

Business Plan

for

The Windham Community Pellet Co-op

and

The Chittenden Community Pellet Co-op

“The Vermont Community

Pellet Co-ops”

Local Pellets, Local Heat, Local Needs

“Though you live near a forest, do not waste firewood.” - Chinese Proverb

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Draft June 1, 2014

1.0 Executive Summary of Vermont Community Pellet Co-ops

The purpose of this business plan is to raise \$3,000,000 each for the development of wood pellet manufacturing companies. The first two Vermont Community Pellet Co-ops will be located in Windham County and in Chittenden County Vermont. These Co-ops will produce and sell wood pellets to co-op members at member prices and function as a non-profit. Each of these modern wood heating technology facilities will start production at 3 tons per hour, but have the siting capacity to expand to up to 12 tons per hour production at the direction of the board of directors. The goal is to maintain a community scale and to never exceed the 12 tons per hour production that will meet local community needs.

1.1 Products and Services

Wood pellets are commonly used products, usually produced from low price woody bio-mass. Typically, these pellets are used as fuel in small, free standing wood pellet burning stoves and increasingly in pellet furnaces or boilers with both residential and commercial applications. There is strong local demand for these products. Other sections of the business plan will further describe possible related products and business opportunities related to the Co-op. (For possible other products and business opportunities see sections 1.6 and 3.0).

1.15 Biomass feedstock for pellet production

Much of the following discussion is based on, “A Feasibility Study of Wood Pellet Manufacturing in Chittenden County, Vermont,” done by the Biomass Energy Resource Center (BERC) of Vermont. It was published August 2011. It will thus be referred to as the “2011 BERC study” or just the “BERC study.”

There is enough feedstock to produce over 70,000 tons of high quality pellets in the area surrounding both Windham County and Chittenden County Vermont. The 70,000 ton yearly production would require a 12 ton per hour facility. By national and global standards this is a very small operation (See BEREC study of 2007). The feedstock will be green softwood to start operations with. This is because forest products have a range of values. Veneer lumber and saw logs have the highest value. Hardwood for cordwood sales generates income for the harvester. What is left is low quality softwood.

Windham County consists of mostly, relatively small land lots that are privately owned. It is hoped that a co-op that is dedicated to serving the needs of the local community will encourage the supply to the pellet facility of feedstock that might otherwise be un-utilized. The economic benefit to the local communities, and lowering of tax rates by supporting the heating of local facilities such as schools, as well as the creation of local jobs will help support a steady supply of locally sourced feedstock.

Chittenden County and Essex Junction in particular, are developed into urban, suburban and rural areas. There may be significant biomass feedstock from even the more developed areas. This would come from primarily suburban areas of the county based on ease of road access, significant biomass that needs to be removed and the inability of home owners to dispose of unwanted biomass. Currently home owners have to pay to dispose of unwanted biomass. There are free drop off places but for large logs, they often have to pay to get biomass taken away. The county has 539 square miles of land area. This equals 334,960 acres of land. Roughly 150,000 acres is suburban in nature. This should generate between 20,000 to 60,000

tons of low grade feedstock a year. These calculations were left out of the 2011 BEREC study. There is no comparable study that has done this type of analysis (as in an analysis on biomass available from suburban communities). By creating a biofuel co-op, it is hoped that the community will be more interested in turning their low-quality biomass into fuel. The co-op will serve the fuel assistance program in Vermont so there is potential for tax credits for donations of wood feedstock to Vermont's low income heating program. The calculations by BEREC on feedstock are based only on conventional wood resources that are available from land that is in more than 40 acre parcels and is within a 50 mile radius of Chittenden County.

One reason to locate the production facility in Chittenden County is the proximity to the University of Vermont and Vermont Technical College. In phase one, production of wood pellets, this is a well-established technology. But for phase two, three and four development, a significant amount of research should be incorporated with the project. The research will be on environmental sustainability, forest health, soil, water and air quality, systems engineering, total system efficiency etc. The facility will thus function as a learning laboratory for related studies.

1.16 Feedstock procurement

The feedstock will need to be harvested in a sustainable fashion. Only bole logs will be harvested with the tops and limbs left in the forest. Yearly evaluations will have to be performed by a qualified board member or co-op employees to ensure sustainable harvest that promotes sustainability and biodiversity. Every three years, a more in-depth review and environmental analysis of the feedstock procurement will need to be conducted. Because the feedstock is

coming from the local community and the co-op is owned by the local community there is a closer feedback loop for information regarding sustainable harvesting. Talk about GPSing all trucks??

