. Some producers have arranged for storage at the site of their customers, and bill the customer on usage. The storage area must keep the pellets dry, as contact with moisture can quickly cause the pellets to revert to sawdust. Some producers give discounts in the off season to reduce inventory costs.

2.2.11 Delivery

Due to the low value per tonne of pellets, the cost of delivery to the customer can be a significant percentage of the value chain, as high as 50% of their total costs. Local resellers in the host country generally pick up the costs of delivery, therefore, tend to choose suppliers near their area. Exports are generally to larger buyers, like institutions and industrial customers. Long term contracts generally are for bulk product including delivery. This cost can change the profitability of a company significantly as shipping costs increase. Care must be taken not to handle the pellets roughly, move them too many times, or allow them to get wet.

Logistics can play a big role in the transport of pellets overseas. Due to the nature of wood pellets, it is imperative that the pellets remain dry, and that they are not handled excessively. Pellets are often shipped in volumes of around 7,000 to 20,000 tonnes, which represents about 70 to 200 railcars of product. The key logistical problems are the storage requirements at the wharf facility, as well as the requirement to load the vessel quickly and efficiently while keeping the pellets dry. Delays in loading a vessel result in huge surcharges that are at the cost of the pellet exporter. Degradation of pellets caused by over-handling or moisture may result in the rejection of the order by the customer, who requires and expects a high quality product.

2.3 Industry Overview

The wood pellet fuel industry is relatively new and is currently in the rapid growth stage of its product lifecycle in Europe. The market is growing more slowly in most other parts of the world. It appears that the rapid growth will continue for some time in Europe. The drivers that are rapidly growing the wood pellet industry in Europe are not yet in place in other areas of the world. Some drivers that have led to rapid growth in Europe are a desire to be less dependent on others for energy, Kyoto targets and the accompanying fossil fuel taxes, and rising and unstable prices of other fuels. The clean burning pellets do not contribute to global warming like fossil fuels because the replacement growth turns the converted carbon dioxide back to oxygen. This cycle remains sustainable, without increasing greenhouse gas levels. The burning of fossil fuels, on the other hand, adds to the carbon dioxide without oxygen replenishment taking place. Wood waste produces carbon dioxide whether it is burned, or decays. Secondly, the supply of fossil fuels is diminishing, and alternative sources of energy need to be developed. Due to diminishing supplies of natural gas, the prices are rising, and tend to be volatile at times. While wood pellets continue to be seen as one of the most viable alternative to fossil fuels, there is a considerable research and development effort in place to find and grow alternate renewable fuel sources. There is a risk that new emerging forms of energy could quickly halt the rapid growth of this industry in Europe.

Sales in North America was 956,000 tons of pellets in 2004. (Pellet Fuels Institute). In Canada, pellets are mostly produced for export. Canadian sales were only 80,000 tons, while exports were 375,000 tons overseas and 200,000 tons to the US.

The North American pellet market consists primarily of residential customers who use pellets to fuel stoves and fireplace inserts in homes. The market is targeted to those who care about the environment and wish to do their part to decrease greenhouse gas emissions, and those

who enjoy the comfort of real wood heat. Wood pellets are currently a cheaper fuel than oil, but the cost of conversion results in long payback periods. Many people prefer the convenience of natural gas, which requires very little consumer involvement. Pellet stoves are more convenient and more efficient than regular wood stoves, but do require feeding up to once a day, and periodical ash removal. More automated furnace systems are available, but the capital costs are higher.

In Europe, the market consists of a very broad range of customers. In Sweden, most customers are large-scale heating plants and medium size boilers. In Austria, on the other hand, most pellet sales are to single and two family houses. The growth of pellet market and applications is quite varied from country to country. Fossil fuel surcharges have resulted in a better business case for the use of pellets, and the use of district heating in some areas has seen the European market grow at a rate of about 25% since 1995.

2.3.1 Key Industry Success Factors

A number of factors exist that continue to limit the growth of the wood pellet industry. Some of these have been overcome to some degree in some areas of Europe, but are limiting the growth of wood pellet use in other areas. These include technical, political and marketing gaps that stand in the way of the industry reaching its full potential. Some effort is being made to overcome the challenges, but there is a long way to go.

Technical challenges include fuel availability, appliance automation, fuel delivery, and service availability. Lack of pellet availability has limited the desire to convert to pellet fuel in some areas. This will remain a problem until the supply reaches a level that can satisfy the existing demand. Current appliances are highly automated, but require a certain amount of user involvement for tasks such as removing ash. Highly automated systems are still expensive and

pellet storage can take up valuable space. Many places do not offer pellet delivery, and customers will prefer other fuels that are currently delivered. Delivery also has challenges related to metering pellets delivered and methods of charging storage tanks. Finally servicing of pellet systems is not well established in remote areas. Many of these issues are being worked on, and critical market penetration will help resolve some of the problems. These challenges continue to exist in Europe, where the market is growing rapidly, so it is expected they will continue to exist in America for a long time.

On the political side, government support will be required to reach Kyoto protocol targets and reduce greenhouse gas emissions. Europe is well on its way to achieving its goals, but many other governments do not seem to have a strategy in place.

The final major factor that is restraining the pellet fuel industry is the lack of industry knowledge by the general public. This relates both to the understanding of the use of pellets as a fuel, but also to the environmental benefits wood pellets provide over fossil fuels. This has been overcome to some degree in Europe, where pellet use is growing rapidly, but continues to restrict the general industry growth in most countries.

2.3.2 Strengths, Weaknesses, Opportunities, and Threats (SWOT)

The SWOT analysis of the industry analyses factors that may affect the industry in the future. An examination of these factors provides insights into how the industry may change.

2.3.2.1 Strengths

Positive environmental factors combined with improving convenience and cost are the source of strength of this industry. Wood pellets are carbon dioxide neutral and do not contribute to the greenhouse gas effect. This makes them desirable as a fuel, especially to those who want to

reduce greenhouse gas emissions. Wood pellets are also a renewable source of energy that is sustainable. There are abundant resources available to use as feed stock for wood pellet production, allowing for rapid industry growth without increasing input costs. Wood pellets have a high-energy content and burn clean compared with other boimass fuels, making them an attractive option. Wood pellet appliances can be low maintenance and automated, making them easy to use. The price of pellets has remained stable compared with fossil fuels, which makes them an attractive alternative. Wood pellets can be used in a variety of applications, and more are being developed.

2.3.2.2 Weaknesses

Several factors have continued to limit the growth of the wood pellet industry in most areas. Wood pellets are not as convenient as natural gas or even oil. The market has not grown rapidly outside of Europe, potential customers are not well educated about pellet products, and there is no existing infrastructure in place for fuel delivery. Capital costs for equipment is still high, limiting growth of the industry. Fossil fuel costs remain low, not providing an incentive to switch to pellets. North American governments are not moving quickly to reduce greenhouse gas fuel use.

2.3.2.3 Opportunities

The wood pellet industry is promising for a number of reasons, presenting several opportunities. Instability of fossil fuel prices and supply, and the high cost of electricity may improve the attractiveness of pellets. Environmental pressures on fossil fuels will make pellets very attractive. The pellet market is currently only a very small percentage of the total energy market, with plenty of opportunity to increase market share. Ongoing research is finding new uses for pellets, which will increase demand. Niche markets, like the greenhouse industry in the

lower mainland of British Columbia, have switched to alternate fuels such as pellets for heating in the past, and may be ready to switch back with the rising costs of natural gas. The rapid economic growth in China could fuel an increased demand for a low cost fuel in that country.

2.3.2.4 Threats

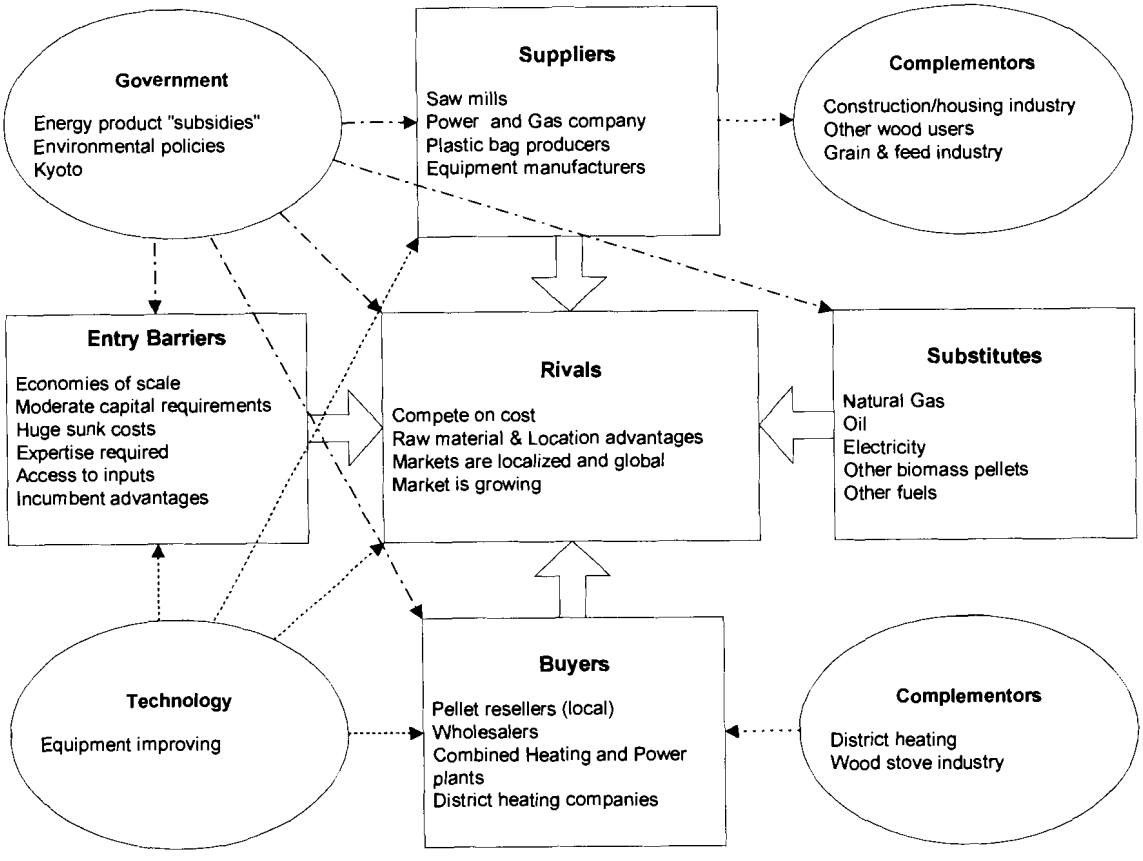
Threats to the industry exist in the form of substitutes and competition for raw materials. One threat to the industry is competition from other boimass fuels, which could erode wood pellet markets. Alternate renewable energy sources could become cheap substitutes and erode the potential market for pellets. Also, a number of alternate uses for wood waste could drive up the feedstock prices and make the industry less attractive.

2.4 Industry Attractiveness Analysis (Porter's Five Forces)

Porter's five forces is a model that analyses five factors which determine the current and future attractiveness of an industry. Each factor contributes positively or negatively to the overall attractiveness of a particular industry. These factors often affect the dynamics of the industry and play a key role in successful strategy decisions. Profitability varies widely between industries, but also within industries. The measure of attractiveness of an industry does not necessarily determine the profitability of a company entering the industry. There are profitable companies in unattractive industries, and failures in attractive ones. Success is often based on the ability to sustain a competitive advantage over others.

Based on the analysis of supplier power, buyer power, barriers to entry, substitutes, and industry rivalry presented below, the wood fuel pellet industry is currently moderately attractive. The visual representation of the forces below is followed by a detailed analysis of each factor and its components.

