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Feasibility Study for New Business

New Business Venture - Design and Installation of Custom Masonry Heaters and
Wood Fired Bread and Pizza Ovens in Newfoundland and Labrador

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Executive Summary

Newfoundland Stone Masonry, a 2-person company, wanted to investigate the logistics, regulations and possibility of success of a new business concentrating on the design and installation of masonry heaters.

A masonry heater is similar to a wood stove in that it heats the home based on burning charges of wood, but unlike a traditional metal stove, a masonry heater is made of brick or stone. This brick or stone stores the heat and allows it to radiate in a consistent manner over a 12 or 24-hour period.

There are 2 ways the company could work. One option would have Mr. Murphy and Mr. Palmer create a small factory and build masonry heater cores and components in Newfoundland for local installation. This was dismissed outright as the total market was determined to be less than 30 units per year and the investment in core creation would not be recoverable in Newfoundland. It may be worth investigating the feasibility of building cores in Newfoundland to be shipped off island but currently that is not an option that appeals to Mr. Palmer and Mr. Murphy.

The second option for Mr. Murphy and Mr. Palmer would be to import cores and components and build masonry heaters as required. This option was considered feasible and would relegate the company as a cost plus retailer and installer. The investment required for this type of company would be primarily marketing. The paper further explores the level and types of marketing that would be optimal based on the size of the market.

The paper has investigated the logistics, competition and regulations surrounding a masonry heater business in Newfoundland and has concluded that there is little to impede the progress of such a company except for market size.

The market size and lack of knowledge of the existence of masonry heaters will probably limit the size of the company. The required number of units sold would be very small – 10 per year would keep Mr. Murphy and Mr. Martin employed full time – but the market itself is also small and it may be very difficult to find suitable customers.

The conclusion is that Mr. Murphy and Mr. Palmer should not make a substantial investment in time and money marketing the masonry heater, but should offer it as a further branch of their current business. The additional investment would be minimal and would include adjustments to their business cards and design, printing and distribution of brochures outlining design and installation of masonry heaters alongside their other products.

Introduction

Martin Palmer, a St. John's based master stonemason, and his helper and partner, Tim Murphy, propose to create a new company to design and install masonry heaters, and wood fired pizza and bread ovens in Newfoundland. They are passionate about the product and its lifestyle benefits and believe they can offer a unique, high quality product that is currently unavailable in Newfoundland. They currently have a successful business installing concrete counter tops, and custom fireplaces from tile, stone and brick.

Masonry heaters are part of a larger growing movement towards sustainable housing in both the US and Canada. A masonry heater in its simplest terms is a wood stove made of rock or brick. It has been a primary heating source for hundreds of years in Finland, Norway and Russia, and remains a feature of most home construction in these northern climes. It often has the additional feature of a wood fired oven as part of its design, (Lyle, 1997).

“The main thing that distinguishes a masonry heater is the ability to store a large amount of heat. This means that you can rapidly burn a large charge of wood without overheating your house. The heat is stored in the masonry thermal mass, and then slowly radiates into your house for the next 18 to 24 hours, ” (*What's a Masonry Heater?*, 2002). The result is a higher burning temperature creating cleaner emissions, less wood consumption, and even heat distribution in the home.

Because wood fired stone or brick is also the basis for traditional bread and pizza ovens, this option can be made integral to the masonry stove, or alternatively can be created as a freestanding unit either inside or outside the home.

Mr. Palmer and Mr. Murphy are strong supporters of masonry heaters and believe in the benefits it can offer residential users in Newfoundland. This feasibility study will attempt to outline the business concept for the design, manufacture, installation and distribution of masonry heaters and wood fired pizza and bread ovens in Newfoundland and Labrador as well as identify possible marketing concerns and flag any potential pitfalls for the business.

Although this is a fairly new product in North America, it has a strong and active association of proponents for the technology, united under The Masonry Heater Association of North America (MHA) based in the United States. The MHA has approximately 120 members, some builders and some people that are only interested in the technology. Its members are active in research and development; information distribution; and support for Masonry Heater builders and users throughout North America.

Tim Murphy and Martin Palmer are both members of the MHA and as such have access to an extensive web connecting Masonry Heater Builders throughout North America, as well as access to the MHA's extensive library on the benefits of masonry heating; government and insurance regulations and concerns; and research and design considerations for masonry heaters, and pizza and bread ovens.

Mr. Palmer has participated in the building of masonry heaters in both Canada and the United States, and Mr. Murphy has a masonry heater and wood fired pizza oven currently installed in his home. The masonry heater is used as his primary heat source, and the pizza oven as a supplemental baking unit to the more conventional electric range.

General Product Description

The masonry heater has existed for hundreds of years and is only now gaining acceptance in North America. Mark Twain wrote eloquently on the masonry heater, praising it and ridiculing the local method of wood burning.

“Take the German stove, for instance — to the uninstructed stranger it promises nothing; but he will soon find that it is a masterly performer. The process of firing is quick and simple. At half past seven on a cold morning one brings a small basketful of slender pine sticks and puts half of these in, lights them with a match, and closes the door. They burn out in ten or twelve minutes. He then puts in the rest and locks the door, and carries off the key. The work is done. He will not come again until next morning. All day long and until past midnight all parts of the room will be delightfully warm and comfortable.

Americans could adopt this stove; but no, we stick placidly to our own fearful and wonderful inventions of which there is not a rational one in the lot. The American wood stove, of whatsoever breed, is a terror.

There can be no tranquility of mind where it is. It requires more attention than a baby. It has to be fed every little while, it has to be watched all the time; and for all reward you are roasted half your time and frozen the other half. It warms no part of the room but its own part; it breeds headaches and suffocation, and makes one’s skin feel dry and feverish; and when your wood bill comes in you think you have been supporting a volcano.

Consider these aspects of the Masonry stove. One firing is enough for the day; the cost is next to nothing; the heat produced is the same all day, instead of too hot and too cold by turns; one may absorb himself in his business in peace. Its surface is not hot; you can put your hand on it anywhere and not get burnt, yet one is as comfortable in one part of the room as another" (Twain, 1891)

It is thus today with proponents seeing the benefits of the masonry stove, and desperate to communicate the advantages of the system to the wood burning public so it can be more warmly embraced.

In a discussion paper presented at the All Fuels Expo in Burlington, Vermont in 1996, Quebec masonry heater builder and advocate Norbert Senf, outlined the options available in masonry heating systems. He indicated that in North America, there are 4 principal heater types: Grundofen (German and Austrian), Contraflow (Finnish), Kakelugn (Swedish) and Russian, with the Finnish Contraflow the most commonly built type in North America, (Senf, 1996). The Contraflow design demands the separation of the core where the fire is built and burns, from the channels moving the heater air and smoke down the sides of the heater and back out through the chimney, (Barden, Hyytiainen, 1988).

There are a number of ways of constructing a masonry heater including purchasing a complete prefabricated heater system including the exterior heater facing as a kit, such as the Tulikivi (<http://www.virginiaradiant.com>) or Biofire (<http://www.biofireinc.com/>) models. The complete heater is shipped as components to your home and is assembled on site by a local mason. The advantage for this system is that the customer can see exactly what the final product will look like, and they are known for being suitable for installation by a mason with no experience in masonry heaters. The disadvantages are that it is not custom to your home, and the kits are shipped as a complete final product increasing shipping costs.

The second type of kit is a prefabricated heater core such as the Tempcast (<http://www.tempcast.com>). The heater core is assembled onsite from factory made components, but the heater facing is a locally bought product, such as local brick or stone. The advantage for this type of product is that the heater skin is not shipped with the heater cutting down on shipping costs and allowing the product to compliment an individual homeowners style.