1.17 Feedstock Competitor Analysis

As the biofuel market develops in Vermont there will be increased competition for biomass. The co-op model should provide an advantage in this regard.

In a co-op the price to co-op members is determined by the members so as to operate the co-op as a non-profit. It is in the best interest of the co-op to work with the local forest workers and land owners, provide educational incentives, and support them in best forest management practices. Because the co-op is capitalized by the members initial investments, the business should have minimal or no interest payments. This will allow the co-op to pay slightly more money for wood harvested in accordance with the co-op member's directives for a high environmental standard.

The majority of potential co-op members have indicated they are willing to pay slightly higher costs for high quality pellets that meet higher environmental standards. In the co-op model the price for members will still be significantly below current market prices. (See Economic Viability 1.21)

The cost of transporting the logs, both prior to processing and the wood pellets after processing, are a significant part of the energy cost. Thus the local scale of this facility will be more economically viable than that of a processing facility more than 50 miles away.

The community of land owners in the harvest radius will also be within the community of co-op members. This and the supporting of local low income heating will tend to encourage small property owners to direct their low quality biomass to the co-op. If biomass is donated for use in the fuel assistance program, tax credits and other benefits to the co-op members may also be available.

There is a strong “keep jobs local” sentiment in Vermont. This will help support community scale pellet production.

1.18 Alternative feedstock

Alternative feedstocks should be considered in the initial development of the facility. Beside the use of bole wood for pellet production, pellets can also be manufactured from invasive species such as Japanese Knot Weed, grasses and industrial Hemp. These species have a high energy density per acre and have been shown to make excellent pellets. The Knot Weed harvesting may help limit its spread. Low THC hemp production has a variety of related commercial applications beside use for heating energy. The facility will start production using proven wood pellet technology, however the availability and potential price per green ton of other feedstocks should be part of the planning process.

1.19 Energy conversion technology, (from trees to pellets)

The bole tree logs are trucked from the harvest location to the processing facility. The tree tops and limbs contain most of the trees nutrients and are to be left in the forest. The energy and dollar cost of trucking is significant in determining the energy return on investment and the final cost of the biofuel. The logs should be stored in a wood yard and then processed. Harvesting is seasonal. It shuts down

during "mud season" and has other environmental impacts at different times of year. Thus the wood yard should be able to hold several months of production feed stock. The goal is to keep the facility running at least two shifts a day, five days a week for three months with wood in the yard.

The logs are taken from the wood yard to a debarking machine. A ring de-barker will be used to remove the bark and leave most of the wood intact. The purpose of the debarking is to decrease the ash content of the fuel, decrease wear on the pellet milling equipment, and provide a bark pile. The bark can be sold as mulch in the spring for significant returns. (\$200 / ton for some types of bark) The bark does not store well (due to combustion or composting potential) so most facilities use most of the bark as a fuel to burn for drying the pellet feedstock. The debarked logs should be sent through a metal detector. Iron metals in the feedstock can ruin the pellet mill with considerable cost.

The logs are then chipped or run through a tub grinder. That material is then run through a hammer mill to generate a flour. The flour is dried to about 10% moisture content from about 50% moisture content. The best way to dry the flour is by using a heat exchange drier to both produce the highest quality pellets, and to reduce local air quality issues. The dry flour is then ready for pelletization. The pelletization occurs in either a rotary head press or a flat head press such that the flour is extruded under high pressure and temperature through a die head. The resulting pellet is of 1/4 inch diameter and less than 1/2 inch in length. Pellets have a density of 40 lbs / ft³ and an energy density of between 8,000 to 9,000 btu/lb.

The finished pellets are very hot and need to cool prior to bagging. The pellets can be shipped in 40 lb. bags but considerable savings are to be had if the pellets are sold in 1/2 ton bags, one ton bags, or bulk shipments. The larger bags cost about \$12 each can be reused.

1.20 Location of the Facility: The Chittenden Community Pellet Co-op

Vermont's largest potential market for pellet fuel is in and around Chittenden County. There is a growing demand for bulk pellets in North Central Vermont adjacent to Chittenden County. Due to the increased costs to ship pellets by truck more 80 miles, it makes sense to locate a pellet manufacturing facility in the Chittenden County. Existing green and brown field sites will have to be evaluated on both cost of land, access to three phase electric power, and access to both feedstock materials and potential co-op members. The site will need to have access to three phase power, good road access, and be sited on over 25 acres of land to allow for expansion up to 12 tons per hour and siting of related commercial activities. (See VSHI Feasibility Study for siting a pellet mill in Chittenden County.)