Figure 2.2 Porter's Five Forces Model of the Wood Fuel Pellet Industry



Source: author, based on Michael Porter, 1985

2.4.1 Rivalry

Rivalry in the wood pellet industry is primarily based on cost, but high transportation costs create interesting competitive dynamics. Much of the rivalry is localised, giving monopoly power to some strategically placed producers, and creating a highly competitive market where industry consolidation is higher. In addition, many low cost producers have been able to compete in the export market. Although quality pellets are like a commodity, there are 2 or 3 grades of pellets with different quality standards that are well defined in each of the various markets. Some

pellets have superior properties and are hence more desirable and can demand higher prices. While low cost drives competition, a certain level of quality is demanded. Cost reduction must not be at the expense of quality, but is usually achieved through advantages in input costs and logistics.

This is a relatively new industry and rivalry is not very intense yet. As long as demand for pellets continues to grow faster than the supply that should continue to be the case. In some areas, there is competition for raw material, which raises the cost for those producers. Those with access to cheaper raw materials, lower power costs, and lower delivery rates will benefit by seeing higher profits. There are economies of scale that must be balanced by the cost of delivery of the feedstock. Larger plants can use manpower and equipment more efficiently, holding the cost per tonne of production down.

In the future, rivalry may grow in the form of foreign pellet producers who have access to cheap feedstock and low delivery costs to major markets in Europe. These rivals could develop out of the East Coast of South America or Russia.

2.4.1.1 Domestic Markets

In domestic markets, rivalry is localised. Firms that enter geographical areas where there is little competition will be able to extract higher economic rents than will those competing in areas with a high concentration of producers. This dynamic may change in the future as the market grows and matures and competition and rivalry intensify. Currently, a wide variation exists in industry rivalry based on geography. The local market often supplies residential customers, who demand a higher quality of product than commercial customers.

2.4.1.2 Exports

Rivalry in the export market is quite high. Fortunately for the wood pellet industry, demand is still exceeding supply, which enables producers to maintain a reasonable level of profitability. Transportation costs are a very significant cost in the export market. A pellet producer must have a significant cost advantage in relation to the target country to ensure profitability in the pellet export market. The supply of pellets in British Columbia is well in excess of the demand, and production costs are low, so most of the product is produced for export. Two pricing structures exist for pellets in Europe, which is the destination of most North American pellets. Local markets in Europe compete on a "spot" price, while exporters negotiate long-term contracts. Demand is expected to exceed supply into the next decade, enabling the export industry to enjoy higher profits than would be possible in a highly competitive mature market.

2.4.2 Barriers to Entry

While capital costs and interest to enter the pellet industry are typically only 10-15% of the cost of goods sold, a number of factors exist that may deter competitors from entering this industry. These factors that discourage new entrants make the industry more attractive for the current incumbents.

2.4.2.1 Construction and Start-up Costs

In addition to the capital costs required to build a pellet plant, a significant effort is required to stabilise the operation of a new plant. This period of time can be up to six months for an experienced operator, to up to eighteen months for a new entrant into the business. During this period of adjustments, the quality of the pellets could be low, and the sale of poor quality pellets could negatively impact future business opportunities. In addition, maintenance costs are very

high during this period, due to dies breaking and high stress on equipment. The result can be high start-up costs with little revenue for a significant period of time. Technology is improving, and new entrants may shorten the "break-in" period with expert help.

2.4.2.2 High Exit Costs

Once built, the operation is, to a large degree, a sunk cost. Because the feedstock cannot be economically shipped large distances, the plant is a site-specific asset that relies on a local supply of sawdust or chips. Some costs can be recovered by selling the equipment to another pellet producer, or to be used in the feed industry.

2.4.2.3 Expertise Required

Expertise in the pellet industry goes beyond the technical process of producing pellets, and extends to marketing and negotiation skills. Making quality pellets efficiently requires a high degree of technical understanding and experience. This expertise is required on start-up to ensure an efficient plant design, but also during operation. The quality of pellets can make or break a business, especially in the early life of the business. Poor management of operations can also result in high maintenance costs. Negotiation skills are required to obtain feed stock at a competitive price, and in the export market the lack of a commodity exchange for pellets requires the ability to market the product to foreign buyers that may present a challenge.

2.4.3 Buyer Power

Buyers of pellets fall into two groups, each having varying power to impact the prices charged by the pellet producer. Both resellers and importers enjoy low switching costs to other suppliers, but in many cases the current market where demand exceeds supply negates this benefit. A reseller's power is generally low, while commercial buyers' power is moderate but

varies with changes in supply and demand. As the industry matures and the supply and demand balances, the power will shift in favour of the buyers.

2.4.3.1 Resellers

Typically, resellers are small and rely on local producers. They mostly sell pellets to the residential market in bagged form. These resellers are hardware and lumber stores, speciality pellet stove stores, but may also include large chain stores. A local pellet producer has an advantage over a more distant supplier due to the high cost of transporting the pellets. In these localised types of markets, the pellet producer may have monopoly or oligopoly power over buyers who are mostly local retailers. Some large chains, like Walmart, have been able squeeze suppliers, even though they are local. In areas where supply exceeds demand, competition results in a buyers market. Residential customers require the highest quality pellets, which somewhat reduces their ability to negotiate prices downward.

2.4.3.2 Commercial Buyers

Commercial buyers who purchase large quantities of bulk pellets are better able to negotiate prices downward. These customers operate large heating plants and medium and small size boilers as well as CHP plants. They are often less demanding on fuel quality because convenience and ability to scrub exhaust gasses is not as challenging as it is for residential consumers. Some of them have the ability to burn several types of fuel, enabling them to switch to lower cost substitutes at will. In the case of exports, it is difficult to arrange many small deals, and a contract with a big buyer will generally be in favour of the big buyer. Especially in Europe, buyers operating CHP plants and district heating for large cities can be very big and powerful in comparison to a typical sized pellet producer. Fuel is a significant percentage of the operating costs for most commercial buyers and they are highly motivated to keep prices low. The high

demand and low supply of quality pellets greatly decreases the high power of large buyers in Europe. The superiority of pellets produced in North America also diminishes the ability of the European buyers to put downward pressure on prices.

2.4.4 Supplier Power

Much of the competitive advantage in the wood pellet industry is gained through the ability of a company to acquire inputs at a lower cost than competitors. In general, suppliers are large in comparison to pellet producers and have moderate to high power over the pellet industry. The major inputs are the feed stock, utilities, equipment, labour, and transportation.

2.4.4.1 Raw Material Suppliers

The power of the supplier of raw materials depends on the circumstance. The feed stock for wood pellets is wood waste products, and consists primarily of sawdust from sawmills. Some pellet producers use wood chips and others use scraps from the furniture and other secondary wood industries. This material has generally been considered to be of low value, but the pellet industry is creating a market for it. This is especially true in Sweden, where the demand has reached the available supply. In North America, the supply is still plentiful, and untapped in specific areas. The ability to acquire feed stock at a low price depends on the demand as well as the relative bargaining power of the pellet producer with respect to their supplier.

Supplier power increases when firms in the industry purchase large percentages of the suppliers' product. In the case of feed stock, there is often a one-to-one relationship between buyers and suppliers, often between a sawmill and a pellet plant. Generally, the sawmill is less dependent on the pellet plant, and the result is that the sawmill is able to control pricing better than the pellet plant.

A concentration of producers in central British Columbia has found themselves competing for sawdust. Generally, sawmills incur a cost to dispose of their sawdust, and it would make sense that a pellet plant should be able to obtain sawdust as a feedstock for their operation at little or no cost, other than transportation. In cases where pellet producers must compete for the sawdust, the price has been as high as $40 per tonne. Even without competition, the pellet plant can become a site-specific asset and raw material suppliers could demand a much higher price for the feedstock. Due to the high cost of transporting sawdust, the pellet plant relies on local supply to feed its site-specific asset. In areas where a single pellet plant relies on a single sawmill, the pellet plant could find that its raw material costs rise to the point that profits disappear. Where there is a small number of suppliers, the pellet producer can become dependent on its suppliers.

The power of the feed stock supplier can be diffused several ways. Vertical integration or a joint venture with a sawmill can balance the power of the supplier. A long-term contract for feedstock prior to construction of the pellet plant could also ensure that the supplier does not use hold-up techniques to extract increasing larger rents from the pellet producer. Finally, a buying consortium among the pellet producers might restrict the ability of the sawmills to extract unfair rents.

The future outlook is highly dependent on how fast the industry grows, and the availability of sawdust from the forest industry. The current pine beetle situation in BC may create a huge supply of feed stock at a low cost, but for a limited number of years.

2.4.4.2 Utilities Suppliers

Generally, utilities have monopoly power and can command market price for their products. In some areas governments regulate utility prices, giving or taking away competitive advantage to producers in their jurisdiction. The pellet plant requires electricity to power its

motors, and a source of heat to dry the raw materials. Many European pellet plants generate their own heat by burning biomass. Where the utilities are public, subsidised utility prices may be available for job creation or environmental initiatives that are seen as positive by the government.

2.4.4.3 Bag Suppliers

Bag suppliers are generally large and an individual pellet plant would have little power to negotiate pricing. Bags are a low cost item to the pellet plant. Companies that export most of their product or sell to commercial or institutional buyers can avoid this expense by shipping in bulk.

2.4.4.4 Equipment Suppliers

Equipment suppliers are also large companies, and are able to charge market prices for their equipment. Equipment purchases are a major expense at start-up, and replacement parts are needed as part of the regular maintenance of the operation. Due to the existence of a large number of equipment suppliers, they must maintain competitive pricing.

2.4.4.5 Labour

Generally, pellet producers compete for good employees with other industries in the area. The unemployment rate and other demographics in the location of the pellet plant often determine the cost of labour. Staffing and labour represents a significant portion of the total cost of pellet production, especially in a small plant. The operation of a pellet plant requires a certain level of skill, implying higher salaries and wages must be paid in order to retain employees. Most pellet plants are 24-hour operations, and shift work usually requires additional pay to attract employees. Some trades people will be required, whose rates may be determined by trade unions.

2.4.4.6 Transportation

Transportation costs include the delivery of feed stock from the supplier, and in the case of the export market, delivery to the customer. Buyers often pay for transportation in local markets. Transportation of feed stock is usually by truck and the pellet producer may negotiate reasonable contracts with local trucking companies for year round work. Transportation to global markets can vary widely based on the location and existing traffic of goods. Back haul situations using containers can provide very cheap transportation. Currently, the majority of exports go to Europe from interior locations in Canada. This requires rail and shipping, as well as inventory and logistical challenges at the port. Generally, rail companies have monopoly power, and a limited number of port facilities leave the pellet producer with little ability to negotiate. Opportunities to work with existing or future port facilities could ease situation.

2.4.5 Threat of Substitutes

The major uses of pellets as a fuel are for heating and power generation. Pellets can also be used for pet litter and floor cleaner. The availability of substitute products with similar pricing and performance reduces the ability of the industry to make high profits. This is especially true where switching costs are low.

The wood fuel pellet market has grown largely as a replacement alternative to fossil fuels. The industry has displaced only a small fraction of the existing fossil fuel market, and is only one of the alternative renewable fuels being used and considered. Much research is being done, especially in Europe, to find environmentally friendly fuels that can compete with fossil fuels. Other fuels that may present a threat to the growth and maturity of the wood pellet industry include other biomass fuels, nuclear energy, wind generators, wave and tide generators, solar power, geothermal heat, and others.

One promising substitute is pellets made of grass or straw. The energy value of these products is only 75% of that of wood, but the availability of feed stock may be much better and the economics of production has potential to be superior. These fuels have higher ash and impurities content but that is not as important in commercial applications. A mass shift from wood to alternate pellets by the large institutional and commercial customers is a very real potential threat to the wood pellet industry. Some switching costs exist for many current wood pellet users, along with the lower heating value and additional transportation costs require that alternate pellets offer significant pricing advantages, which do not currently exist. Feedstock costs are often 50% of the cost of pellet production, and feed stock supplies in Europe are reaching their limit.