The third option is a hybrid core such as Heat-Kit (<http://heatkit.com/html/g-pric-u.htm>) and Albie Core (<http://www.mainewoodheat.com/>). In these systems factory cast components are combined with standard firebricks and heater facing that is purchased locally and is installed onsite. It is the most flexible of the pre cast models: the core can be adjusted as only portions of it, such as the firebox floor, are factory cast and shipped. The balance of the core is built from locally available materials. There are shipping savings in locally acquiring the firebrick and refractory cement as well as brick or stone for the facing. Its disadvantage is that it requires a greater depth of knowledge of masonry heater systems, and because the technology is so new in North America seasoned heater masons are a rarity.

The final option for a masonry stove is one that is hand built. The advantage is having a unique item and if competent, a person can prepare one for a very low cost. In his book, *The Book of Masonry Stoves - Rediscovering an Old Way of Warming*, David Lyle describes a home made (and admittedly unattractive) masonry heater made by a Mr. Fred Fitzpatrick adequately heating his 1800 square foot home in Massachusetts. The cost of

the heater, completely installed, was \$2200; far lower than any furnace available. He consumes about 6 cords of wood per year, which he picks up free around his area.

The disadvantage to building a masonry heater without pre cast core or core components lies in the difficulty obtaining some of the angles required in the fire box or bake oven. As well it would require commitment to learn enough to build one, or finding a mason either already competent or interested enough to learn how to build one. There are plans available for purchase through some companies such as the Maine Wood Heat Company (<http://www.mainewoodheat.com>).

It should be noted that the first three options are relatively new. Until quite recently, all masonry heaters were hand built onsite and often custom-designed. While a masonry heater and wood fired oven can be built from scratch, using pre-cast sections and cores as described above will cut down substantially on the installation time.

There is no core system currently manufactured in Newfoundland; any masonry heating system prepared with a factory core would require the core to be shipped in from Maine or Quebec. In addition to the core, it is currently necessary to import other components such as bake oven or soot doors required for the construction of the heater. These cast iron elements are manufactured in Europe and shipped to the US or Canada where they are combined with the heater cores and sold with kits. As well there are a few manufacturers of doors and other hardware in the United States.

Many of the kits, cores or basic designs for masonry stoves have the option of a bread or pizza oven integral to the stove. Alternately wood fired bread and pizza ovens can be made separately either inside or outside the home, again from kits or by hand. Unlike a masonry heater, which could in many instances, replace a furnace or metal wood stove in use in a residence; a wood fired bread or pizza oven will not replace the standard range in most homes. It would be required by those who are committed to baking in a traditional method, or as a unique, unusual addition to a kitchen.

Advantages

Most companies that sell masonry heaters or masonry heater cores list several advantages of the masonry heating system. Although actual numbers may vary site to site and from design to design, overall the advantages are similar. StoveMaster is just one site which lists commonly quoted advantages such as an efficiency rate of approximately 65 to 85%; the higher burning temperature of the wood resulting in a cleaner burn; low levels of wood smoke emissions and very little in the way of creosote production preventing chimney fires, (*Why Masonry Heaters?* 2006).

The masonry heater uses wood, which is a renewable, sustainable source of energy. In comparison to other forms of wood heat the masonry heater uses minimal amounts of fuel resulting in lower heating costs. Most sites indicate that one or two fires a day are sufficient to keep a standard home heated.

Wood heat can mean independence from electrical heat, removing the worry of dependence on electric or oil heat during electrical black outs and storms,

Disadvantages

There are disadvantages to having a masonry heater in the home as well. Heating with a masonry heater requires the owners to have a personal commitment to heating their homes. A home heated with a masonry heater requires a daily lighting of the fire because heating with a masonry heater relies on thermal mass of the brick or stone letting off heat slowly and evenly over a 12 to 24 hour period. The converse to this concept is that a masonry heater cannot be heated from cold quickly; to do so can cause damage to the unit. Maintaining a steady regular heat with a habitual lighting of a fire is the only way to use a masonry heater effectively.

A masonry heater, because it relies on thermal mass to heat a home, requires a large footprint, thus the heater will take up a large amount of space. The design of the house must accommodate the heater both from a space point of view and also with a nod towards efficiency. Because the unit relies on radiant heat, the open concept home is the one that can benefit most from a masonry heater.

Another major disadvantage is using wood. Ideally, someone that is using wood for heat will have an outbuilding for storing and splitting wood, as it requires space. Small city lots are generally not suitable. Wood in and of itself is dirty work; leaving sawdust and splinters around the garden and in the home. It is also hard work splitting and stacking so this requires a personal commitment to the work or the hiring of someone.

Overview of a New Business

Mr. Martin and Mr. Murphy currently work together, completing stonewalls, chimneys, Rumford fireplaces and concrete counter tops. This is Mr. Palmer's business and Mr. Murphy is an employee. The two are doing reasonably well; their approximate wages are \$600 per week for Mr. Murphy and \$1000 per week for Mr. Palmer. They are limited to about 35 weeks per year because of weather (most masonry must be completed in dry weather and when the temperature is above 5 degrees C.). They have relationships with a small number of architects and builders that prefer to work with them and they have enough projects to keep them both busy.

Mr. Palmer and Mr. Murphy would like to establish a St. John's based business concentrating on the design, manufacture and install of masonry heaters and wood fired bread ovens for new home construction and older home retrofit in Newfoundland. The purpose of this investigation is to discover, based on the potential market, to what extent Mr. Palmer and Mr. Murphy should invest energy into bringing the masonry heater to the Newfoundland market.

There are three options for the new business.

- 1) To invest in location and materials that would allow the company to create cores, and then install the cores, as well as supply core to other masonry heater installers.
- 2) To import cores from another core supplier or suppliers. The company would concentrate on marketing and installation of this type of masonry heater.

- 3) To build masonry heaters as a sideline of their current business, not actively marketing the product.

These options are not clean cut and it would be possible to morph the company from a sideline through to a full-fledged business and on into a core supplier. Mr. Murphy and Mr. Palmer feel that each stove will take four to six weeks to complete so the most they could complete each year would be 10.

The basic model for a masonry heater business will be based on any contractor / construction model. An ideal case would see a potential customer conducting their own primary research on masonry heating systems to first be comfortable with having one and using it properly in order to heat the home. While Mr. Murphy and Mr. Palmer are capable of explaining what a masonry heater is and will be able to provide photos and brochures explaining the various designs, the capital cost and lifestyle commitment of this type of heating system should not be something a customer should invest in without a complete understanding of the benefits and disadvantages of such a heating system.

As mentioned earlier, there are 4 options for preparing a masonry heater, with or without a bread oven, – complete kits; full cores; partial cores and building from scratch.

The option of supplying and installing a complete heater system is available but shipping cost may be prohibitive. A complete system can make some consumers more comfortable because they can see what they will be getting when the unit is completely finished. It is questionable if shipping literally tons of masonry products to Newfoundland is wise,

when most of the raw materials such as firebrick and refractory cement can be bought locally. Complete kits are very expensive and damage can occur during shipping. If there are problems it may not be worthwhile shipping things back.

A full core system supplies all the pieces except the facing for a masonry heater; shipping costs are less than full kits but more than partial cores. The full core system allows the homeowner to decide on the face to be used for the heater, customizing the product to their taste and their home.

Partial cores can also be sourced, and shipping partial cores is also expensive; but least costly of the three pre-fabricated options and will cut down on installation time.

Small core production is really a cottage industry as the cores are made by hand. The cores are prepared by pouring refractory cement into a hand made mold, letting the cement set and then polishing the finished product. The commitment to designing the original molds and having a building available for this type of work requires that there be a certain level of sales. Ideally the cores could be cast locally if this business was successful in the future, but initial start up sales would be with shipped in partial cores.

There is an option of licensing the Albie-core design to be made locally, which would reduce research and development cost – the product is popular, safe and has been in use for many years in Maine. The price of such a licensing agreement is being studied.