The Windham Community Pellet Co-op

The facility will be located in Windham County to meet the needs of local homes, businesses and government facilities such as schools. It will need to have access to three phase power, good road access, and be sited on over 25 acres of land to allow for expansion up to 12 tons per hour and siting of related commercial activities.

1.21 The Financing

We are seeking to raise \$3,000,000 from financial backers. This money will be repaid by local co-op members. 15,000 co-op member

shares will be sold for \$200 each. Members may join the co-op in units of one quarter ton. A household thus might join at 3.25 ton capacity for \$650. This will raise the \$3,000,000 needed to build a three ton per hour production facility. However such a facility if operated at 3 tons per hour x 24 hour per day x 6 days per week x 50 weeks per year = 21,600 tons per year. If 21,600 member shares are sold at \$200 per share it will raise \$4,320,000. This will pay for interest on any loans, fund expansion to a higher rate of production per year, and be able to put money back into the clean energy development fund to further expand co-op pelletization in Vermont. The goal is to repay the initial \$3,000,000 loan in less than four years of the loan initiation, and within three years of the start of production. It is possible that the entire amount can be raised in one year as members join and production starts.

One share will control the production of one ton of pellets each year with life membership, or be vested to a specific property. Members can choose to pay for each ton capacity, yearly membership fees at \$50 per year for five years or the \$200 per ton capacity in a lump payment. The production facility will be sized so as to start produce at 15,000 tons of pellet fuel a year. Thus by selling the 15,000 shares at \$200 each, \$3,000,000 will be raised to start production at 3 ton per hour. The co-op can expand as new members join up to a maximum of 12 ton per hour production. The number of shares each person can purchase will be limited at the first membership offering. The goal is to meet members residential or business heating needs, not to have pellets be resold by members. This will be addressed further in the mission statement. (See sections 1.3)

1.22 Economic viability

The feedstock costs can be compared for similar operations in Vermont. Wood chips are similar to round log feedstock but have been processed into chips with a chipper. The McNeil electric generation plant in Burlington is currently paying \$27/ton for wood chips delivered to the plant. (From McNeil Plant manager April 2011) <https://www.burlingtonelectric.com/page.php?pid=75&name=mcneil> Wood chips elsewhere in Vermont cost between \$35 to \$40 per ton delivered to local schools that use them for heating. Wood chips are by far the least expensive fuel in terms of cost per BTU in Vermont. Wet wood chips have an energy density of 11.85 Mj/kg. One ton, or 2000 lbs is equal to 907 kg. Thus wet wood chips have a 10,747 Mj/ton energy density. (Biomass Energy Foundation http://www.woodgas.com/fuel_densities.htm). This provides an approximate cost of feedstock at \$27/ton of 398,000,000 j/\$ for green or wet wood chips. At \$35 / ton of wet chips this comes to \$2.95/GJ compared to Natural gas a \$13.81/GJ. (Biomass Energy Foundation http://www.woodgas.com/fuel_densities.htm). The technology to burn wood chips is very expensive and does not scale down to residential or small business sizes. However the technology exists to burn wood pellets at these scales.

Pellets should be able to be produced by a co-op for between \$150 and \$180 per ton and then sold to co-op members at production costs. The Vermont Wood Pellet Company has sold high quality pellets for in bulk or one ton bags for as low as \$120 a ton. At this price range, a ton of pellets is very cost competitive with natural gas. One ton of pellets is 2000 lbs, at 8,000 btu per lb this is 16 million btu per ton, or .13 million btu/\$ at \$120/ton or \$7.5/ MMBtu. Natural gas is currently selling for \$12.85/ MMBtu

(<http://www.eia.doe.gov/oog/info/ngw/ngupdate.asp>). The price for natural gas is based on a total cost of \$1.3111 per CCF. (One CCF of natural gas= 100 cubic feet = 102,000 BTU) These calculations are based on my bill from Vermont Gas Systems Inc. of March 22, 2011. The real cost of natural gas is slightly higher due to a daily access fee of \$.61/day that was left out of these calculations. The Energy Co-op of Vermont is selling Pellets for \$259/ton including delivery with a five ton minimum in 40 lb. bags (<http://www.ecvt.net/buy-wood-pellets.html>).

Conclusion: Pellets at \$120/ton are 58% the cost per btu of natural gas at \$1.3111 per CCF. Co-op member prices should be between \$120 to \$180/ton depending on how large the co-op is and decisions by the members.

If a co-op member chooses to pay member ship fees of \$50 for five years per ton capacity, they will still then have to pay for the production cost of the pellets at member prices.