Other possible threats exist in the form of new and economical ways to create renewable oil fuels from grains. These are not an immediate threat, but with time they may emerge as superior options to wood pellets.

2.4.5.1 Heating Market

The reality is that pellets are the substitute in the heating market. They are beginning to replace natural gas, oil and other fuels. The industry still faces challenges from the many other fuels in the form of convenience and cost. Pellet appliances have come a long way from their beginnings, and today's stoves can be nearly fully automated. The capital cost to a new pellet user is quite high to achieve the full automation. Even then, the pellets need to be delivered, incurring a manpower cost. Bins to hold a long-term supply of pellets are large and take considerable space. Underground bins are expensive to install and are subject to leaking, which can destroy the value of the pellets. In North America, pellets are a better choice than log stoves because of the higher level of automation and the clean burning characteristics of pellets. In

Europe, where the fossil fuels are taxed, the market is taking off much faster, as pellets are not considered to be a fossil fuel, but rather a renewable energy source.

Wood pellets are superior to other biomass fuels due to the high energy and low impurities and ash that they contain. High quality wood pellets are much more desirable in the residential market for this reason. Substitutes must be much cheaper to compete in residential markets.

2.4.5.2 Combined Heating and Power Plants (CHP)

There are a number of plants that use pellets to generate power. They also provide district heating, thereby taking advantage of all the heat produced. Some of these plants can run on a number of types of fuel, so the plant can switch fuels depending on the price of the cheapest one. These larger installations are less sensitive to labour and impurities, and can afford the effort and capital investment to use lower cost substitutes such as alternate biofuel pellets. These plants use pellets because the cost of delivering other fuels, such as wood chips, is too high, or too inconvenient from storage or handling perspectives. Other plants that are near a supply of wood chips find it cheaper to simply burn wood chips.

2.4.5.3 Other Markets

Some pellets are used for pet litter, animal bedding and floor drying material, but this is a very small portion of the market. The price of pellets for these uses is higher than as a fuel, so there is an opportunity for further development of this market.

2.5 Competitor Analysis

2.5.1 Local Competitors

A number of competitors exist in British Columbia. These companies have experience in local and export markets and are well established. Many of the pellet producers in British Columbia belong to the BC Pellet Fuel Manufacturers Association, which promotes the use of pellets in North America. These producers have the reputation of producing the highest quality pellets in the world. The largest pellet producer in British Columbia is Premium Pellet, located in Vanderhoof. This plant was built at a cost of about $20 million, and is capable of producing over 20 tonnes of pellets per hour and is rated at 180,000 tonnes per year. This plant is located on the site of a sawmill and is vertically integrated with that sawmill. The size of the plant requires additional feedstock, as the attached sawmill does not produce enough waste to feed the pellet plant on its own. Economies of scale work well for a plant of this size, but the requirement for additional feedstock represents additional costs in the form of payment for the feedstock as well as transportation. Pellet Flame in Prince George is rated at 120,000 tonnes per year and was the first to ship pellets to Europe. Four other pellet producers produce nearly 150,000 additional tonnes.

Existing competitors have been experiencing a period of lower profits over the last few years. This is due to two factors, the cost of the feedstock, and the transportation costs of getting their product to the major market, which is in Europe. This situation is being exacerbated in Prince George with the building of a Canfor co-generation plant, which competes for raw material. These pioneer pellet producers have made their investments, and their operations are fixed. Minor adjustments can be made, but for the most part, these companies are living with the decisions they have made in the past. A new competitor could possibly imitate the effective parts of their operations and improve on their weaknesses, resulting in a more profitable operation. It

would require a good understanding of the strengths and weaknesses of the existing competitors, who may not be willing to share the information with a new competitor. To date, the industry has been close and most of British Columbia's producers are well aware of the issues the others face. At a time where there is pressure on the current producers in the form of high feedstock prices and high shipping costs, a new player may not be welcome in the area.

2.5.2 Global Competitors

Production costs vary significantly from area to area, and Sweden has a significant cost advantage over Austria, yet Austria is still able to make a profit in the industry. The availability of feedstock in Sweden may limit the total production there, but until that limit is reached, there seems to be a competitive advantage favouring Sweden. Advantages in North America are the lower input costs, but those are somewhat offset by the high shipping costs.

2.6 Complements and Substitutes

To understand the future market for pellets, an understanding of the complements and substitutes is required.

2.6.1 Complements

Industries that are obviously complementary to the wood pellet industry include sawmills, the animal feed industry, and the transportation industry. Sawmills produce sawdust and shavings that provide a cheap source of feedstock with which to make pellets. As sawmills thrive, and their industry grows, the increased supply of sawdust will reflect lower feedstock costs to pellet producers. The animal feed industry is also complementary to the pellet industry. This is true in two ways. Equipment to pelletise animal feed is similar to that required to produce pellets and improvements in the technology will help both industries. Also, equipment designed

to handle animal feed is similar to the technology required in the automatic feeding of wood pellet heating systems. This could increase the convenience factor for residential wood pellet customers and improve the market. Finally, cost reductions in the transportation industry could improve the rate of growth of the pellet industry by making the product cheaper to the end customer.

2.6.2 Direct Substitutes

Other pellet fuels can be used in some appliances intended to burn wood pellets. These are generally less desirable than wood due to the higher ash and impurity content, but can be used if the price difference is great enough. There is a lot of study going on to evaluate the use of grass and other crops as a feed stock for pellet plants. These crops have a much faster growth rate and can be a more cost-effective fuel. The availability of land to grow the crops is quite large in North America, and there is a lot of study taking place to develop that option. There is also concern for the amount of biomass heading to landfills that could be used as feedstock for pellet fuel.

2.6.3 Indirect Substitutes

As was stated earlier, it is more the situation that wood pellets are the substitute, and fossil fuels are being replaced with pellets, especially in Europe. Other forms of biomass are also being burned and are a cheaper source of heat than pellets. Wood chips can be a good substitute in some applications where the source of chips is nearby and the installation is large enough to take care of environmental issues of burning less clean fuels.

A lot of research is going on in Europe in an effort to develop and promote alternate forms of energy. These are examined more closely in the following section.

Due to the high capital cost of the appliances that use pellets or substitutes, switching costs are very high. As a result the short term cross price elasticity of substitutes is low, and generally, customers will only switch when they expect pricing advantages of a substitute to be sustained for some time before switching. In some commercial applications, the ability to burn several types of fuel avoids this high switching cost.

2.7 Environmental Scanning

The future of the pellet industry may be affected by a number of macro-environment factors. Political, technical, environmental, and economic factors may have a significant impact on the pellet industry in the future.

2.7.1 Political

Political factors in the pellet industry include government reactions to Kyoto protocol commitments, and existing and potential tariffs on fuels and complementary products. Huge opportunities to achieve Kyoto protocol targets are possible by shifting from fossil fuels to renewable sources of energy. Taxation of fossil fuels in Europe has promoted the use of pellets there, and many countries are on target to reach their Kyoto commitments. This is expected to continue to grow the pellet industry well into the next decade. North America has not followed that example, and it seems that the governments here are not moving quickly to achieve their targets. In fact some areas, such as the Greater Vancouver Regional District, have banned the use of wood stoves in that area, including clean burning pellet stoves. Currently, no tariffs exist on pellet fuels, and they are traded freely. One of the objectives of the European Union is independence in its fuel supply. As tariffs have been put in place on fossil fuels in the recent past, the future may see tariffs put in place on pellets to help achieve that independence. The pellet industry, which depends on the forest industry in Canada, has been negatively affected by

the softwood lumber tariffs placed by the United States. Removal of these tariffs would improve the availability of sawdust, and thus reduce costs for North American producers.

2.7.2 Technical

Energy is in great demand and much research is taking place in search of clean, low cost sources of energy. While some of the technical developments will promote the wood pellet industry, many others will promote potential substitutes. A new experimental technique has been developed in Sweden that produces pellets that are denser and are much tougher. Ongoing research is looking for opportunities to use pellets in the transportation industry. Much research is ongoing to develop other energy sources, such as fuel cells, landfill methane, and non-fossil oil.

2.7.3 Environmental

People are realising that fossil fuels are contributing to global warming, and that fossil fuels are not environmentally friendly. In 1997, the Kyoto protocol was signed by 160 countries, and is still in the process of being adopted. Canada has committed to a decrease of 6% below the 1990 level. The current level of carbon dioxide equivalents is nearly 30% over the 1990 levels in Canada, which leaves an enormous challenge for Canada to meet its Kyoto commitments. Development of tar sands oil reserves in the Fort McMurray area are making the targets even harder to reach as large amounts of fossil fuels are used to produce oil. The USA has not made commitments to the Kyoto protocol. Some areas, like Europe, are quickly adopting alternative fuels. They are doing this by taxing fossil fuels and thus encouraging a shift to more environmentally friendly fuels, like wood pellets. This has created an enormous demand for wood pellets in northern Europe.

The biggest driver of the pellet industry could be Kyoto. If countries are to reach their targets, there will have to be a massive shift from fossil fuel use to renewable energy sources. Wood pellets are considered by many as the most feasible alternative.

2.7.4 Economic

Cost could be a major driver of the pellet industry in North America in the future. In North America, the supply of fossil fuels is not increasing as fast as the demand. This leaves North America in a situation where it will become dependent on other suppliers for fuel. The ratio of reserves of natural gas to production is decreasing, indicating that supply cannot continue to keep up with demand. This will inevitably lead to price increases in the future. This situation is being exacerbated by the conversion of coal fired installations to natural gas in the USA. In the short term, the price elasticity of demand for natural gas is very low. As supplies are unable to keep up with demand, the price can rise by orders of magnitude. This was experienced during the California energy crisis of the winter of 2000/2001 when natural gas prices peaked at nearly $60US/MBTU, compared with current prices of $7US/MBTU. Other spikes in prices have been experienced due to variations in demand that cannot be met by the current supply. The increased demand in developing countries is increasing the rate at which fossil fuels are being consumed in the world. This is particularly evident in China, where economic development is happening at a rapid pace.

2.7.4.1 Oil

Currently, wood pellets are cheaper than oil in most locations, and the replacement of oil furnaces with wood pellet ones requires only the replacement of the furnace itself. Other components of the heating system, such as ducting do not change with the switch to pellets. Some capital investment may also be required to automate the feeding system where the

consumer wishes to have a fully automated system. This is usually not practical in North America, as the delivery systems are not in place to deliver pellet fuel to residential customers. Capital costs to replace currently working oil furnaces are high and payback is more than 10 years, making a strictly financial business case not feasible. Continued increases in oil prices will reduce the payback period and make conversion an interestingly attractive alternative.

2.7.4.2 Natural Gas

Natural gas is still a cheaper fuel than pellets in North America. The convenience of natural gas as a heating fuel stands in the way of change for many in North America. The existing infrastructure and ease of use are a barrier to change. As natural gas prices rise, that situation will change.

2.7.4.3 Electricity

Many electricity producers use fossil fuels as the input to generate their power. Because of inefficiencies of that process, electricity is a very expensive form of energy compared with others. It is also a very convenient form of energy, and many applications are only able to work with electricity. For heating, there are cheaper alternatives.

2.7.4.4 Coal

Coal is abundant, but is not considered a clean fuel. The major problem with burning coal is that the impurities like sulphur and nitrogen are released on combustion, can combine with water vapour and form acid rain. Newer processes are able to clean a large percentage of the impurities before they are released into the atmosphere. Coal is also a fossil fuel and contributes to the greenhouse gas effect.

2.7.4.5 Fossil Fuel Alternatives

Most fossil fuel alternatives are not yet competitive with wood pellets. These include hydro, wind, geothermal, wave, tidal, solar and alternate forms of biomass. Biomass can be further broken down to a number of forms, including pellets, briquettes, raw material, and even liquefied and gaseous forms. Some countries are looking at pelletising material headed for landfills. In these areas, where labour is very cheap, it is possible produce fuel cheaply.