Building from scratch is not necessarily more cost efficient because the installation time increases substantially, and neither Mr. Murphy or Mr. Palmer have built any masonry heaters from scratch so there would be a learning curve.

The business will offer consulting and estimating services as a way to attract customers, and will not charge for the first 4 hours for this type of offering. The consulting and estimating services will assist the customers in planning which type and size unit to build; where in the home it should be located for optimal performance and convenience; and which final face materials are suitable for the unit – which are available and which are complimentary to the style of the home. The decision on size, location and final look of the masonry heater will allow the duo to prepare estimates for the project. Mr. Palmer and Mr. Murphy should limit themselves to four man-hours for consultation and estimating – a client that cannot commit to a position of the heater, resulting in multiple visits and re-measurements, or one that is indecisive and requires constant hand holding over choice of finish should be charged the masons hourly wage for these consultative services. This will discourage the “tire kickers”.

The estimate for the installation of a masonry heater could be done on a project basis or on a materials plus hourly wage basis. Mr. Murphy and Mr. Palmer will estimate the materials they require; including shipping costs, customs and incidentals and charge for the materials plus a percentage for their research; contacts and handling. Buyers should be aware that they would need to supply washroom facilities and power for the workers. If the customer cannot supply them, Mr. Palmer and Mr. Murphy can and the client will be charged accordingly.

The labour charge can be calculated by estimating the amount of time that will be required to complete the project; including buying materials, clearing customs; and consulting fees, and adding to it government demanded fees such as Employment Insurance and Worker's Compensation Premiums. HST will have to be included in all estimates.

A completed signed estimate will be supplied to the client and upon acceptance, a 25% down payment for the project will be secured - this will allow Mr. Palmer and Mr. Murphy to order the cores and hardware that will be required to complete the project. This up front payment will prevent Mr. Palmer and Mr. Murphy from shipping in cores and hardware, and then having a client change their mind about design or installation. The cost commitment will ensure the client is serious and has thought the project through.

Initially, the business would be a partnership between Mr. Palmer and Mr. Murphy, with no other employees. A part time labourer could be employed if there were enough projects, and it may be advisable to retain an accountant part time to maintain the company books, but Mr. Palmer and Mr. Murphy could manage both of these functions in the short term.

The installation of a masonry heater and/or bread oven is a one-time purchase, so repeat customers will be rare. It is advisable for Mr. Palmer and Mr. Murphy to understand the importance of a happy client. In this situation, with the very small market and lack of public knowledge of the product, people will learn about masonry heaters as they see

them in action and not through mass media. Therefore a very satisfied customer is most important.

Mr. Palmer and Mr. Murphy feel comfortable with any of the supplied core options, and would install the system that made the most sense in a given situation.

Masonry Heater Competition – Direct and Indirect

Competition for Mr. Palmer and Mr. Murphy's masonry heater business in Newfoundland would be at four levels. Direct competition could come from other masonry heater builders that exist in the province or are willing to travel into the province from Nova Scotia; Prince Edward Island or Quebec. Other direct competition can come from outside kit suppliers; such as Tuviliki and Biofire; that can ship the entire product to Newfoundland and have the product assembled by a local mason.

As far as can be determined, this type of competition is minimal. There are no other Newfoundland and Labrador masons that are members of the MHA; and no kit dealers in Newfoundland (MHA Membership List). There are 30 to 35 masons, bricklayers and fireplace companies in the Avalon region, many of them specializing in tile laying, stone walls or propane fireplaces, but none indicating that they do any work with masonry heaters (Eastern Newfoundland/St. John's Phone Book). There is one masonry heater company in Nova Scotia; one heater mason in Price Edward Island, three companies in Quebec and three in Maine.

The second level of competition would be with other wood stoves; primarily sheet metal

and cast iron woodstoves available through fireplace dealers and home and building supplies stores throughout Newfoundland and Labrador. The people buying these types of products have already committed to having wood heat their home to some degree.

In the 1997 report, *Scoping Study: Reducing Smoke Emissions From Home Heating With Wood*, prepared for Environment Canada, authors Gulland Associates Inc. noted that in 1996 “...Newfoundland still has among the highest provincial concentration with 20 percent reporting wood as their primary heating source and a further 13 percent using wood to supplement other fuels. This total of 33 percent of houses is a dramatic drop from the 44 percent reported in 1991,” (Gulland, 1997).

This drop seems to have leveled off by 2003, with 19% of households in Newfoundland and Labrador still indicating wood and other solid fuels as their primary heating source (Snyder, 2006). There was no indication of the number of households using wood as a supplemental heat source in this most recent study.

The third level of competition would be with the decorative wood-burning fireplaces and its alternatives such as propane fireplaces and high efficiency fireplace inserts. In recent years the fireplace has become a design feature of a home and not a heating source. The MHA defines a masonry heater as a site-built or site-assembled, solid-fueled heating device constructed mainly of masonry materials and having a mass of at least 800 kg. or 1760 lbs., (MHA, 1998). Although the masonry heater can be used to showcase a decorative fire, the size and ideal footprint of a masonry heater make it overkill. Because

a masonry heater burns very quickly at a very high temperature, maintaining a decorative fire over a long period is not recommended.

The masonry heater works best when fired regularly, daily or twice a day, in order to prevent heat stress cracks. The home owner that is looking for a appliance to showcase a fire occasionally would not be advised to invest in a masonry heating system. The new advanced combustion fireplaces and propane inserts are far more suitable for this type of usage.

The forth set of competitors would be comprised of all other forms of home heating used in Newfoundland. The major sources of heat for homes in Newfoundland include electricity (50% of homes) and oil (30% of homes), (Snyder, 2006). Other heating methods such as active and passive solar, and geothermal, do not have a foothold in Newfoundland but can be considered as more direct competition as they also offer alternative sustainable heating methods with low environmental impact.

Competition with other forms of home heat is a function of the installation cost for the base unit – the electric heaters, wood or oil furnace or woodstove; the price of fuel that is required to maintain the home at a comfortable temperature; and the esthetics that a home owner wishes for their home.

Considering a masonry stove as a supplemental or secondary heat source to any of the above heating methods is feasible but the required building up of thermal mass prevents the masonry stove from being used as a extra blast of heat on an extraordinarily cold night, the way you would use a small space heater for example. Ideally the masonry

heater would be the main form of heat with propane fireplaces or electric heat being used to supplement the masonry heater when necessary.

Comparison of Annual Heating Costs

A comparison of energy costs can be calculated by the following method outlined by Natural Resources Canada, (*A Guide to Residential Wood Heat*, 2002).

Table 1: Energy Content and Local Price of Various Fuels

Fuel	Energy Content	Local Price
Oil	38.2 MJ/litre	77.25/litre (NAP, 25/05/06)
Electricity	3.6 MJ/kWh	8.458/kWh (NP, 2005)
Natural Gas	37.5 MJ/m ³	NA
Propane	25.3 MJ/litre	74.6/litre (NAP, 25/05/06)
Hardwood (air dried)	30 600 MJ/cord	Approx \$250/cord (Warfield, 2006)
Softwood (air dried)	18 700 MJ/cord	Approx \$200/cord
Wood Pellets	19 800 MJ/tonne	\$250.00/tonne (Kent, 2006)

Table 2: Typical Seasonal Heating System Efficiencies

Fuel	Type of System	% Efficiency
Oil	Conventional Burner	60
	Retention Head Burner	70-78
	Advanced Mid-Efficiency Furnace	83-89
Electricity	Central Furnace or Baseboard	95-100
Propane	Central Furnace	55-65
	Conventional powered	76-83
	Exhaust condensing	85-93
Wood	Central Furnace	45-55
	Conventional Stove (properly located)	55-70
	"High Tech" Stove (properly located)	70-80
	Masonry Stove	65-90
Wood Pellets	Pellet Stove	55-80

All numbers from the Natural Resources Canada - A Guide to Residential Wood Heat, 2002 – except masonry heater number taken from average numbers throughout research materials.