Yearly costs	\$200 per ton paid in advance	\$50 per year over five years
Membership fees	\$0	\$50 per ton member ship
Price per ton	\$150	\$150 per ton
total	\$150 per ton	\$200 per ton
Current market price		\$230 to \$260 per ton

Note that the yearly membership is paid off after five years. Even while paying off the membership fees, the cost per ton should be significantly below the current market cost of \$230 per ton. It is after the membership fee is paid, that the real savings start.

The Pellet Co-op will sell to members at the co-op facility. Delivery to the consumer may be run by the co-op as the co-op members decide. The co-op may decide to invest in a bulk delivery truck that will greatly improve the supply system efficiency for bulk customers.

Surplus yearly production will be addressed on a yearly basis. There are significant yearly variations of heating needs. (See VSHI Heating Variation Study.) The cold winter fluctuations for the last 60 years have been less than 14% of the decade average. For the last 30 years the cold winter fluctuations have been less than 10% of the decade average. Thus co-op members who wish to have a pellet supply to meet their heating needs should purchase enough shares to meet 110% of their 30 year average calculated heating need. In most years this will generate a surplus. This is good, because the alternative is to run out of fuel. The members will be encouraged to use fuel by the first delivered, first used system. Pellets have a shelf life of over two years so slight over stocking will allow for a reliable fuel supply without wasting fuel. Pellet production will vary slightly according to the previous year's use and current member demand. This yearly fluctuation should be about 10% of the decade average based on VSHI statistical analysis.

If members choose to purchase extra tonnage in reserve capacity, they can easily do so. The recommendation is to have at least 10% capacity held in reserve. This means that they will always have extra pellets available for those occasional really cold winters. See VSHI Heating Load in Vermont for how to plan ahead for those really cold winters.

1.23 Economic Impact on Local and State Economy

We are proposing the creation of two facilities that will start at 3 ton per hour production. Each of these at full capacity of 12 tons per hour will produce about 75,000,000 of wood pellets a year. The price differential for pellets to kerosene, propane and fuel oil is over two to one for usable BTU's. Thus by heating with pellets Vermonters should be able to cut their heating bills in half. Co-op price will be even lower, approaching 30% of the price of other fuels.

Each mill at 75,000,000 ton a year production will save the local economy \$18 million in reduced fuel bills and put \$10 million directly into the local economy. Furthermore 85% of money spent on fuel oil, kerosene and propane leaves the state economy. 85% of the money spent on locally produced pellets stays in the local economy. The multiplier effect of money spent for wages, chainsaws, foresters, subcontractors, etc. will have a significant impact on the local economy.

When seven such facilities are built in Vermont, it will save Vermonters about \$100 million a year while spending \$100 million in the local economy using pellets at market costs. If the co-op model works as expected and can lower the price to co-op members down to \$140 per ton, the savings will be \$130 million, and the money spent in the local economy will be \$70 million.

Each of the seven regional facilities should save the state fuel assistance program between \$700,000 and \$1,000,000 per year. Thus with phase four implementation the saving to the state taxpayers will be between \$4.9 million and \$7 million annually.

1.3 Mission Statement

The Community Pellet Co-op.'s mission is to become a local community based provider of quality fuel pellets at a reasonable cost while meeting other local needs. These needs include:

*Maintaining high levels of environmental stewardship in the procurement, processing and consumption of biofuels. To this end both yearly and five year summative environmental impact analysis will be conducted by the corporation on all aspects of its operation.

*Promoting education regarding biofuel energy use, efficiency, and conservation. Educational programs and partnerships will be developed with local forest product subcontractors, universities and schools.

*Promoting sustainable heating for our lowest income neighbors. Up to 10% of current pellet production will be directed to the states fuel assistance program (Low Income Home Energy Assistance Program or LIHEAP) at co-op member prices. LIHEAP clients may purchase pellets from the co-op at member prices in proportion to the fuel assistance provided by the state. The co-op will partner with the State program as both a provider of fuel, and as an advocate for local LIHEAP clients. The co-op board may choose to provide pellet stoves to LIHEAP clients and co-op members on a lease to own basis.

*Providing high quality pellet fuel to the local community. To this end, membership shares will be limited to ten per person for residential use in the first offering. After personal home use is met, then membership will be offered to schools, municipalities, residents and businesses for commercial- governmental heating use. The second offering will be to Vermont residents and businesses outside of Windham County for

local use. The third offering will be to out of state co-op members for their use. Membership will not be offered to people who wish to resell pellets. Members are expected to contract with the co-op to meet their personal, municipal or commercial heating needs.