2.8 Industry Analysis Summary

In summary, the wood pellet industry currently appears to be a relatively attractive industry. This is especially true with the high growth in Europe, and with time the growth should improve in other areas as well. Specific markets could be developed in North America, such as the greenhouse industry in the Fraser Valley, where heating costs are a very high percentage of the industry cost. Porter's five forces indicate a moderately attractive industry where above average profitability is possible. The competitor analysis indicates that a new player could gain a competitive advantage with access to cheap feedstock and with low cost delivery advantages. Political, technical, environmental and economic factors also indicate that the future of the industry should continue to be positive.

Industry attractiveness alone is not adequate to make the decision to enter the industry. An internal analysis of the HBDC will be done to evaluate whether the proposed pellet plant will align with the goals and future strategy of the corporation.

3 INTERNAL ANALYSIS

3.1 Financial Analysis

Existing performance data does not exist for HBDC, and a complete strategy has not been developed. The HBDC is relatively new, and has yet to be incorporated. The company will take over existing ventures currently run by KVC as soon as incorporation takes place. The HBDC has $1.5 million in capital provided by the KVC and additional financing of $1.5 million available. Existing ventures have provided some employment with indirect benefits to the Haisla First Nation, but they have not provided direct revenue generation. Once incorporation takes placed, HBDC will evaluate a number of new opportunities that are available. One of these is a possible wood fuel pellet plant, which is the subject of this paper.

3.1.1 Financial Expectations

Based on the three stated goals, financial performance is the highest priority goal. The objective behind this goal is not high returns, although that is desirable, but rather the longevity of the company. A modest return to cover the cost of capital and allow for some growth would be considered adequate. It is important that early profitability is apparent to build confidence and credibility. This is also required to ensure cash flows are adequate to keep the company solvent as well as to provide cash to take advantage of some of the many other opportunities that are available. Employment created within the Haisla community will also be an indirect financial benefit.

3.1.1.1 Strategic Implications

To ensure financial expectations are met, low risk investments and joint ventures where the HBDC invests equity in the form of natural resources rather than capital will be preferred early in the life of the company. Once a steady flow of cash is established and experience and credibility build, riskier ventures with high potential returns can be undertaken.

3.2 Resource Analysis

The HBDC will work to build independence for the Haisla First Nation, using and developing people and natural resources. An analysis of the current situation, combined with an achievable target situation will help identify gaps and guide the process of establishing strategy.

3.2.1 People

Human resources are assets the HBDC wishes to develop. Employment rates, average income, and levels of education are all indicators that portray the independence of the Haisla. Currently, the situation among the Haisla is extremely high unemployment at about 60%, and a very low average income. These can be linked in part to the low percentages of the population who have graduated from high school and college. Targets for these statistics have not been set so as not to detract from the key financial goals. Opportunities will be analysed for profitability, but also for their ability to improve the independence indicators listed above. Some investment in the development of people will be undertaken, independent of the profitability of the activity. Opportunities for self-employment will be made available through the financial arm of the HBDC, especially where these opportunities are in support of HBDC investments. The Haisla are working with the Simon Fraser University business' learning strategies group (LSG) who plan to implement a program tailored to Haisla needs.

3.2.2 Natural Resources

The HBDC will focus on development of forest products, fisheries, and tourism in order to capitalise on their access to natural resources. Each of these areas presents unique opportunities.

Currently the Haisla have a non-replaceable forest license to log 360,000 cubic meters of forest over a period of five years. The license will likely be renewed, provided that the HBDC develop and use the resource within the prescribed timeframe. Currently, the HBDC is working with Brinkman and Associates and Triumph Timber to maximise the value of the forest resources. Logging is about to begin, and profitable uses of the logs are still being explored. Further forestry opportunities may exist in the form of a Community Forest License that could be developed with the District of Kitimat.

In the area of fisheries, an existing relationship with Cormorant Seafoods will develop salmon, oolichan, prawn, crab and shellfish resources. These opportunities include export of salmon roe, and buying and selling of various fish and seafood. In addition, an opportunity to take over the fish hatchery in Kitimat exists.

In the area of tourism, an opportunity to develop a luxurious resort similar to King Pacific Lodge with a cultural theme is looking promising. There is a demand for this type of resort and a recent study by King Pacific Lodge has suggested that there is a market for an additional three of these in the Great Bear Rainforeast and Haida Gwaii area. The Kitlope may be an ideal location for this type of lodge, which would have a minimal impact on the environment while generating huge revenues and creating dozens of jobs.

Opportunities may exist to trade natural resources where that could be of benefit to both parties. For example, low quantities of high value logs or chips could be traded for larger

quantities of low value sawdust required for the production of pellets. This type of trade could be beneficial to both parties, reducing transportation costs and achieving better utilisation of existing resources for both parties.

Co-operation with existing and new industry in the area may present additional opportunities. For example, unused heat generated by Alcan or Eurocan could be used to dry pellets. Low cost poser may be available from Alcan. The Cascadia project which will export aggregate from the Sand Hill may provide synergies in the area of bulk shipping other products like wood pellets.

3.3 Summary

The wood pellet plant is only one of many opportunities that exist for the HBDC to profit and develop their people by capitalising on resources within their traditional territory. Opportunities will be examined on an individual basis and the HBDC board will select the ones that are most able to achieve the three goals of the HBDC. The following opportunity analysis will evaluate the current and future market for wood pellets, competitive advantages and disadvantages of the HBDC, and finally, a financial analysis that will explore several optional configurations for a pellet plant.

4 OPPORTUNITY ANALYSIS

4.1 Market Forecast for wood fuel pellets

On a global basis, the market for wood pellets looks extremely promising. The demand for wood pellets is estimated by some to be 30 million tonnes annually and the supply is only 4 million tonnes. The North American market for pellets has been growing at a compounded rate of about 4.5 percent per year since 1994, mostly due to the increases in the Northeast US segment. The European market is much more promising and has been growing at a compounded rate of around 25 percent over the last decade. Other markets are showing promise, but are not significant and are still being developed. Because pellets are used mainly for heating and generating electricity, the market is not subject to economic swings like other commodities.

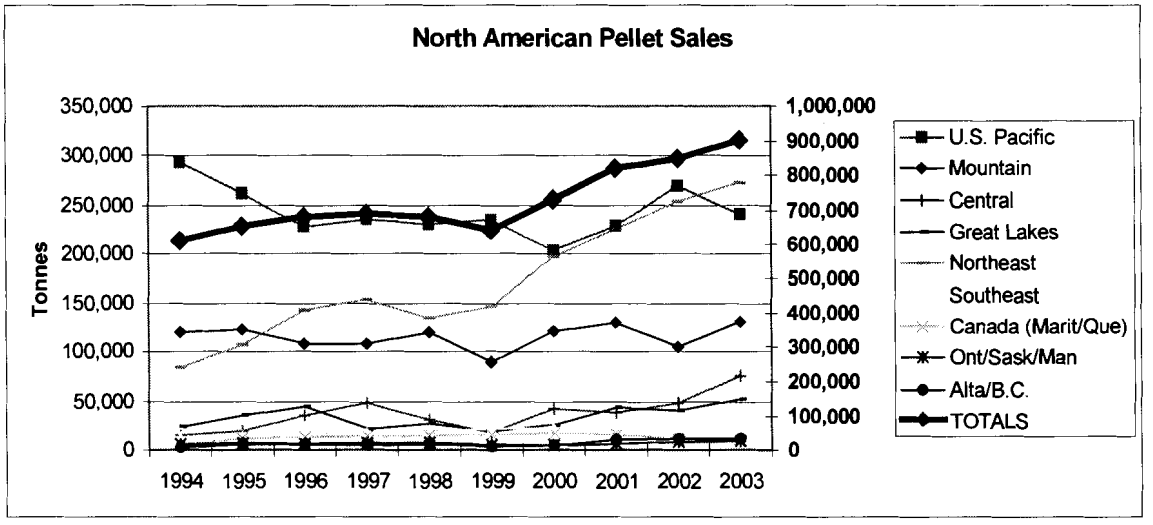
4.1.1 North American Market

The North American market consists primarily of residential customers who enjoy the comfort of wood heat without the inconveniences and mess of other wood fuels such as cordwood. Some effort was made in the past to convert to biomass fuels in the USA when natural gas prices were high, but a return to more affordable natural gas has seen a decline in that trend, with some facilities closing and being dismantled. An apparent disinterest in Kyoto and the greenhouse gas problem has seen North America continue using natural gas for heat and power generation. Two major reasons are that the existing infrastructure to support natural gas use is in place and convenient and the price of natural gas makes it the most economical to use

currently. The infrastructure to support renewable fuels such as pellets is not in place to compete with natural gas, making the switch difficult.

The structure of the market in North America could be described as localised monopolies. The reason for this is the high cost of transporting pellets. Cost advantages gained by a competitor are quickly eaten away by transportation costs to get the product to distant markets. For this reason, production is often set up in areas where there is existing or potential demand, without the nearby supply. In some areas, there is some competition, reducing the profit potential of the competitors. The chart below in Figure 6.1 shows the North American sales volumes since the 1994 season. Canada supplies about one third of the pellets sold in North America.

Figure 4.1 North American Pellet Sales Trends



Source: author, based on Pellet Fuels Institute, 2005

The future market in North America is very dependent on the price of alternate fuels and public policy related to fossil fuels. A shift from the status quo requires drivers that do not currently exist. Market growth will continue to be slow until natural gas prices climb or public policy changes people's attitudes about fossil fuels. The Greater Vancouver Regional District,

for example, does not even allow the burning of pellets, except for greenhouse operations. There is a potential to develop that niche market which is very sensitive to heating costs.

Production of pellets in North America is higher than the consumption, with exports going mainly into Europe. Western Canadian producers export over 95% of their production to the USA and Europe.

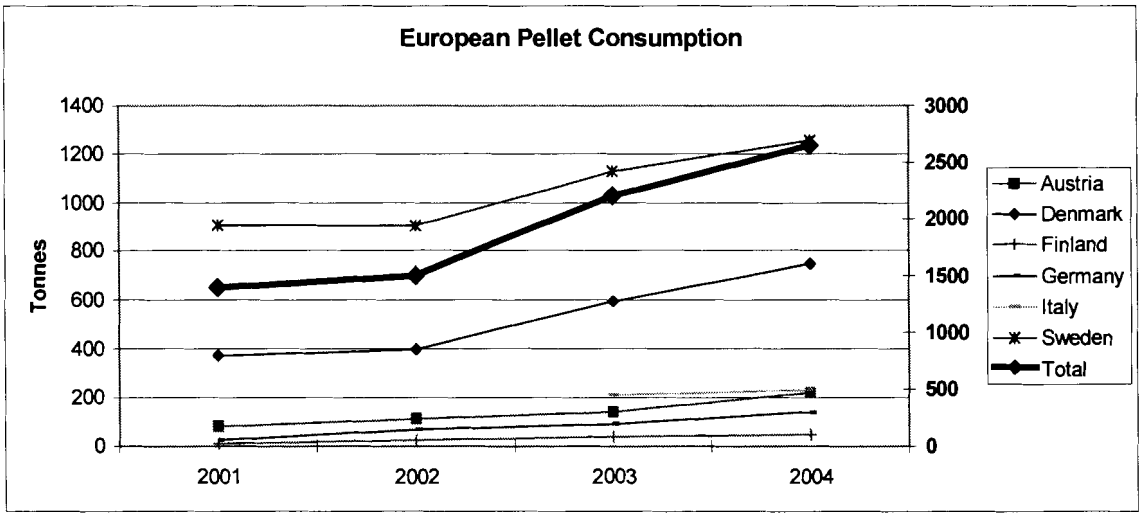
4.1.2 European Market

Unlike the North American market, the European market is growing at an extremely rapid pace for two major reasons. First, the desire to become energy independent and Kyoto protocol goals are driving the pellet market, especially in Northern Europe. The Directorate-General for Energy and Transport of the European Commission has defined four challenges that are driving the European market towards energy security. These key drivers of change are to manage demand, develop internal resources, enhance the internal markets, and diversify external resources. Second, the Kyoto protocol targets require a shift from fossil fuels, which, in some countries, is being encouraged by surcharges on fossil fuels.