Typical Annual Heating Loads in Gigajoules (GJ) for Various Housing Types in St. John's New detached – approximately 186 m² (2000 sq. ft.) requires 85 GJ per year
 Old detached – approximately 186 m² (2000 sq. ft.) requires 120 GJ per year

A comparison of approximate costs for different heating methods is attached as Appendix

1. The comparison indicates that though electrical heat is the most efficient, wood heat can cost thousands less per year than other forms of heating. These costs do not take into account the cost of installation of the appliances; and the price of installation can be from \$10,000 to \$20,000 for a masonry heater (including chimney) (Senf, 2006); \$3500 to \$8000 for a woodstove (including chimney liner) (Palmer, 2006), \$8500 to \$12000 or more for oil furnace and hot water radiation heating system (Ottenheimer, 2006) or \$5000 to \$7000 for electrical heating, (Walsh, 2006).

As seen above with Gulland (1997) many homeowners have multiple heating systems (primary and supplementary) with “20 percent (of respondents) reporting wood as their primary heating source and a further 13 percent using wood to supplement other fuels.” This will increase installation costs as two or more systems may be installed, and the installation costs of multiple heating methods may be a limiting factor for selecting primary and supplementary eating methods.

There are many factors other than cost that go into the decision of what type of heating system to install in a home. Cleanliness, convenience, perceived quality of heat, and environmental concerns can all be factors in choosing heating for your home.

Wood-Fired Oven Competition – Direct and Indirect

Similar to the masonry heater, direct competition for a wood fired oven in Newfoundland does not really exist. There are available on the internet wood fired pizza ovens in kit

form, as well as mentioned previously kit masonry heaters often offer a wood fired pizza oven as an option.

Indirect competition would include all electric, propane and oil ranges that can be used for preparing any product that can be prepared in a wood fired oven. The wood fired oven would not be a replacement for these items but a supplement to them. As well, for the connoisseur, a wood fired pizza or bread may be demanded but there is not a tradition of this type of food required in Newfoundland.

Regulations

Installation

In a publication on Residential Wood heat, Natural Resources Canada advises

“Masonry heaters are entirely different in design, construction and operation from conventional masonry fireplaces. The core of the heater, consisting of the firebox and heat exchanger, has a series of precast components made of high-temperature brick materials. They are assembled by a mason and surrounded by the finish material (brick, tile or stone). The clearances of a masonry heater from combustible materials must meet the standards found in building codes for conventional fireplaces.

Someone without specialized training and plenty of experience would find it difficult to build a masonry heater that would perform well and last a long time. A masonry heater is not only costly but also a lifetime investment, so select your heater mason carefully. Ask for references from previous customers, and call them for their comments. Qualified heater masons are certified by the Masonry Heater Association of North America, (*Guide to Residential Woodheat*, 2002).”

Installation regulations for a masonry heating system would be the same as that required by the National Building Code for masonry fireplaces and other fire burning appliances.

The Natural Resources Counsel encourages safe wood burning by encouraging wood burners to:

- a) Follow a reliable installation code such as the CSA B365 Installation Code for Solid-Fuel-Burning Appliances and Equipment, which will give information on clearances and air intake required for wood burning appliances.

- b) Use safety-testing standards where applicable in the construction of a masonry heater, for stoves, inserts, fireplaces, furnaces, chimneys and flue pipes (almost all equipment for sale carries a certification label indicating that it conforms to safety tests);

- c) Thorough training program for retailers, installers, chimney sweeps, municipal fire and building inspectors, and insurance inspectors (professionals in every part of Canada have completed the WETT or APC programs). These regulations indicate clearances from the masonry to combustible materials; chimney heights, air intake requirements etc. and as a certified mason are well known to Mr. Palmer.

Any new home construction or renovation will require a permit from the city or community in which the home is being built; the installation of a masonry heater would not require any extraordinary permits.

Manufacturing Regulations and Concerns

As mentioned above the company can proceed in many directions. The level of manufacturing will be negligible if the business decides to ship in complete or partial kits and cores; or if the business proceeds to build masonry heaters completely by hand or

with one off forms. In these cases all the manufacturing and installation is done on a site-by-site basis, and there is no manufacturing or inventory to account for.

If in future the business grows enough to warrant the manufacturing of cores, or other pieces, the manufacture would proceed as a cottage industry, with Mr. Murphy and Mr. Palmer hand building forms and pouring refractory cement to prepare cores. They would be required to follow Canadian Standards Association guidelines for the production of precast concrete as set out in CSA Standard A23.4. This Standard specifies requirements for materials and methods for the manufacture, transportation, and installation of architectural, structural, and specialty precast concrete products. (CSA, 2005)

Licenses for Masons

Installing masonry heaters requires no license, although there is a system of accreditation offered by the MHA. There are 20 accredited heater masons in North America. The MHA accreditation (appendix 2 attached) requires demonstration of an understanding of relevant housing and fuel burning regulations work; 40 hours work under the direction of an accredited mason; and completion of 3 masonry heaters in the past 5 years - at least 2 of which the candidate must be lead mason. Mr. Palmer and Mr. Murphy do not have the certification, as there has only been one masonry heater built in Newfoundland in the past 5 years. Installation by Mr. Palmer of 3 masonry heaters in a five-year period is all that is required to qualify him for accreditation through the MHA.

According to Mr. Palmer (2006) there is no license, legal requirement, certificate or even schooling required to work as a bricklayer, or stonemason in Newfoundland. Installation

of a masonry heater, as it is a form of a fireplace, has no regulation. The College of the North Atlantic does offer a bricklayers course; but Mr. Palmer indicated that most bricklayers learn on the job as an apprentice; he himself is the son and grandson of stonemasons and learned his trade through apprenticing with his family. In St. John's he is a well-regarded fireplace mason, and has been called on by the courts to offer expert testimony about the work of other masons.

Environmental Regulations

In 2002, the Intergovernmental Working Group on Residential Wood Combustion, comprised of representatives from municipal, provincial, territorial and federal governments working group prepared a discussion paper on reducing the emission from wood burning appliances.

In their paper they indicate that although there are EPA and CSA regulations on some wood burning appliances... “only British Columbia has a provincial regulation prohibiting the sale or manufacture of wood heating appliances that do not comply with the CSA standard or the US EPA standard...” As well it indicates that there no regulations regarding emissions or the type of wood stoves sold or manufactured in Atlantic Canada and that “...As a general rule, regulatory authorities in the Atlantic provinces act on a case basis only when a complaint has been filed. An air pollution regulation in Newfoundland specifically excludes emissions stemming from residential heating”, (*Options to Reduce Emissions from Residential Wood Burning Appliances*, 2006).

Because masonry heaters are custom made on site, not manufactured, they are exempt from certification, as all would require individual testing to achieve CSA and EPA emissions approval. Reporting to the EPA in a technological review, James E. Houck and Paul E. Tieggs from OMNI Environmental Services, Inc. indicate that, “All masonry heaters produce low particulate emissions through high-temperature, short-duration combustion of cordwood that transfers heat to a high masonry mass. The masonry mass radiates heat after the fire is out. Masonry heaters are exempt from certification and few are in use due to their high cost,” (Houck, 1998).

Wood Procurement

In Newfoundland wood procurement is controlled by the provincial government Department of Natural Resources. The department requires those that cut wood for domestic use from crown land apply for the Domestic Cutting Permit. This permit allows cutting of timber for personal use, allowing for wood removal not in excess of 23 cubic meters. Domestic cutting permits cost approximately \$21 per year, (Dept. of Natural Resources, 2006).