1.4 Management Team

Adam Sherman of BEREC and VEIC is an expert in modern wood heating technology. Adam and a VSHI representative will be hired to set up the Co-op, establish its board of directors, oversee construction and contract bids, and get the co-op up to production.

The board of directors of The Chittenden Biofuels Corp. will need to include Vermont experts in pellet fuel technology, sustainability experts in energy and environmental areas, and people knowledgeable in low income fuel programs. These people should be invited from the local community to be served by the co-op. A representative of VSHI should serve on the board while the facility is being build and for the first year of operation. Jessie-Ruth Corkins is the operations Board member of VSHI and...

1.5 Sales Forecasts

The business model is that of a consumer co-op. The goal of the co-op is to only produce wood pellets that are already contracted for by co-op members. Thus the sales will be contracted a year in advance. Each shareholder will notify the co-op every May first to communicate how many of their tons they will need to take delivery on the next heating season. If they already have an oversupply of two tons, then they can choose to not take delivery of two of their tons. Each shareholder will have the following options as to how to use or direct the use of their pellets.

- A) They may purchase their full allotment pellets at co-op production prices for private use in heating. Co-op members may not resell pellets. This will give them a surplus of pellets going into the heating season.

- B) They may direct the co-op to sell the pellets for them at local or regional market spot prices. Any revenue above production costs generated by the sale will go to the co-op member. Co-op sales prices outside the co-op should not be below production costs. The spot market is volatile. If the co-op member has surplus pellets, then there is probably going to be a regional glut, driving prices down.

- C) They may donate some of their production capacity to support LIHEAP or other local nonprofit needs. The co-op member will not be charged for the pellets produced for such needs. The LIHEAP client would be able to purchase the pellets at co-op prices.

- D) The co-op member has purchased 5 ton shares, but has one ton left over from the last heating season, they can direct the co-op to not produce one of their tons for them. They will still purchase four of their five tons at member prices. This is probably the most cost effective option for both the co-op and the member. The co-op may contract to manufacture that ton and sell it on the open market. Any price advantage will go to the member. This allow the co-op to look for a contract that will be advantageous over the next year.

1.6 Expansion Plan for Phase Three

There are a range of related commercial opportunities that are synergistically related to the operation of a pellet facility. The co-op board may choose to lease available space at the production facility to private businesses, or expand the co-op operation into these related areas. Such expansion will make the entire operation more efficient, and thus decrease the costs of all related activities.

Any possible expansion must be done only after study of the economic, environmental and social impacts. The facility is intentionally scaled so that it will draw feedstock from, and sell goods and services back to the same communities. Possible expansion may occur in both pellet fuel and non-pellet fuel areas. These may include:

Bio-gas Production

Bio-gas production can be used for electricity generation. The low quality feedstock that is partially rotten or has a high mineral or nutrient content could be added to a digester along with food waste and manure. The digester will then produce bio-gas and compost.

Compost production

The compost from the bio-digester can be sold as a byproduct. It is better for the environment to use a digester than a compost system in that the compost releases the methane into the atmosphere. Methane is a 20 times worse greenhouse gas than CO₂. The digester also generates a valuable bio-gas product.

Grass, Knot Weed and Hemp energy and pellet production

Grasses are potentially a sources of biomass that is more sustainable than wood pellets. Currently there is almost no market for grass pellets in America. To develop this market locally, grasses can be used as feedstock for a digester or as a feedstock to generate heat for processing the wood fiber during pelletization. Grass pellets and blended grass and wood pellets may be a viable energy product. Similar potential exists for Knot Weed and Hemp production.

Bio-Char

A possible source of bio-gas is from the pyrolysis of biomass with heat. This will produce bio-gas that can be used to generate electricity and also to produce bio-char. Bio char has several potential markets as both a soil additive and for use as carbon filter material.

Bark Mulch Sales

Bark mulch will be generated by debarking the logs. The demand is seasonal, but large revenue is possible.

Low grade Lumber from portable mill

A portable saw mill can be temporarily set up at the facility to turn marginal saw logs into low value lumber. The logs will already be coming into the facility so to use some of them to make lumber is an efficient use of the supply stream and resources. Pellet storage bins for bulk delivery could also be built from this lumber. The bins would hold 1/2 ton or one ton bags for bulk delivery by boom truck. Each bin would open on the side facing the road or drive, and have access to place the bulk bag into the bin. The bin would need to be weather tight and have a bottom hatch for pellet access.

Waste heat from drier used in Greenhouses

The pellet production will generate waste heat from the wood-flour drying process. This waste heat can be sold to a greenhouse operator for seasonal local food production.