The wood pellet market has prospered as a result of the above drivers. The widespread uses of district heating and combined heat and power (CHP) plants in some countries are suitable for biomass heating. Although biomass is a large percentage of total renewable energy use, renewable energy currently makes up only a small fraction of the entire energy pie in Europe. Wood pellets have a high energy content and burn very cleanly. Alternate densified boimass products are also being adopted in larger applications, and are in direct competition with wood pellets. These products (made from straw, grasses and other products) contain less energy and contain more ash and impurities. Alternate renewable fuels such as solar, wind, and geothermal

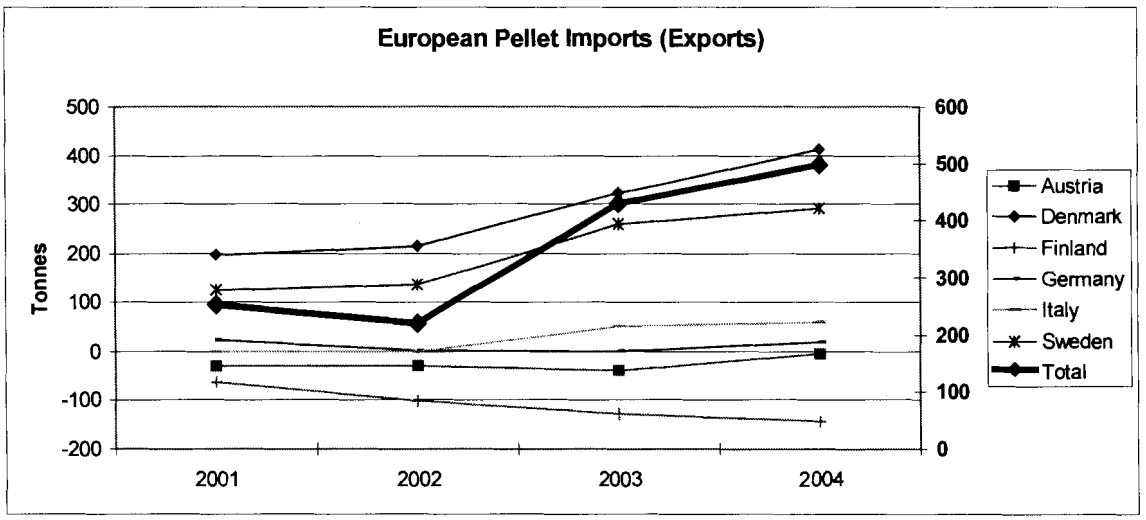
are not expected to offer significant competition to biomass products. Based on the above analysis of the market, the rapid growth of the market is expected to continue for some time.

Figure 4.2 European Pellet Sales Trends



Source: Author, based on European Pellet Centre, 2005

Figure 4.3 European Pellet Import (Export) Trends



Source: Author, based on European Pellet Centre, 2005

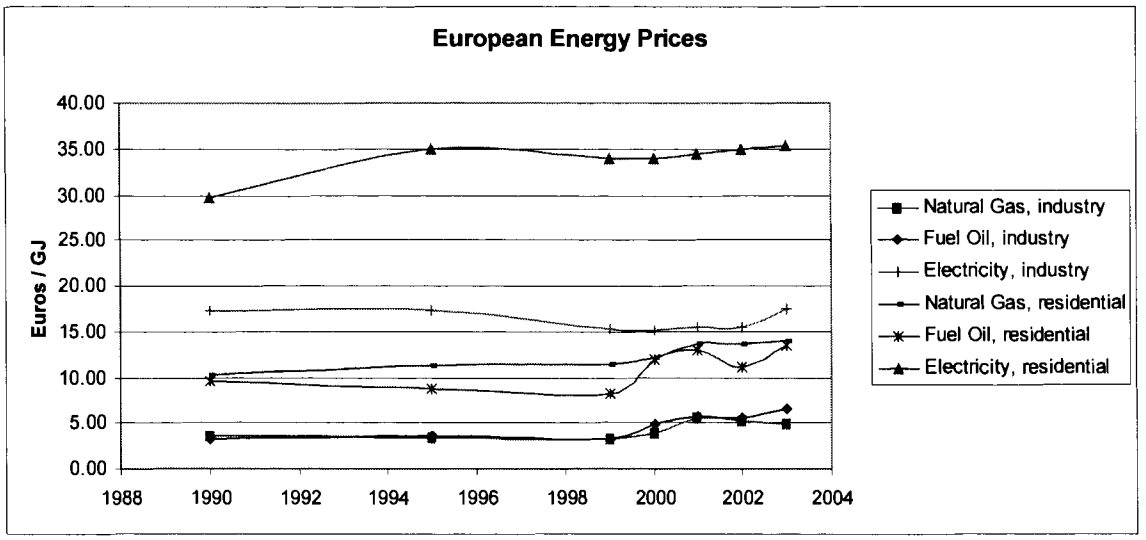
4.1.3 Other Markets

Pellets are being used in other areas of the world as a fuel as well. A number of countries are exploring the option of producing fuel pellets. Some of these are considering exports as well as domestic use. Asian customers have not been a big piece of the North American wood pellet export market, but the opportunities may grow. Asia is closer to British Columbia, and the large volume of containerised goods coming to North America and returning empty may provide opportunities for very cheap shipping to Asia. There is some use in Asia of pellets as animal bedding, but that is not yet an established market. Pellets sold for this use command a higher price than those sold as a fuel, and therefore may become a promising new market.

4.1.4 Substitutes Analysis

Direct and indirect substitutes exist for wood pellets as a fuel. Direct substitutes include other fuels than can be used in the same appliances, and include a large variety of biomass that has been converted to pellets. Currently, these alternate pellet fuels are inferior with respect to energy content as well as impurities, and they have not been a threat to date. Much research is being done in this area, and if production costs can be reduced, these products may offer competition in the future. Indirect substitutes are the fuels that require different appliances. Due to high switching costs, a significant pricing advantage must exist or be expected in order to cause customers to switch to wood pellets. The average pricing of various energy sources in the EU15 countries is presented below in table 4.3. These prices include taxes and tariffs, and vary widely by country. The cost of energy in the form of pellets is about 7 euros/GJ based on an average price of 140 euros/tonne of wood pellets with an energy value of 20 GJ/tonne.

Figure 4.4 European Energy Prices



Source: author, based on Eurostat 2005, converted to GJ

4.2 Competitive Advantages and Disadvantages

Competitive advantages and disadvantages are analysed in order to provide insight into the factors that can affect current and sustainable profitability. Advantages that cannot be duplicated by competitors provide a strong base for continued profitability, while disadvantages that cannot be overcome or neutralised will diminish possible returns.

4.2.1 Advantages

Advantages favouring the HBDC include timber rights, proximity to the ocean for shipping, lack of other competition for sawdust in the area, tax benefits, and potential synergies with local business.

4.2.1.1 Forestry Range Agreement

The HBDC has rights to 360,000 cubic meters over the next 5 years. Logging is about to begin and opportunities exist to build a sawmill to cut this wood. Sawdust and other waste from this process would have little value and could act as very low cost feedstock for a pellet mill, especially if the pellet mill and the sawmill were located on the same property. Other forms of waste could be used for pellet production, depending on market conditions for chips. This volume of wood is not sufficient in itself to provide sufficient feedstock for a pellet plant that is large enough to provide efficiencies in the form of economies of scale. This wood will be harvested and delivered via salt water, which may render it useless for pelletisation. An analysis of the wood would have to be carried out to establish the actual salt content. Alternately, chips generated from this wood could be traded for sawdust with Eurocan, which would prefer chips.

4.2.1.2 Shipping Logistics

One of the high costs of exporting pellets is transportation. Significant advantages could exist for a pellet producer who is in close proximity to a port facility that can handle storage and shipping of large volumes of pellets. Competitors currently have to ship their product 700-1000km via rail, and then require storage at the port facility. Efficiency in loading is required for a low value product that is quite bulky. Special handling is also required, as the pellets must not get wet or be handled roughly. A port facility to handle pellets no longer exists in northern British Columbia, but there is an opportunity to develop it, perhaps in conjunction with competitors. This may be an opportunity for synergies to be created with Cascadia which will be building a bulk terminal in Kitimat.

4.2.1.3 Lack of Nearby Competition

The lack of competitors in Northwest British Columbia indicate that additional low cost feedstock may be available. Currently, some of the local sawmills are shut down but plans are in place to restart some of them. Options may also exist on the market side to supply local pellet resellers, even though this market is currently very small. An opportunity to reintroduce the use of pellets to the greenhouse industry may prove profitable.

4.2.1.4 Tax Benefits

The Haisla are a First Nation's people and therefore have tax advantages that other companies do not enjoy. This has the effect of improving net income and financial ratios on marginal opportunities. In addition, First Nation employees on reserve lands enjoy Indian Act protection, and may be enticed to accept lower wages.

4.2.1.5 Possible Synergies with Alcan

In addition to already mentioned synergies, opportunities exist to generate synergies with Alcan, especially in the form of possible energy savings. Drying costs could be greatly reduced by using heat from Alcan's coke calciner to dry feedstock. This would require a significant capital expenditure, but would greatly reduce one of the major variable costs and isolate HBDC from rising natural gas costs. In addition, Alcan may be in a position to sell power to the HBDC for less than market price.

4.2.2 Disadvantages

Two major disadvantages are the possible salt contamination of the feedstock due to the proximity to salt water and the high water content of the available wood.

4.2.2.1 Salt Water

One key factor in the pellet business is the quality of the pellets. Customers will not accept pellets with chlorine because of its corrosive nature. Chlorine contamination can result from the proximity of the wood to the salty ocean, either during growth, or transportation. An analysis of the wood would have to be done to ensure marketability of the pellets prior to the investment is a pellet plant. An analysis of the feedstock would be required to validate if the salt content will be a problem. As mentioned earlier, it is possible the HBDC feedstock cannot be used for pellets.

4.2.2.2 High Water Content of Feedstock

The species of wood currently available to the HBDC has a high percentage of hemlock and balsam, which have a low value profile. This profile of wood has a high water content, which will result in higher costs to dry the feedstock prior to pelletising, and require larger quantities of feedstock for the same amount of final product.

4.3 Financial Analysis of Opportunity and Scenario Analysis

The financial feasibility of a wood pellet plant will be carried out by evaluating the fixed and variable costs of producing pellets, estimating pellet pricing, and by modelling profitability based on options related to costs including the size of the plant, source of feedstock, processing options, and the target market.

An initial profitability analysis will be done using a base model. It will assume a four tonne per hour plant constructed in Kitimat under expected local conditions, assuming the use of natural gas for drying feedstock. Because of the high transportation costs, the analysis will assume the production of only the premium grade of pellets. Due to the limited market in North

America and its current slow rate of growth, the analysis will focus on the option of supplying pellets to the European market. These parameters are standard for pellet producers in British Columbia. The base scenario will be used to evaluate profitability based on expected current market conditions and pricing. Pessimistic and optimistic market conditions for inputs and pellet pricing will also be examined to establish ranges of profitability.

Further scenarios will be evaluated by varying plant size, location, and drying and delivery options to determine the optimal investment configuration. Each scenario will be evaluated for profitability using expected market conditions.

Finally, each of the strategic options will be evaluated based on how well they are able to satisfy the goals of the HBDC.