The alternative to cutting your own wood is to buy wood from a variety of wood suppliers around the province. In winter the local papers carry classified ads for wood sellers, the price is often for split wood, sold by the pick up load and delivered, though the buyer is left to stack the delivery. Wood is sold for \$80 to \$100 per pick-up load, with each load approximately equal to 1/3 of a cord, (Warfield, 2006).

Insurance Issues

There are a variety of insurances that apply to people who are beginning their own business including property insurance, commercial auto insurance, general commercial liability insurance, worker's compensation and design professional insurance.

Business Property Insurance – required if the business owns its own office or manufacturing plant. Covers building and inventory in the event of fire or other types of damage or disaster.

Commercial Auto Insurance – required to cover a truck and any accidents that might occur while the truck is being used for business purposes.

Commercial Liability Insurance – covers damage to property or people caused by negligence, accident or fault of the insured but does not cover items considered under their care, custody or control. For example if Mr. Murphy drops a square of marble during installation and it hits a window or a person, damage to the window or person is covered but damage to the marble is not covered.

This insurance also covers damage resulting from negligence or fault of installation of the product – for example if a heater was installed incorrectly and caused a house fire this insurance would help cover the damages. It will not cover the work that may have to be redone based on problems in workmanship or materials. For example if the mortar fails and a chimney had to be repointed this insurance would not cover this work.

Worker's Compensation – Mandatory coverage required in Newfoundland to cover all work related injuries.

Design Professional Insurance – Coverage for architects and engineers to insure their designs so that any damage that results from a design they have approved is covered.

The configuration of the business Mr. Palmer and Mr. Murphy embark on will determine which types of coverage they require. Their current coverage would be suitable only if the masonry heater components were supplied and the installation was according to manufacturers instruction and followed bricklayer and stonemason current codes.

Installation of cores and facing for masonry heaters and wood fired ovens or installation of complete kits would require:

- Commercial liability insurance – for damage that may occur on a worksite or damage resulting from faulty installation of the product,
- Commercial vehicle insurance to cover the truck required for the work site and
- Worker's compensation insurance for work related injury sustained by Mr. Palmer or Mr. Murphy or their employees.
- It may also be advisable that Mr. Palmer and Mr. Murphy purchase property insurance that would cover their equipment such as wet saws or chisels but this is optional; the premium and deductible are quite high and it may not be worth the investment.

Design and installation of masonry heaters and wood fired ovens would require all the insurance required above plus the approval of the designs by an engineer who is covered by the Design Professional Insurance.

Design and manufacture of cores, and installation of cores and facing would require all the insurances mentioned above plus business property insurance for the manufacturing plant.

Approximate costs quoted by insurance agents Susan Winsor from Sunco Insurance and Gordon Payne from Munn Insurance are as follows:

- Commercial Liability - \$1000 / year for \$1,000,000 in coverage \$1250/year for \$2,000,000 in coverage. According to Ms. Winsor some contractors are requesting \$2,000,000 in insurance. (Winsor, 2006)
- Coverage for Loss to Tools - \$100 per \$10,000 of coverage with \$1000 deductible
- Vehicle insurance - \$1000 to \$2000/ year for a 10 year old pickup – Public Liability

Paul Newell at the Workers Health and Safety Commission requested that \$6.62 per \$100 of gross payroll would be required for workers compensation payments. This is mandatory in Newfoundland, (Newell, 2006).

Import and Customs Concerns

Import and customs concerns will be dependent on the design of the business Mr. Palmer and Mr. Murphy propose.

Building masonry heaters completely on site with local materials, or buying cores or heaters made in the US and installing them in Canada should result in little or no duties in reflection of the free trade agreement but once the concept of the business is decided on an application for advanced tariff ruling should be made to the Canada Customs agency.

Although cores manufactured in the US will be exempt, most of the hardware available is imported from Finland, Germany, and Russia, to distributors in the US and Canada.

There are also some American manufacturers of hardware for wood fired stoves and heaters. Hardware created in the US and Canada, should not be subject to duties if shipped to Newfoundland, but all materials shipped from Europe and then to the will be assigned tariffs and duties upon entrance into Canada. After deciding the manufacturer or distributor from whom they will buy their hardware, application can be made in order to determine the appropriate duties tariffs and taxes for the different items, (Canada Border Services Agency, 2006).

Critical Risk Factors

Critical risk factors, or areas of concern that could positively or negatively effect the business, include new government regulations, changes in the population demographic, technological changes and economic factors such as increases or decreases in housing starts, or a recession or economic boom.

Change in Price / Availability of Wood – A person that is using a wood fired oven or masonry heater or wood stove will be sensitive to fluctuations in the price of wood for their wood supply. Currently the price of precut and split wood is very reasonable at \$200 to \$250 per cord, delivered, (Warfield, 2006). This might change as the price of oil and gas also rises; forcing wood transporters to increase prices to cover costs.

Cutting wood for domestic use from crown land requires a permit currently priced at \$21. This price is negligible for many who cut their own wood; changes in the prices of trucks, trikes or chainsaws will have more impact, factoring into a users price of wood.

Change in Price of Oil / Electricity – As the price of oil and electricity increases or decreases the dependence of wood for primary or supplementary heating increases or decreases as well. Though not confirmed with statistics, anecdotal evidence from wood stove installer, Mr. Warfield, relates an increase in wood stove installation rates this past winter related to the sharp increase in oil prices (Warfield, 2006).

Change in Emissions Policy – As mentioned above, there are currently no emissions regulations for fireplaces in Newfoundland and Labrador. For on site built fireplaces there is no indication this will change but for factory built wood stoves, new air pollution control regulations under the Environmental Protection Act regulations come into effect in 2008. These regulations read as follows:

Commencing July 1, 2008 a person shall not manufacture sell or permit the selling of a residential woodstove, fireplace insert or factory built fireplace, which may emit particulate matter into the environment in excess of:

- a) The emission requirements for the Canadian Standards; or
- b) The emission requirements of the US EPA standard.

These changes in policy will not directly affect the building of masonry heaters because the masonry heater is an individual on site installation and therefore will not be subject to emission controls. The emission controls may reflect positively on masonry heaters because the high temperature burning and one or two burns per day inherent to the design result in fewer emissions per heating unit than fireplaces and most woodstoves, but this is currently not measurable under the EPA standards. (Tiegs, 1995)

Age of Population

The work involved in wood burning may make it unattractive to the elderly. The government of Newfoundland agrees the population is aging and the median age is expected to rise from 39.3 years in 2003 to 47 years in 2018 (*The Economy 2004 – Newfoundland and Labrador*, 2004). This demographic shift may move people away from wood burning as they reduce their physical ability to maintain wood burning as a way to heat the home.

Advancing Technologies

Other critical risk factors include heating with solar, heat pumps and wind power. The promise of clean and affordable heat is in development and is always on the horizon. As in masonry heater systems there are pioneers investing in building or retrofitting their homes with these alternative sources of heat or electrical power. Those hoping to gain independence from high electrical or oil pricing will continue to seek alternate ways to heat their homes. The recognition of a method less expensive, and more efficient, than wood burning will affect the market for masonry heaters and all wood stoves in general,

though sadly there is no imminent breakthrough in technology to warrant concern by the wood heating industry.

Entrance of New Competitors in the Market

As in all potential new businesses there is the possibility that if a masonry heater / wood burning oven business was successful new competitors would enter the market increasing competition and lowering prices and profits. While this is possible this is not the biggest obstacle facing Mr. Palmer and Mr. Murphy; they will have more problems informing the Newfoundland public about the product and its benefits than with direct competition, it is something they should consider.

Should the masonry heater in Newfoundland become a common item, Mr. Palmer's years of experience building the units, and Mr. Murphy's years of research into all aspects of the design; as well as first mover advantage and current good standing membership in the Masonry Heater Association should allow them to get a foothold as the "guys that build masonry heaters" long before other companies would be able to do the research and create the contacts to get into the market.