These programs will be developed so as to meet the sustainable energy needs of the co-op members and be of benefit to the larger community. It is recognized that there are economic, sustainability and efficiency benefits to developing synergistically relevant energy and biomass projects. For example a pyrolysis system can be used to generate heat to dry the feedstock, bio-char, and biogas for electricity to run the pellet mill.

1.7 Multi Year Plan

Phase one

The short term goal is to establish and get a facility operational to produce wood pellets. Once this facility is operational at 15,000 tons per year then the project enters phase two.

Phase two

In phase two the social relevance and educational goals of the program should be started. In the first winter of operation there will be only a few low income households ready to heat with wood pellets. To increase the number of low income homes the co-op will work with the state LIHEAP program and local affordable housing authorities.

The pellets will be made available to the LIHEAP clients at co-op prices. The stoves will be made available to LIHEAP clients through the state fuel assistance program working with town energy committees and local groups. The co-op may choose to offer lease to own options to both LIHEAP and co-op members. The savings will

pay for the stove in under two years if replacing oil, kerosene or LP gas heat.

Phase three: Expansion to other interconnected/synergistic energy systems

Co-op members may make recommendations as to expansion into technologies such as those described above in section 1.6. A study will be undertaken at the request of the board of directors. At the completion of the study the co-op members will vote on the proposed expansion program.

Phase four

The goal is to expand co-op pellet production so that eventually there are 7 similar facilities located around the state. All will operate at less than 80,000 ton production per year. As other facilities are built, each local pellet co-op will work with the other co-ops. Membership fees may be transferable so that if a member wishes to join a new co-op located closer to their home or business, the lifetime membership is transferable if both co-op agree.

The goal of phase four is that as the capital is paid off for the original construction of the first pellet facilities in Vermont, the capital will be used in a revolving fund under the direction of the Vermont Clean Energy Fund.

2.0 Registered Name and Corporate Structure

The Windham Community Co-op and the Chittenden Community Co-op will be registered as corporations in the State of Vermont.

Each company will have a board of directors who will have oversight of the CEO and plant operations manager. The co-op members will

elect the company board. Board members must have specific backgrounds to be eligible for positions on the board. These will include directors in charge of: sustainability, education, fuel assistance, social benefits, etc. The board will appoint the CEO. The CEO, with board approval, will hire the plant manager, operations manager and co-op staff.

2.2 Further Required Funds

The goal is to start up the company with the least amount of debt as possible. More will be known about the funding requirement as the specifics of location are determined.

2.3 Investor Equity

The goal is to establish the shareholders in the co-op as investors. The membership fee to \$200 per ton capacity will be used to capitalize the co-op. The co-op members will have lifetime membership, or can designate their membership to their property, as an asset. Thus for a home owner, upon sale of the home, the co-op membership transfers with the property.

2.4 Management Equity

The management are just like any other shareholders. Any managers will be required to join the co-op at, at least 1 ton per year capacity.

2.5 Exit Strategy

The co-op is established so as to exist to serve the energy needs of the local community into the future. At such time as the co-op members vote to disband the corporation the assets will be sold off and distributed between the shareholders. Because the co-op was started with Vermont Clean Energy Fund monies, the state

department of public service will have to approve such a dissolution of the co-op.

3.0 Products and Services

As stated in the executive summary, the Chittenden Biofuels Corp. will be actively engaged in the production of wood pellets for its co-op members as its primary business. Other possible products may include bio-char, bark mulch, compost, bio-gas and electricity. The services of the facility may include educational and community programs as determined by the co-op members. Community land use management to promote biodiversity, limit invasive species, and assist in providing sustainable feedstock from the community to the processing facility may also be provided.

The per ton price for wood pellets will be determined by the CEO working with the plant manager in the best interest of the mission statement of the corporation. There will be different prices for co-op members, co-op sales outside the co-op, sales to non co-op members on the open market and to the LIHEAP clients. LIHEAP price savings will be in proportion to the client's fuel assistance from the state.

3.1 Production and operations schedule

Pellet demand will fluctuate from month to month and year to year (see VSHI study on HDD analysis in Vermont). The Pellet Co-op will need to modify production so as to not over or under produce pellets. The goal is to ensure that each co-op member will have access to the pellet fuel to meet their calculated needs. In time of warmer weather, production should be scaled back to avoid surpluses. In times of cold heating seasons, production can be scaled up.

The following data is for a facility that has a three ton per hour production rate. Down time of two weeks per year is allowed for scheduled servicing of the machinery.

3 ton per hour x 16 hour per day x 6 days per week x 50 weeks per year = 14,400 tons per year. Days per week and hours per day can be further reduced below the production goal of 15,000 tons.