4.3.1 Pellet Plant Fixed Costs

Fixed costs are those that do not change with the volume of product. The bulk of the fixed costs are made up of the capital costs to build a pellet plant. They are typically dependent on many factors related to the specific environment in which they will operate, including the type of material being converted to pellets. For this analysis will assume the use of locally supplied feedstock in the form of wet and dry sawdust and shavings from balsam and hemlock.

4.3.1.1 Capital Costs

Capital costs depend on the type of raw material and the size of plant. Raw materials with greater than 12% moisture content require drying, and therefore require a dryer, which can cost up to 40% of the total capital costs. In addition, if the feedstock is of greater size than a matchbook, a chipper is required to reduce the feedstock to a size that can be handled by the hammer mill. Capital costs are not linear in relation to equipment size. For example, a 100HP, 1-

1.5 tonne per hour pellet plant from a specific vendor costs $145,000USD while a 400HP machine that can handle over three times the capacity is only $275,000USD. A recently built pellet plant in Vanderhoof that is capable of producing 20 tonnes of pellets per hour cost about $20 million CDN in capital costs. In addition to the high capital costs, many pellet plants take 6-18 months to refine the process before becoming profitable, requiring significant operating capital to carry the company over that period of time. Sample capital costs for a Swedish plant that is capable of producing 10 tonnes per hour of pellets is shown in table 4.1 below.

Table 4.1 Capital Costs of a Ten Tonne/Hour Pellet Plant in Sweden ($CDN)

Item	Capital Cost $CDN	Life in Years	Annual Amort 7%	Cost/ Tonne
Dryer	3,550,000	10	505,440	6.32
Hammer Mill	530,000	10	75,460	.94
Pellet Machine	890,000	10	126,716	1.58
Cooler	360,000	15	39,526	.49
Storage, Conveyors, Separators	1,290,000	50	93,473	1.17
Peripheral Equipment	640,000	50	46,374	.58
Buildings	1,520,000	50	110,139	1.38
Total	**8,780,000**		**997,129**	**12.46**

Source: author, based on Zakrisson 2002 (Swedish) converted to $CDN

Similar calculations based on a smaller Austrian plant producing 3 tonnes per hour are shown in table 4.2 below. The plants have different layouts, and the Swedish plant had higher capital costs than a direct comparison would suggest due to co-generation that enabled them to lower drying costs.

Table 4.2 Capital Costs of a Three Tonne/Hour Pellet Plant in Austria ($CDN)

Item	Capital Cost $CDN	Life in Years	Annual Amort 7%	Cost/ Tonne
Dryer	700,000	10	99,038	4.13
Hammer Mill	120,000	10	17,700	.74
Pellet Machine	280,000	10	40,037	1.67
Cooler	19,000	15	2,112	.09
Storage, Conveyors, Separators	430,000	50	31,207	1.30
Peripheral Equipment	740,000	50	53,620	2.23
Buildings	810,000	50	58,768	2.45
Total	**3,100,000**		**302,482**	**12.60**

Source: author, based on Zakrisson 2002 (Swedish) converted to $CDN

The cost per tonne calculations above are based on full time operation with about 10% down time for maintenance. Amortisation is over the life of the asset and assumes an annual interest rate of 7 percent. Based on the data in the tables above, the capital costs for a pellet plant are relatively low at under $13.00 per tonne of pellets, assuming maximised production. Because individual installation characteristics vary widely as well as land and construction costs, the above examples are for general illustration purposes. Although the examples do not depict it well, economies of scale work against plants smaller than 3-4 tonnes per hour. Based on economies of scale calculations done for the US government, capital costs for a 1 tonne per hour plant could be as high as $18.00 CDN per tonne.

Management and administration personnel expenses are also fixed costs and will add about $20,000 per month. For a four tonne per hour plant, this will be equivalent to $9 per tonne during full production. Other costs that generally referred to as fixed costs, such as insurance are small in comparison to the capital portion and would not affect profitability calculations significantly. For that reason, they are ignored.

4.3.2 Variable Costs

Variable costs make up a large portion of the total pellet production cost of a plant that is operating at full capacity. These costs are dependent on the volume of product produced and the cost of the inputs. The input costs vary widely based on geography and availability of inputs, but can be estimated reasonably accurately for a known location.

4.3.2.1 Feedstock Costs

Feedstock cost will be assumed to be zero for internally supplied sawdust and shavings, and will be valued at market cost plus trucking if the internally produced supply is not sufficient. It will be assumed that the current forestry agreement for 360,000 cubic meters will be harvested evenly over 5 years, at about 72,000 cubic meters per year. Moisture content determines the amount of raw material required and heating cost. Assuming moisture content of 53% in wet sawdust and less than 6% in the final product, over 50% of the wet weight of the raw material is removed by drying and processing. On the other hand, shavings have typical moisture content of less than 19%, requiring the removal of only 14% of the original raw material. Typical sawmills in the area produce 70% of their waste as shavings and 30% as wet sawdust. Each tonne of pellets requires about 1.35 tonnes of raw material, assuming typical moisture contents. Feedstock costs are currently low in Northwest British Columbia, but transportation costs are high, especially for longer distances. Trucking charges are about $3 per load plus $0.12 per tonne per kilometre. Assuming a cost of $5.00 per tonne of sawdust and shavings, the cost of feedstock from various sources in Northwest British Columbia near Kitimat is shown in table 4.3 below.

Table 4.3 Feedstock Availability in Northwest British Columbia

Source	Distance	Volume Tonne/Yr	Cost/Tonne (Delivered)
Skeena Sawmill	65km	21,600	15.50
Terrace Lumber Company (future)	65km	21,600	15.50
Kitwanga	160km	18,000	26.40
Carnaby (Hazelton)	200km	25,000	31.00
Smithers	265km	32,000	38.50
Houston	330km	43,200	45.95

Source: author, based on Economics & Trade Branch, Ministry of Forests, BC, May 2002

Assuming 1.35 tonnes of raw sawdust are required for each tonne of pellets, it can be seen that feedstock costs coming from Terrace adds $21 to the cost of producing pellets in Kitimat. Feedstock coming from Hazelton adds $42 per tonne to the final pellet cost. It quickly becomes clear that long distance transportation of feedstock becomes cost prohibitive. Economies of scale that are gained by a large plant can be lost if sufficient feedstock is not available nearby. Feedstock costs for a 4 tonne per hour plant are $21 per tonne of pellets produced, requiring 94% all the material available from the two suppliers in Terrace. Without the availability of the Terrace Lumber Company feedstock, the average price of feedstock would rise to $28 per tonne and require all the remaining feedstock from Terrace, Kitwanga and 40% of the supply from Carnaby.

4.3.2.2 Drying Costs

Raw material must be dried to less than 12% moisture. Drying costs are mostly related to heating with a small component for electricity. The energy required to vaporise 1 tonne of water is 3.3 GJ. Assuming the use of natural gas as a fuel, at $9 per gigajoule, that works out to about $12 per tonne of pellets produced based on the typical moisture content of locally available feedstock. Electricity costs are an additional hourly rate based on the size of the dryer. At $40/MWh, and electric consumption of 120kW, power costs are an additional $2 per tonne of

pellets. Annual maintenance costs for dryers work out to an additional $1 per tonne. Total variable costs for drying are about $15 per tonne.

4.3.2.3 Milling Pelletising, and Cooling Costs

A combined unit is available that does the milling, pressing and cooling. This unit uses about 160kWh of power per tonne of pellets, regardless of the size of the plant. At $40 per MWh, the cost works out to $6 per tonne of pellets. In addition, replacement of dies is $2 per tonne, and non-die maintenance is estimated to be $3 per tonne. Total variable costs of milling, pelletising and cooling are about $11 per tonne.

4.3.2.4 Storage and Peripheral Equipment Costs

Electrical costs for peripheral and office equipment is estimated to be about 50kW. At $40/MWh, that works out to be about $1 per tonne of pellets. Maintenance is about $1 per tonne of pellets. Total storage and peripheral costs are about $2 per tonne of pellets produced. A small portion of these costs is fixed costs and would continue during production stoppages.

4.3.2.5 Personnel Costs

A pellet plant requires 2 employees per shift during continuous operations, and additional resources for support and management. Based on wages of $15/hour a plant requires $30 labour per hour of production. Management, administration and logistics personnel costs are included in the fixed costs. Maintenance costs are also calculated separately. In total, labour costs are about $8 per tonne for a 4 tonne/hour plant and about $4 per tonne for an 8 tonne/hour plant.

4.3.2.6 Delivery Costs

Delivery charges vary widely depending on the location of the plant and the location of the customer. These costs can exceed 50% of the total cost of goods sold. Typical costs to export pellets from the interior include rail charges to reach a port, port charges, and shipping charges. Currently, Vancouver is the only port handling pellets in western Canada. Rail charges include rail car rental, pull charges and demurrage. At the port, storage and port charges apply. Finally, shipping charges themselves are significant and can also include demurrage charges of $25,000US per day if the boat is held up. Total delivery costs for a pellet producer in central British Columbia shipping pellets to Europe are over $70 per tonne of pellets, of which $50 is for ocean transport. A pellet producer near tidal water may be able to avoid or reduce some of those costs and gain a competitive advantage. Covered barges are available to handle 3,000 tonnes of pellets and can be delivered two at a time to the Vancouver port for less cost than rail. The possibility of creating synergies with the Cascadia project to ship pellets from Kitimat might create an additional savings by avoiding the barge charges. Challenges to that option exist, including the lack of a rail line to the proposed site of the port. There is a possibility that the port in Prince Rupert will reopen to pellets in the future, providing another feasible option of trucking the pellets to Prince Rupert and shipping from there instead of barging to Vancouver, should the Kitimat port not be suitable.

4.3.2.7 Total Pellet Production Costs to Market

The total cost of goods sold is the sum of the fixed and variable costs, but the sum of these costs is not sufficient to predict the cash requirements and profitability of a pellet plant. A financial model was built to prepare seven years of financial statements and ratios based on key profitability variables in the industry. The model allows the user to vary market data, interest rates, variable input costs, and original capital costs. The resulting financial statements show the

profitability of each scenario. The variable costs related to the production process itself are similar for most producers (within similar plant sizes where economies of scale are similar) while the feedstock and transportation costs vary widely by geographical location. These base processing costs, including interest and depreciation and administration costs are only $55/tonne for a 4-tonne/hour plant, and $44/tonne for a 8-tonne/hour plant, based on an equity investment of 40% of the total capital required. Feedstock costs for a 4-tonne per hour plant located in Kitimat are $21 per tonne, and $29 per tonne for an 8-tonne per hour plant. Delivery costs are about $66 per tonne to Europe. The approximate cost of goods sold is $140 per tonne delivered to Europe. A more accurate financial analysis will be done using financial statements to calculate actual earnings estimates.

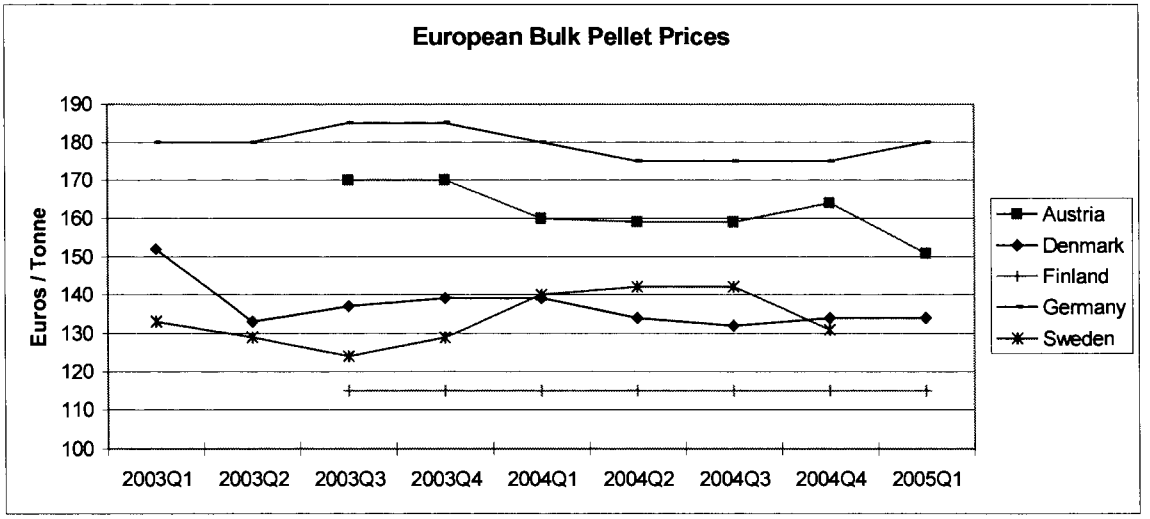
It should be noted that the costing for this model is only approximate and intended to estimate the general feasibility of this type of plant. If a decision is made to go ahead with this project, a more detailed cost estimate based on local conditions and current pricing should be carried out prior to proceeding.