Having a working 5-year-old model in Mr. Murphy's home will also prove advantageous as potential clients can see the unit in action before one is commissioned. The large investment may also keep a customer focused on the "guys with more experience" rather than trying out a new mason that has not built one before.

Estimate of Market Size

The market for the masonry heater in North America is still in its infancy; it is a custom product that few people supply, and few wood burners are aware of its existence, much less the advantages or disadvantages it may have over other wood burning appliances.

Norbert Senf, a Quebec based mason and member of the Masonry Heater Association, estimates the total number of masonry heaters installed in North America each year at approximately 2000 and the total number of masons building heaters full time at around 20. He, himself, builds 12 per year and sells cores for 40 more that other masons install (Senf, 2006).

Mr. Senf feels that most buyers are well educated about heaters and understand the function of a masonry heater long before they contact him or other heater masons to discuss a project. “90% of our clients are enlightened home owners or people building a house, who find us on the web, do their research on our web site, and are thrilled to be able to find all this information online. They make up their own mind, and I am not on the phone endlessly with people trying to explain to them what a masonry heater is. Probably 75% of them have a university degree,” (Senf, 2006).

Although it makes the most sense to build a masonry heater during the home construction phase when everything from the footprint support to the positioning can be accounted for in the construction, there is interest in retrofitting some older houses that currently use woodstoves or have traditional fireplaces that do little for energy conservation or sustainability.

According to the Canada Mortgage and Housing Corporation (CMHC), between 2001 and 2005 there were approximately 5500 detached single family housing starts in St. John's Mount Pearl, Torbay, Paradise, Conception Bay South, and the surrounding areas (see appendix 3), an average of 1100 per year. In 2005, the average price for such a home was \$196,500, (see appendix 4).

Statistics Canada reports that in 2004, there were a total of 192,810 (Statistics Canada, 2005) households in Newfoundland and Labrador, with 31,000 of these, or 16%, indicating wood as their primary heating source, (Statistic Canada, 2004). This is a drop of 3% from the 1997 Gulland *Scoping Study on Reducing Smoke Emissions* which indicated Newfoundlanders reporting a 20% usage of wood as their primary heating source, with 13 percent using wood to supplement other fuels, (Gulland, 1997). This change could reflect an actual drop in use of wood heat for residents or different definitions of primary heating fuel. For estimating purposes we will use the more conservative number.

To determine the possible market potential for masonry heaters in Newfoundland, a combination of factors such as the percentage of people using wood as their primary source of home heat, the percentage of people installing a wood burning fireplace in a new construction and the total of new housing starts should all be taken into account.

One way to estimate the number of homebuilders that can afford the up front capital costs for a masonry heater would be to include only those that would install a traditional masonry fireplace. Natural Resources Canada reports that in 1997 traditional wood

burning fireplaces were present in 17.9% of homes in Atlantic Canada, but also indicates the percentage of new homes built with wood burning fireplaces is going down as they are replaced with gas fireplaces (Natural Resources Canada, 1997).

By multiplying the number of new homes built per year with the percentage of people that heat by wood and the percentage of people that have a wood burning fireplace in their homes this will give us a rough idea of the potential market.

1100 new homes built per year x .16 heating with wood heat x .179 homes built with wood burning fireplace = potential market of 31 homes in the St. John's area per year.

This formula results in an estimate of possible interest only as it assumes that the percentage of people that heat with wood is evenly distributed throughout all income levels, and that those with the higher incomes (presumably those that are installing wood burning fireplaces in new homes) are equally likely to heat their homes with wood as those of lower income levels. Without a more in depth study we cannot discover the correlation of income levels to heating with wood. As well, our formula ignores owners of existing structures that may wish to include a masonry heater as a renovation item, as well as any construction outside of the St. John's area.

There is some anecdotal evidence to suggest that these numbers are a reasonable starting place and are similar to the average percentages from Statistics Canada. For example out of the last 10 home insurance policies completed for The Cooperators in Mount Pearl, 2 homeowners indicated wood as a primary heat source. These 2 homes were built in 1967

and 1976. The other 8 homes were all built between 1964 and 2003 (Lacey-Osmond, 2006).

Personal observation was also employed to determine if the St. John's and Avalon statistics mirrored the Newfoundland statistics reported in Statistics Canada. A standard subdivision street was chosen in Paradise to be observed. The west side of Donna Rd., had 17 visible homes (2 were obscured by trees). Of these 17 homes, 5 had visible steel chimneys, separate from a masonry fireplace chimney (the masonry fireplaces chimneys could also be used as a wood stove chimney). This does not necessarily indicate that that these homes burn wood now, only that they probably did at some point since they were built. These homes are all about 10 to 20 years old. The other problem with this personal observation is that the wood stove may be used as a secondary heat source not as a primary heat source.

While the findings do support the proposal that there may be a market for approximately 30 masonry heaters in St. John's and the Avalon this may be misleading as there may be other limiting factors which may decrease the total market size:

- a) House design – an open concept home is required for the maximum benefit of a masonry heaters
- b) Travel – because a masonry heater requires almost daily firings in the winter, households that engage in a lot of travel are not really suitable as a household that uses masonry heaters as a primary heating source.
- c) As mentioned before limited land or lot size is also a factor in the practicality of installation of a masonry stove.

These concerns can only limit further the already small market size, resulting in a market size that may in fact be too small to measure. Marketing for such a small and select group, such as these buyers, would be limited - mass marketing would not be cost efficient or affordable for such a small group. The targeting of this group would be a special case. Some options are discussed in the Marketing Options section to follow.

Marketing Options

For any new product to be successful the potential customers must know it exists and must see a benefit of using it over other options. The customer can find out about the existence and availability of a product through mass media advertising, word of mouth, or happenstance, but it is what the potential customer understands as benefits – what induces a favourable opinion of the product – that matters.

Without research, we cannot be sure if consumers in Newfoundland have not actually heard of masonry heaters or know about masonry heaters but do not know how to order one or that there are local experienced installers available. Anecdotally, Mr. Murphy feels that few people know what they are, and that visitors to his home often engage in basic concept discussions to understand how they work (Murphy, 2006).

If we assume that masonry heaters are an unknown entity in North America and Newfoundland, with very few consumers considering it as an option for home heating, then the first concern would be to create primary marketing for the product. Primary marketing for a product ensures that consumers know of its existence and benefits and

does not worry too much about having a potential consumer choose one brand of the product over another. Any increase in the primary demand for masonry heaters in Newfoundland should lead to an increase in installations for Mr. Murphy and Mr. Palmer.

The limited size of the potential market in and around the St. John's area precludes the idea of mass media advertising as a channel for primary product marketing, (although the potential of mass media to introduce consumers to the product through feature stories or news items should not be ignored). In an ideal world, contacting the 1100 new home owners per year before they build would be the best move, but this will prove difficult – many of the homes are built on spec by developers without a final buyer and are built from the same basic plans. And while the developer may install a wood-burning fireplace as a selling point, the expense and space of installing a masonry heater that may never be used does not make economic sense.

Contacting those owners that build a custom home through an architect may also be an option but again that is a small portion of the market, and not necessarily correlated to those that would burn wood as a primary heating source.

Consumers could be reached through tradeshows such as the Canadian Home Builder's Association Home Show in St. John's each spring. The 2005 home show attracted 23,000 visitors; and targets consumers and residential builders, contractors, and renovators, (CHBA, 2006). Although it would not be possible to make a working heater to bring to a Home Show, Mr. Murphy would consider the investment of preparing sample heaters if he felt sure that he could contact potential customers, (Murphy, 2006). The trade show

would be a good vehicle for informing builders and architects about masonry heaters, as many of the local builders are member of the CHBA and would attend the tradeshow.