3 ton per hour x 16 hours per day x 7 days per week x 50 weeks per year = 16,800 tons per year. 1,800 tons over production goal.

3 tons per hour x 24 hour per day x 6 days per week x 50 weeks per year = 21,600 tons per year. This is 6,600 tons over production goal, allowing for more members, more production as needed by members, or more production for sales outside of the co-op. The goal for sustainability of production and to meet the long term heating needs of the co-op members. The best way to do this is to limit sales to only co-op members and to reserve 10% production capacity for times of unusual need.

4.0 Strategic and Market Analysis

Vermont has a long history of co-op ventures. These include farm co-ops, food distribution co-ops and electric energy co-ops. A pellet fuel co-op is in this tradition. There are currently thousands of pellet consumers locally. If consumers knew that they had access to affordable pellets produced with a high environmental standard more local consumers would invest in pellet burning equipment. Pellet prices may vary with time. However the co-op members will be supportive of locally produced pellets made with the highest quality and environmental standards. Low quality and non-sustainably produced pellets have negative environmental impacts. The trend is that other fuels specifically fossil fuels will continue to increase in cost. There will be market volatility in price, however pellet prices tend to remain very stable. The co-op nature of this business model should

increase price stability for the co-op members. A more in-depth market analysis is currently being conducted by BERCC.

Part of the market strategy is to establish pellet standards along two sets of guides. One is very specific pellet physical properties of pellet fuel: density, energy content, moisture content, fines, etc.

The second set of standards is on procurement: no tops and limbs harvested, biodiversity maintained, worker education in forestry practices, worker pay, etc.

These pellet standards will be clearly communicated to all consumers.

4.1 Economic Outlook

This section of the analysis will detail the economic climate, the wood pellet manufacturing industry, the customer profile, and the competition that the business will face as it progresses through its business operations.

The local economy is relatively strong. However traditional fuel prices are close to the historic highs of a few years ago. The payback period for installing a pellet stove is currently less than three years. Stoves can be installed for between \$1,500 and \$2,500, with savings between \$500 to \$2,000 per year depending mostly on usage. Another market force is the desire for Vermonters to move away from fuels that contribute to global climate change. While burning pellets produces carbon dioxide, local plants will reabsorb the emissions each year and thus pellet fuel does not contribute to increases in atmospheric CO₂. In the last year pellet prices have ranged from \$200 to over \$350 a ton. One advantage of a locally produced pellet co-op is price stability. By using local production the transportation of both the feed

stock and the pellet product are greatly reduced. The wood pellet industry is well established both here and in Europe. However many pellet producers have limited, or no commitment to sustainability or social benefits to the local communities they serve. Further development of other energy products with in the co-op will serve to support the co-op and the local economy.

4.2 Industry Analysis

"Within the United States, there are more than 3,800 companies that specialize in the production of wood products (which includes wood pellet manufacturing). Approximately 10% of these companies have production capabilities to produce wood pellets. These businesses generate more than \$25 billion of revenue per year while providing jobs to more than 110,000 people. Aggregate payrolls in each of the last five years have exceeded \$3.5

billion". http://www.thefinanceresource.com/free_business_plans/free_wood_pellet_manufacturer_business_plan.aspx

This is a mature industry. In other New England states there are land plots of over 100,000 acres of privately owned land that is used for lumber/biofuel harvesting. Vermont does not have this same type of forest resource as Maine or New Hampshire. Nor may that type of operation fit into Vermont's scale of community. One concern is that the pellets are being produced in one location with little regard to long term sustainability and then shipped great distances using fossil fuels before being consumed. A significant goal with this local pellet co-op is to establish a community scale operation. This operation will be of benefit to the local economy, and serve the same communities as where the feedstock is harvested.

4.3 Customer Profile

The co-op customers will be both local home and business owners and low income members of our communities. Pricing the shares at \$200 each makes them affordable to most Vermonters. Pellet may be sold outside the co-op at market prices to provide affordable heating to the larger community as directed by the co-op board.

A significant pellet demand is developing in small to medium sized schools located off of the Natural gas supply network. Large schools have been converted to wood chips. Wood chips are low cost but require a high cost capital facility to burn them. Wood pellets cost more per usable btu, but the capital cost required to burn them is much lower than for a chip facility. Thus Vermont's schools and other municipal buildings will constitute a major customer base. The towns involved will have to join the co-ops as regular members, contributing \$200 per ton needed to purchase the pellets at co-op member prices. However this will lock in the bulk prices at considerable savings, and allow the schools to determine what level of pellet reliability they desire. We recommend reserving at least 110% of the 10 year average as a contracted supply.