4.3.3 Pellet pricing

Pricing for pellets varies significantly by country in Europe due to variations in production costs and the high cost of shipping pellets. Pricing has been reasonably stable, but varies by as much as 50% based on the country. These prices are spot market prices, but are good indicators of the customer's willingness to pay for long-term import contracts. Currently, most of the imports are going to Sweden. Long-term contract prices are somewhat lower but allow the supplier to ship pellets year round, and keep inventories low. Originally, pellet pricing of exports to Europe was based on the Euro. Neither buyer nor seller wants to be exposed to currency exchange risks, and some Canadian sellers have been able to negotiate contracts in Canadian

dollars. Recent increases in demand are expected to put an upward pressure on the European pellet prices. A conservative estimate of a long-term contract for pellets is 110 Euros per tonne.

Figure 4.5 European Bulk Pellet Pricing (in Euros)



Source: author, based on European Pellet Centre, 2005

4.3.4 Profitability Analysis

Profitability will be analysed by modelling the potential financial results of a typical pellet plant, and then by varying the base assumptions to produce optional scenarios. Profitability will be expressed as a dollar amount as well as a rate of return, assuming all profits are paid out in the form of dividends to the initial equity investor. It is assumed that all debt will be paid out within the 7 year modelling period. While these assumptions do not necessarily align with typical business practices, they provide a potential investor an adequate tool to evaluate profitability.

4.3.4.1 Base Model

The base model will assume production cost estimates based on the fixed and variable costs described above and constant market conditions of a Euro valued at $1.46CDN, a long term

pellet contract price of 110 Euros per tonne, and a 7% interest rate. A 4-tonne per hour pellet plant located in Kitimat and operated by the HBDC, shipping pellets to Sweden via barge to Vancouver could earn about $3.75 million over the seven year period based on a 40% equity investment of $3.2 million. That would represent an average annual financial return of about 16.7% over the 7 years on the invested equity. This scenario would also require a 7-year loan of $4.8 million for initial capital investments and to ensure adequate operating capital. An assumption of 8 months to stabilise production will result in a loss in the first year, but profitability from that point onwards. The base model assumes conditions in the first year will not change through the 7 year life of the model. Financial statements for the base model are shown in appendix A and B.

This base model is not speculative and does not take into account inflation or varying market conditions. It is expected that energy prices and transportation costs will increase faster than inflation. The high demand for pellets should also drive up the cost of pellets faster than inflation. On the other hand the value of the Euro is expected to decrease. A pessimistic model with energy costs increasing at 6% per year, and transportation costs increasing at 2% per year and the Euro decreasing at 1% per year with no increase in pellet prices would generate a marginal profit of $1.17 million for the 7 year period. That would represent an average annual return of 5.2% on the invested equity. An optimistic scenario with energy costs increasing at only 4% per year and transportation costs increasing at 1% per year and pellet prices also increasing at 4% per year would generate a profit of over $6 million over the 7 year period for a rate of return of over 27%. The expected scenario will assume the Euro decreasing at 1% per year, pellet prices increasing at 3% per year, energy prices increasing at 5% per year, and other costs increasing at 2% per year. This expected model would generate a profit of $4.1 million, representing an average annual return of about 18% for the 7 year period.

4.3.4.2 Scenario Options

Profitability can vary greatly based on plant size, location, as well as options used for drying the raw material and delivery of the pellets. A number of options will be examined to determine whether an optimal configuration exists that will satisfy the objectives of the HBDC.

Plant size must optimise the balance of feedstock trucking costs and economies of scale. A plant producing less than 4 tonne/hour will not improve profitability since the base model already optimises feedstock costs by utilising almost the entire availability in Terrace. An 8-tonne/hour plant could earn about $9.0 million over the seven-year period based on a 40% equity investment of $4.8 million. This represents an average annual return of almost 27% on the initial equity investment. This scenario would also require a 7-year loan of $7.2 million for initial capital investments and to ensure adequate cash flows. The economies of scale outweigh the additional feedstock cost, and the return on equity of this option is significantly higher than that of the base option. This result continues to hold true even if one of the feedstock sources in Terrace were not available.

It is possible to reduce feedstock costs by building the pellet plant closer to the sources of feedstock. The economics can change significantly because pellets are much cheaper to ship than sawdust. A Terrace location would decrease the raw material transportation costs by about $10 per tonne, but increase pellet delivery costs by about $3 per tonne. The base case model built in Terrace would increase profitability from $4.1 million to $5.4 million over the seven-year scenario, corresponding to a return of about 24%. In the hands of a company paying taxes on 100% of their income instead of the 1% that HBDC would pay, that profit would be reduced to 3.3 million, representing a return of about 14.8%. It is clear that the tax advantages of the HBDC are a significant competitive advantage.

Two interesting options for drying feedstock will be examined. First, Alcan operates a coke calciner, which produces a significant amount of heat that is not utilised. An opportunity may exist to use that heat to dry feedstock at a very low cost. This option may present logistical challenges regarding additional transportation of feedstock, unless the entire pellet plant was located near the coke calciner. This option would break-even based on a $1 million additional investment for the dryer, and additional transportation costs of $3 per tonne of raw material. Building the pellet plant adjacent to Alcan to eliminate the additional delivery charge would improve profitability by .8 million over the seven-year scenario. This option is not as profitable as the option of building in Terrace, and would require negotiation with Alcan. Similar options could exist to use waste heat generated by Eurocan, but the economics remain similar. Secondly, a dryer could be designed to operate on hog fuel and utilise waste bark available to the Haisla, or use some of the produced pellets to dry the feedstock. The use of biomass for drying is more common among European producers and can insulate a pellet producer from spikes in natural gas prices.

Current plans to build a port facility by Cascadia may greatly reduce shipping costs by eliminating the barge costs from Kitimat to Vancouver, and reducing the dock rates, which are high in Vancouver. A decrease in shipping costs of $5 per tonne of pellets would represent an increase in revenue of about $1 million over the seven-year scenario. The lack of existing traffic to Europe from Kitimat, as well as the low volume of pellets that will be shipped may complicate this option. The lack of a rail line to the Cascadia site may also present a problem. This opportunity could prove more interesting as a joint venture with other pellet producers in British Columbia.

A combined option of locating the pellet plant near the Alcan coke calciner as well as using the Alcan dock to ship pellets might prove to be the most attractive option. This would provide optimal shipping logistics as well as lower drying costs. The profitability of this option

would be $7.7 million with a rate of return of over 34% over the 7 year scenario. It would require a multilateral agreement between the HBDC, Alcan and other pellet producers in Northern and Central British Columbia, and is beyond the scope of this project. While this option would represent an optimal situation for the HBDC, it would represent only a marginal benefit to the other pellet producers. Without the co-operation of the other pellet producers, the volumes of pellet shipments may be too low to attract a shipping company to call at the Kitimat port.

4.3.5 Strategic Alternatives

The options above must be evaluated in order to determine how well they align with the goals and strategy of the HBDC. The options of location and size represent significant profitability and investment choices and require a more detailed analysis. On the other hand, the option of drying feedstock using Alcan heat is of questionable value unless the entire plant is located near Alcan. A plant location near Alcan to reduce drying costs is not sufficient in itself to compete with a plant built in Terrace, but may be an optimal configuration if combined with possible logistical gains in shipping. The option of shipping directly from the Kitimat Cascadia bulk terminal rather than barging to Vancouver and shipping from there would not significantly impact the other options, and therefore can be evaluated separately at a later time.

The choice of location for the pellet plant represents a trade-off of profits versus employment and development of people. While a plant in Terrace would be more profitable, it would not be as effective at achieving the second goal of the HBDC, which is to create employment for its people. The risk of building in Kitimat is that a future competitor could build in Terrace and achieve a competitive advantage, utilising the feedstock resources and rendering the Kitimat plant unprofitable. Tax advantages that the HBDC enjoy are significant when profitability is high, but can disappear in a low profit, price competitive environment. Long term contracts for feedstock could eliminate that threat for the duration of the contracts.

The choice of plant size may be determined by the ability to invest. Profits and returns are higher for an 8 tonne/hour plant, but require a larger investment. Either plant would generate about the same amount of employment, which is 8 labourers and 4 staff. The larger plant would require slightly more maintenance, but that is negligible compared with the much higher investment required for the large plant. Additional self-employment opportunities may exist for the Haisla in trucking the feedstock, and these opportunities would be greater for a larger plant. The choice of a smaller plant would require less investment, and offer a satisfactory level of employment.

4.3.6 Investment Options

This HBDC could pursue these options on their own, or as a joint venture. The initial equity requirements range from about $3 million to about $6 million, depending on the selected plant configuration. These values assume the ability to borrow the remaining 60% required at a 7% interest rate. In theory, a smaller investment could suffice under ideal circumstances, but deviations from the expected plan could result in cash flow problems in the first year. This is risky, especially without the benefit of an experienced partner. The $1.5 million cash the HBDC has for investing could be supplemented by possible grants from the Nechako Kitamaat Development Fund Society or the government to allow the HBDC to develop this opportunity on their own. Alternately, the HBDC could proceed with partner in a joint venture. That would decrease the initial capital requirements and potentially allow the HBDC to benefit from an experienced pellet producer.

4.3.7 Potential Risks

Potential risks that could change the feasibility of this opportunity include a decreased availability of feedstock, decreased pellet pricing, and increased shipping costs. The loss of one

of the feedstock sources in Terrace would decrease the base case profitability from $4.1 million to $3.3 million due to additional feedstock transportation charges. The loss of the second feedstock source in Terrace would render the company insolvent due to the high transportation costs of feedstock. Secondly, a sharp increase in supply of pellets along with a decrease in demand could decrease pellet pricing. Potential competition could come from countries that have available feedstock at low cost and lower shipping costs to the existing market in Europe. Profitability of the potential pellet plant depends on a pellet price of at least 100 Euros/Tonne. Finally, sharp increases in shipping costs could also make the industry unprofitable for North American producers. This may become a reality if shipping companies do not act quickly to provide for a greater demand for ocean transport caused by increasing globalisation.

4.3.8 Summary

The wood fuel pellet opportunity seems to be very promising. The market is currently growing rapidly, especially in Europe. All indicators point to continued growth with demand exceeding supply for the foreseeable future. The HBDC have a number of competitive advantages including lower transportation costs and income tax benefits. Finally, a detailed financial analysis indicates that the proposed pellet plant will be both profitable as well as a source of employment for the Haisla. A recommendation will be made to pursue this opportunity.

5 RECOMMENDATION

5.1 Option Evaluation

Based on the analysis to this point, a number of profitable options exist for the HBDC to build and operate a wood pellet plant. The options for the plant size are for a 4 tonne/hour plant or an 8 tonne/hour plant. The options for the plant location are Kitimat or Terrace. Finally, each of these could proceed as an independent investment of the HBDC, or as a joint venture. Each of these will be decided independently, beginning with ownership choice.