Costs to actively market the masonry heater business through the Home Show would include:

- a) A booth at the Canadian Home Builders' Association of Eastern Newfoundland Home Show in St. John's at a cost of \$950 plus tax per year (Comerford, 2006)
- b) Design and printing of brochures and pamphlets describing masonry heaters and how they work. Allow approximately \$3000 (Keiley, 2006)
- c) A full size model of a masonry heater to show how they work. Allow \$15000 for materials and labour. (Murphy, 2006)
- d) Truck to move model and storage. Allow \$500 per year for storage and \$250 per move (inside city only – truck rental and forklift) (Murphy, 2006)

Total expenditure would be approximately \$18,000 first year to build the model and prepare brochures, and a continuing cost of \$1950 per year for the trade show booth and storage and movement of model. If we allocate 1/5th of the cost per year and 5 years for our market development, the cost is \$5550 per year for out of pocket costs.

This would be a large investment with a very small chance of recovering the investment.

Norbert Senf is not a fan of tradeshows or marketing in general.

“This is my own personal view, but I'm a contrarian on marketing. We did a few home shows - we got a lot of tire kickers who can take up a lot of your time. The last person in the world that I would market to would be a builder. Almost ditto for architects. I would only sell direct

to the end user. This has worked very well for us, but I think everybody has to find their own niche. Quite a few guys do home shows, and it works for them. Jerry Frisch did the Seattle Home Show for 25 years, and got most of his business that way (that was pre-internet). It was a long-term investment. Some people would talk to you for 5 years before they were ready to actually build,” (Senf, 2006).

How Market Size Will Impact the Business Design

The limited market of 30 heaters per year does not look promising for creating a business of building cores locally. Although Mr. Palmer and Mr. Murphy feel confident in their ability to design and manufacture a suitable core, or, alternatively, build cores from an existing licensed design, the market size appears to be too small. With a total estimated market of 30 or fewer heaters per year in Newfoundland, it would not be prudent for Mr. Murphy and Mr. Palmer to consider manufacturing cores initially, as the set up costs such as mold design and creative; licensing of existing designs; obtaining and setting up manufacturing facilities and testing suitability of cores would be prohibitive until it was proven that the local market could sustain their production. Capital costs would only be able to be spread out over a limited market of less than 30 units per year.

In the future if Mr. Murphy and Mr. Palmer can confirm demand, building cores locally may be something to look into, but in the next 2 to 5 years, creating cores with no current market and only a limited potential would not be suggested.

To create a new company that will concentrate on masonry heaters or even to expand the current company to include a masonry heater component, will require a different focus than that of their current business. Mr. Murphy and Mr. Palmer would need to invest time

and energy into finding the potential customers and informing them of the product and its use. In the next 2 to 5 years, creating the new business with cores and components that can be shipped to Newfoundland is a more feasible option. The cores and components cost from \$2000 to \$4500 US depending on the design, (see Pro Forma Invoices from Heat Kit of Maine Appendix 5).

The limited size of the market is not particularly discouraging to beginning the business, as if even 1/3 of the calculated potential customers installed a masonry heater, Mr. Palmer and Mr. Murphy would have all the work they could handle, and this calculation does not include customers that may be renovating.

The biggest problem for this company will be in reaching potential customers. The difficulty with such a small market is reaching them to inform them of the existence of masonry heaters. Ideally, convincing publications such as the Telegram or the Herald to prepare features about masonry heating systems would create word of mouth and create local interest. Unfortunately, this is a difficult task and there is no guarantee of coverage.

Attending trade shows will make you a little more visible to the target market – those that are considering renovating or building a home – but finding the few potential customers in a sea of over 20,000 visitors is daunting.

Personal selling to builders and architects is difficult – Norbert Senf advises against it, “The last person in the world that I would market to would be a builder. Almost ditto for architects. I would only sell direct to the end user. There is nothing in it for the builder,

because he doesn't make any money on it,” (Senf, 2006). Reaching the 30 or so consumers that would be likely candidates through an architect or a builder would only be by chance.

Capital Requirements

The capital requirements for the new business would include hard costs such as insurance, incorporation fees, and workers compensation fees; as well as office equipment, trucks, stone saws, chisels, cell phones and computers - much of which Mr. Palmer and Mr. Murphy already have and use in their current business.

The expansion of the current business to include installation of masonry heaters would not incur additional expenses. But any attempt by Mr. Murphy and Mr. Palmer to actively pursue the market would incur additional costs. These costs could be minimal such placement of a yellow pages ads, and the printing of brochures and business cards for placement in brick and stone yards around the city or alternatively a larger investment such as regular attendance at the Home Shows.

Break Even Analysis

The cost of the core and components from Maine Wood Heat is \$2000 to \$4500 US, or \$2200 to \$4900 Canadian (Currency Conversion Aug 29, 2006) depending on the design features required, (see Appendix 5 Pro Forma Invoices). Shipping costs will for the core and components plus duties for components manufactured outside of North America are estimated at \$1000 or less. The prep work for a heater and finish for each heater will not be able to be standardized as the placement in the individual home and the buyers taste

will cause the price to vary substantially. Mr. Palmer and Mr. Murphy feel that a stove could be installed in 4 to 6 weeks – the cost at their current wages of \$6600 to \$9900.

The above numbers indicate that the cost for a masonry stove are comparable to the average masonry heater costs of \$10,000 to \$20,000 Canadian indicated by master builder Norbert Senf (Senf, 2006).

The small size of the market and the difficulty reaching it will mean that should Mr. Palmer and Mr. Murphy decide to tackle it, they will require a low cost, low investment, marketing plan. Any large capital costs spread over such a small market will not be easily recoverable.

Because of the small size of the market this product does not lend itself to a break-even analysis. There is no set number of units that the company must sell in order to break even as the product is sold and installed on a cost plus basis. It will be necessary for Mr. Palmer and Mr. Murphy to ensure during estimating that they recover the costs they will be spending on any installation of a unit – their wages, the out of pocket costs for the cores and components and other materials.

If Mr. Murphy and Mr. Palmer could sell and install 10 to 12 heaters per year on a cost plus basis they could maintain their current wages. In order to build up such a market it is recommended that they begin by expansion of their existing services - i.e. adding installation of masonry heaters as a service alongside chimney rebuilding, tiling, and installation of concrete counter tops.

Final Conclusion and Recommendations

Because Newfoundlanders have such as high rate of wood burning, and few regulations that would impede the progress of a masonry stove company, Newfoundland could be an ideal market for such as product. But limitations such as the small population base, cost and the aging of the population will prevent a mass-market appeal of such an item, cautioning Mr. Palmer and Mr. Murphy against large scale investment that may not be recoverable. The recommendation is that Mr. Palmer and Mr. Murphy expand their current business to include the installation of masonry heaters without incurring any extra capital expense.

To market the masonry stove as a specific item in order to build awareness must be done carefully and cost consciously, as a large investment will probably see little return in this small market. Brochures and business cards made available in Carew's Stone Works, or Creative Brick and Tile may be one place to promote the product. Word of mouth discussion with those that are known for the promotion of sustainable living, such as organic farmers or those living in alternative housing, may be another place to investigate possible markets.

Adding the installation of a masonry heater as an option or a service provided by Mr. Murphy and Mr. Palmer is the recommended path for this business. To concentrate on heavy handed marketing to the detriment of their current products could jeopardize their current company for only a small chance of real success.

Masonry Heater Business in Newfoundland – Feasibility Study Summer 2006

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APPENDIX 2

Method for MHA Certification for Heater Builder

1. Introduction

The MHA is a professional association of masonry heater builders that was formed to advance the technology of masonry heating in North America and to increase the knowledge and skills of professional heater masons. The MHA fulfills its mandate by sponsoring laboratory research into masonry heating technology and by publishing information of interest to practitioners. The MHA also maintains a professional training and certification program to recognize the competency of qualified heater builders.