5.0 Marketing Plan

The local co-ops intend to operate with a minimal marketing presence after they are established. The establishment of the co-op will mean that the purchasers of the fuels will be the owners of the company. Sales outside of the co-op will be driven by the price, the environmental standards of production and the quality of the pellets. The initial marketing to establish co-op membership is discussed in 5.2.

5.1 Marketing Objectives

The goal is to sell at least 15,000 shares at \$200 per share to raise the capital needed to establish the pellet facility at 3 ton per hour capacity. Once this membership is established then the goal is to expand up to about 75,000 ton membership. Past this level of production it is advantageous to have a separate co-op in a different location to minimize transportation of the feedstock and the pellets.

Part of the marketing objective is to educate the community regarding sustainable production/consumption/energy practices.

5.2 Marketing Strategies

To establish the co-op some commercial marketing may be required. The initial marketing of membership in the co-op will be focused on free media through the news, public events, and access to local political leaders, town energy committees, a Facebook site and a website.

Once established the marketing required by the Co-op will be minimal as its products will mostly go directly to its members. One important relationship is that the community understand the long-term supply of the feedstock is vital to the long term production of the biofuels. What the co-op will sell is environmental stewardship and sustainability, and being part of a community that values its natural resources.

A co-op may partner with other producer co-ops in Vermont to market excess production capacity outside of the co-op system or in other states.

5.3 Pricing

The CEO and the board will determine the pricing of the fuel to the co-op members so as to maintain the facility, pay operation costs, maintain a livable wage to the workers, support other sustainability programs the co-op member's shall vote to engage in and provide up to 10% of production to the Vermont fuel assistance program at member prices. Pellets sold out side of the co-op will be sold for the benefit of the members at market prices.

The board will determine prices for pellets sold in 40 pound bags, by the 1/2 ton bag, 1 ton bag or in bulk truck delivery of up to 10 ton loads. Savings should be significant with large reusable bags and bulk delivery.

Members may purchase membership in units as low as one quarter ton to be able to get member prices. The rational in this, is that members should always at least 10% over their average decade consumption.

6.0 Corporate Organization

The co-op members shall elect appropriate board members every year. The board members shall appoint a CEO by election. The CEO, working with the board shall hire staff to run the operations of the co-op. The co-op will be an equal opportunity employer and support competitive and benefits wages for its employees.

Appendix A Capitalization and Production Calculations

$\$200 \text{ per ton share} \times 15,000 \text{ shares} = \$ 3,000,000$

This is the capital needed to create a 3 ton per hour production facility.

It is assumed that the facility will be shut down for two weeks a year for large maintenance and servicing of the machines.

3 ton per hour x 16 hour per day x 6 days per week x 50 weeks per year = 14,400 tons per year. This is not enough to meet the 15,000 member shares.

3 ton per hour x 16 hours per day x 7 days per week x 50 weeks per year = 16,800 tons per year. This is 1,800 tons in excess of the minimal production needed. This allows for more members and to support some LIHEAP clients at member prices. This surplus could also be paid in part as interest to pay off the capital loan. 1,800 ton capacity x \$200 per ton capacity = \$360,000.

3 tons per hour x 24 hour per day x 6 days per week x 50 weeks per year = 21,600 tons per year. This is 6,600 tons in excess of minimal production needed. This allows for capital to be raised to go to 6 ton per hour production, and to support up to 2000 tons for LIHEAP clients at co-op prices.

The more tons that can be produced by the facility up to a max for a three ton per hour line is 21,600 tons per year. However the capitalization is quite a bit less than the \$200 per ton capacity.

Appendix B

Support of State Fuel Assistance Program

Once the facility is operational with \$15,000 shares accounted for, as new members join, LIHEAP clients, and the state LIHEAP program can be granted member ship up to 10% of the total tonnage produced at three shifts six days a week, 50 weeks a year.

Windham County has a roughly 44,000 population. Windham County also has 10.5% living below the poverty level, or roughly 4,620 people, or approximately 1,500 households.

When the facility reaches maximum planned capacity of 12 tons per hour, it should generate enough LIHEAP pellets to heat these homes with three tons of pellets per year per house at co-op member prices.

Chittenden County and the surrounding counties have a significant population of Fuel assistance clients. The co-op should be able to produce pellets and provide them to LIHEAP clients at a price below the cost of natural gas per usable BTU. At full operation the facility should be able to provide 6,000 tons of pellets for LIHEAP use. The cost savings to the state will be between \$600,000 and \$ 1,000,000 per year.

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