Options will be evaluated based on their alignment with HBDC goals and strategy. For this new company it is essential to achieve a quick win. The three goals of the HBDC are financial performance, human resource development, and care for the environment. The financial performance is the highest goal, and the target is the longevity of the company. The strategic implication is to avoid risk. Human resource development includes business experience, jobs, and earned cash that can be used to provide training. Finally, projects that are not environmentally friendly or sustainable will be rejected.

In the case of a pellet plant, a joint venture would make sense for a number of reasons. Firstly, the pellet business requires a number of competencies that may be hard to acquire without an experienced partner. Long start-up delays combined with inexperience can result in early cash-flow problems. Lack of contacts in Europe could result in lower than optimal prices, which can quickly turn a potential profit into a loss. Partnering with an experienced pellet producer could eliminate much of the financial risk and ensure a successful start for the HBDC. Synergies would also exist with this option in the form of selling and administration savings, where the joint

partner would already have these services in place. A joint venture also provides an opportunity for employment and development with a partial investment. Finally, the size of investment required for an economic sized plant may be out of reach for the HBDC at this time. A joint venture would allow the HBDC to negotiate the amount of investment and percentage of ownership.

The choice of location is not as straight forward. A plant located in Kitimat near the Alcan plant, using coke calciner heat to dry raw material, and having the ability to use the Alcan wharf to ship pellets would maximise profits and provide the best opportunity for Haisla development. If this scenario could be developed into a reality, the low production and shipping costs that would result would be a great hedge against some of the potential risks that exist in this business. This option is also contingent on Alcan developing a co-generation facility at the coke calciner. If all of the requirements above are not met, then the decision of location becomes a trade-off of profitability versus potential Haisla development. Higher profits resulting from lower transportation costs in Terrace would result in less risk, including the risk of a competitor locating in Terrace, should the HBDC locate in Kitimat. The Terrace plant could continue to make a small profit, even if both local feedstock suppliers were to shut down, whereas a Kitimat plant would become unprofitable were that to happen. Finally, some Haisla live in Terrace and those living in Kitimat could commute to Terrace to work, providing a level of employment and development. Terrace would be the optimal location for the pellet plant, should the Alcan scenario not be feasible.

The choice of plant size is more about profitability than about risk reduction or human resource development. It is also about the size of investment. A larger plant is somewhat more profitable, but may also provide a better opportunity to generate shipping options from Kitimat, which could lower costs significantly. For economic reasons, the 8 tonne/hour plant is recommended, provided adequate capital could be raised.

In conclusion, further discussions would have to be held with Alcan to explore the possibility of obtaining land, using heat from the coke calciner to dry feedstock, and using the wharf facilities to ship pellets. Should that option not be feasible for any reason, the second choice would be to build an 8 tonne/hour pellet plant in Terrace as a joint venture with an experienced pellet producer. This option would require about $4.8 million in combined equity investment, and a loan of about $7.2 million. Based on the expected assumptions, the HBDC would realise an average annual return of about 34% on their equity investment, while the joint partner would realise a return of about 21% due to their having to pay more taxes.

5.2 Initial Project Implementation

The initial project will require the selection of a joint venture partner. There are few potential pellet producers with the experience required to proceed with a project of this scope. It is known that Pellet Flame of Prince George is interested in expanding operations, and is already exploring investment options. Pinnacle Pellet of Vanderhoof has recently invested heavily in new equipment, and is still in the process of optimising production. It is not likely that they are ready to make further investments at this time. Little is known about the other pellet producers in British Columbia, except that they are smaller producers and may not have adequate capital or experience for this type of venture. Pellet flame would provide experience and some capital, while the HBDC would provide capital and bargaining power with local industries and feedstock sources.

Once a partner is chosen, the implementation will require detailed planning. This should begin with negotiations with Alcan to evaluate the possibility of using their land, heat and wharf. That will be followed with a number of steps that will carry the project through start-up. Each of the steps will represent a decision point and require a review of the base assumptions and profitability. No commitments should be made until all the steps are completed.

First, the possibility of using the Alcan location should be pursued. Alcan has an interest in supporting economic development in the Kitimat area. Much of the infrastructure for shipping is in place, including a rail line to the wharf. Storage and loading facilities would still be required. Some analysis of the potential capture of heat from the coke calciner has been done. Synergies are expected to exist, and Alcan may support this development for other than financial reasons.

If the above option were not feasible for any reason, a site in Terrace would be the preferred choice. About 10 acres of land zoned for industrial use would be required for the pellet plant, dryer, and raw material and pellet storage buildings. A location near the sawmills would keep transportation costs to a minimum.

Once a location is selected, stakeholder approval should be obtained. This will include provincial and municipal approvals as well as an environmental assessment. Public presentations should be made to allow concerned parties to air their concerns. Concerns should be addressed prior to continuing.

The next step is the validation of feedstock availability. Suitable feedstock availability is the most critical success factor of a pellet plant. Long term contracts should be considered to avoid future hold-ups by the sawmills. Laboratory testing should be done to ensure the feedstock does not have excessive chlorine or other unsuitable impurities. The sawmill should be required to notify HBDC if their source of logs has been exposed to salt water. Contracts should be subject to the completion of the pellet plant. An arrangement to exchange feedstock with West Fraser should be pursued. The pulp mill at Eurocan could use sawdust and chips generated by the forest range agreement wood, in exchange for West Fraser sawdust. Both parties would benefit from lower transportation costs and a superior raw msaterial.

When the required sources of feedstock are confirmed, the concept and preliminary engineering should be done. The engineering should supply two drying options, one using natural gas, and the other, wood pellets. Concurrently, negotiations for the transportation of feedstock and pellet delivery as well as contracts for pellet sales should take place. This will validate capital requirements and should provide a more detailed profitability picture.

Financing must then be secured. A number of options exist for securing the required financing. It is assumed that the partners will provide a certain amount of equity in proportion to their ownership. The HBDC may also be able to secure funds from a number of places, including the Nechako Kitamaat Development Fund Society, the government, or even local industry. Other financing options include the issuing of bonds, use of venture capital funds, or a loan from a financial institution. The long start-up period, large inventory balances, and delays in payment that are standard in this business require significant amounts of cash beyond that required for the capital investment, and care should be taken to ensure adequate financing is available before proceeding.

Finally, tendering, construction and installation will prepare the plant for production. Start-up and fine-tuning can take a significant period of time, and full production is not expected for several months. The Del-Tech Industries in Prince George is one contractor that has pellet plant construction experience.

5.3 Future Opportunities

While the initial project is feasible on its own, several future opportunities may exist that could increase benefits gained from the initial pellet plant project. These could include finding niche markets for pellets in British Columbia, opportunities for shipping directly from Kitimat to lower costs, or using pellets for green electricity generation.

Niche markets may exist where businesses rely on low heating costs to remain profitable. For example, the greenhouse industry in the lower mainland of British Columbia may be interested in converting to pellets for heat. As natural gas prices rise, these opportunities may provide a larger local market for pellets and avoid huge shipping costs. Better promotion and marketing of the use of pellets as a heating option is required to increase the demand for pellets in North America.

Shipping from Kitimat or even Prince Rupert would decrease costs for a pellet producer in the Northwest. The Prince Rupert port recently closed to pellet exports, and has left only Vancouver as an option. Costs are higher to ship from Vancouver, especially for pellet producers that are a long distance away. Availability of a pellet facility in Kitimat or Prince Rupert could benefit all pellet producers in the north half part of British Columbia. The HBDC may be in a position to make that possible, and possibly gain synergies with the Cascadia project. This is an opportunity for co-operation with other pellet producers.

Finally, an opportunity to use pellets as a fuel to generate electricity could be pursued. The British Columbia energy plan calls for 50% of all new electricity production to be from green sources. Pellets are considered a renewable source of energy and may prove to be competitive with other renewable sources. This would also increase the demand for pellets in the local market.

5.4 Conclusion

The HBDC is a new and is still in the process of being incorporated. It will invest in opportunities related to natural resources that are aligned with their goals. It is important that early projects are successful to provide capital to ensure the longevity of the company.

The idea of a wood fuel pellet plant was initiated with the availability of wood and potential wood waste through the forest range agreement. Even though that wood will likely not be used as feedstock for this project, the project continues to present an attractive opportunity for the HBDC to pursue. This opportunity is aligned well with the goals and existing strategy of the HBDC. It will enable them to establish profitability quickly as well as gain experience and credibility in the business world.

This opportunity is particularly attractive for a number of reasons. The wood pellet industry is a growth phase with the demand greatly exceeding the supply, especially in Europe. The future of pellets as a renewable energy source also looks very promising. Feedstock is available in a location that will provide development opportunities for the Haisla. Initial profitability estimates are attractive. Finally, the few risks that have been identified should not be a factor in the short term. For all these reasons, it is highly recommended that this project be pursued by the HBDC.

APPENDICES

Appendix A Base Case Projected Income Statement

Pellet Plant Income Statement Projection ($000)

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Sales and operating revenues	**1,670**	**5,011**	**5,011**	**5,011**	**5,011**	**5,011**	**5,011**
Cost of goods sold							
Raw Material (Inc Transport)	215	645	645	645	645	645	645
Drying	102	306	306	306	306	306	306
Pelleting	55	165	165	165	165	165	165
Storage	15	44	44	44	44	44	44
Shipping	684	2,051	2,051	2,051	2,051	2,051	2,051
Labour	78	234	234	234	234	234	234
Staffing	240	240	240	240	240	240	240
Total cost of goods sold	1,389	3,686	3,686	3,686	3,686	3,686	3,686
Depreciation and amortization	310	310	310	310	310	310	310
Selling, admin and general	50	150	150	150	150	150	150
Interest	336	308	252	196	140	84	28
Expenses	**2,085**	**4,454**	**4,398**	**4,342**	**4,286**	**4,230**	**4,174**
Income before income taxes	**(415)**	**557**	**613**	**669**	**725**	**781**	**837**
Income taxes	(2)	2	2	3	3	3	3
Net Income	**(413)**	**554**	**610**	**666**	**722**	**778**	**833**

Appendix B Base Case Projected Balance Sheet

Pellet Plant Balance Sheet Projection ($000)

ASSETS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Current assets							
Cash and time deposits	2,506	1,433	1,553	1,729	1,961	2,249	2,593
Trade receivables	183	686	686	686	686	686	686
Inventories	412	1,236	1,236	1,236	1,236	1,236	1,236
Total current assets	**3,101**	**3,355**	**3,475**	**3,651**	**3,883**	**4,171**	**4,514**
Property, plant and equip							
Cost	4,910	4,910	4,910	4,910	4,910	4,910	4,910
Accumulated depreciation	(310)	(620)	(931)	(1,241)	(1,551)	(1,861)	(2,171)
Long term Asset Total	**4,600**	**4,290**	**3,979**	**3,669**	**3,359**	**3,049**	**2,739**
Total assets	**7,701**	**7,644**	**7,455**	**7,320**	**7,242**	**7,220**	**7,253**
LIABILITES AND EQUITY							
Current liabilities							
Payables	114	303	303	303	303	303	303
Short-term borrowings	0	0	0	0	0	0	0
Total current liabilities	**114**	**303**	**303**	**303**	**303**	**303**	**303**
Long term debt	4,800	4,000	3,200	2,400	1,600	800	0
Long Term Liabilities	**4,800**	**4,000**	**3,200**	**2,400**	**1,600**	**800**	**0**
	4,914	**4,303**	**3,503**	**2,703**	**1,903**	**1,103**	**303**
Shareholders' equity							
Common shares	3,200	3,200	3,200	3,200	3,200	3,200	3,200
Retained earnings	(413)	141	752	1,418	2,139	2,917	3,750
	2,787	**3,341**	**3,952**	**4,618**	**5,339**	**6,117**	**6,950**
Total liabilities and equity	**7,701**	**7,644**	**7,455**	**7,320**	**7,242**	**7,220**	**7,253**

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