This manual has been prepared to assist candidates in achieving and maintaining MHA certification, and to guide the administration of the program. The requirements presented in this manual have been established by the MHA Board of Directors and it is its sole responsibility to apply and interpret them, primarily through its administrative designate. The manual may be amended from time to time to account for changing conditions.

2. Application for Certification

2.1 Application Procedure

To initiate the application procedure, a person must be an MHA member* in good standing and apply in writing to the MHA administrator and provide:

- (a) a completed application form
- (b) a check or money order in the amount of US \$300.

*If a person becomes an MHA member and applies for certification in the same year, \$100 of the application fee can be waived.

2.2 Administration

Upon receipt of a completed application form and fee, the administrator will supply the applicant with:

- (a) a copy of the MHA Heater Mason's Reference Manual,
- (b) a copy of the Occupational Analysis Manual,
- (c) a copy of the Policies and Procedures Manual,
- (d) and such other documentation deemed necessary to prepare the applicant for the certification process.

3. Requirements for Certification

3.1 Professional Credentials Required

A candidate for MHA certification must demonstrate a working knowledge of relevant housing and fuel burning regulations, and sufficient knowledge of masonry work by providing proof* of successful completion of at least

ONE of the following:

- (a) a bricklayer apprenticeship program
- (b) certification issued by the Hearth Education Foundation (formerly WHERF)
- (c) certification issued by Wood Energy Technology Transfer Inc.
- (d) or an equivalent professional credential deemed acceptable to the MHA

AND at least ONE of the following:

- (e) 40 hours of work under the direct supervision of an MHA certified heater mason
 - (f) successful completion of an MHA Hands-on Workshop and Test
- *Proof of certification or participation, i.e. copy of certificate, diploma, letter of successful completion. Other credentials can be judged for their equivalence.

3.2 Field Experience

A candidate must provide evidence of a working knowledge of masonry heater design and construction as set out in the MHA Occupational Analysis Manual. The required evidence must consist of verifiable documentation of THREE masonry heater construction projects professionally contracted and completed within the past five years. The candidate must have served as the lead mason on at least TWO of the required projects. Required documentation for EACH of the three projects must consist of the following:

- (a) ONE photograph of the heater in the process of construction and ONE photograph of the finished unit.
- (b) a thorough description of the heater including firebox dimensions, overall dimensions, wall thicknesses, main materials used, including scale drawings with plan sectionals.
- (c) the name and address of the client, and the date of construction.

3.3 Examination

- (a) The candidate must achieve a passing grade on the MHA examination. The passing grade is 70 percent.
- (b) The taking of the examination may be administered by the MHA or
- (c) The examination may be proctored by an independent agency such as a public library which is deemed acceptable by the administrator. The MHA will pay the proctor for the service. All other costs related to the proctoring of the examination will be paid by the candidate.
- (d) The fee for the administration of the examination is US \$100 which must be received by the MHA before administrative arrangements are made.
- (e) The candidate may take the examination before the other certification requirements are met, but certification will not be granted until all requirements are satisfied.

3.4 Summary of Certification Requirements

To achieve certification under the Heater Mason Program, the candidate must:

- (a) supply a completed application form 2.1(a)
- (b) pay the application fee of \$300 2.1(b)
- (c) provide proof of relevant professional credentials 3.1
- (d) provide documentation of three heater projects 3.2
- (e) pay the examination fee of \$100 3.3(d)
- (f) achieve a passing grade on the MHA examination 3.3(a)

4. Maintaining MHA Certification

4.1 Annual Certification Renewal

To maintain MHA certification in good standing, a certificate holder must be a MHA full voting member and pay an annual renewal fee of \$50. The fee covers administrative costs, validation of renewal and information updates. Failure to pay the annual renewal fee will result in the withdrawal of certification after two payment notices have been sent and no response is received by the administrator within 90 days.

4.2 Continuing Education Requirement

Within each five year period after certification, the certificate holder must accrue MHA continuing education workshop points, or other relevant professional credentials deemed equivalent by the MHA. Points accrued must be a minimum of 3 to 5 each year or 24 or more for the five year period.

Presenting an MHA Workshop	5 points
Participating in an MHA Workshop	4 points
Attending an MHA Workshop	3 points
Attending a workshop deemed acceptable by MHA	3 points

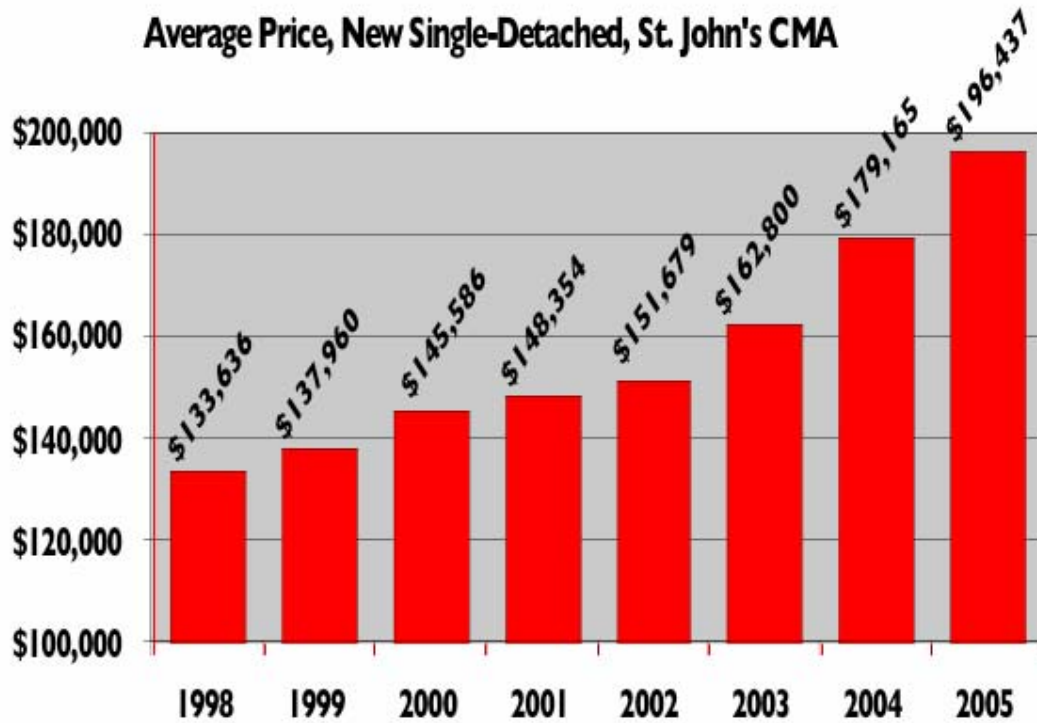
Failure to comply with the continuing education requirement will result in withdrawal of certification after two notices have been sent and no response is received by the administrator within 90 days.

4.3 Leave of Absence

Any Certified Heater Mason leaving North America or becoming inactive as a working mason must remain a paid Associate Member of MHA and keep annual certification fees up to date.

Appendix 3					
STARTS BY AREA AND DWELLING TYPE ST. JOHN'S CMA					
Area/ Period	Single	Semi	Row	Apartment & Other	Total
St. John's City:					
2001	280	14	22	82	398
2002	359	14	38	174	585
2003	438	62	78	173	751
2004	465	238	37	192	932
2005	444	116	28	195	783
Conception Bay South:					
2001	172				172
2002	217	0	0	0	217
2003	250				250
2004	281				281
2005	223				223
Mount Pearl:					
2001	79	10			89
2002	88	2			90
2003	73			8	81
2004	61	8		12	81
2005	25	14		10	49
Paradise:					
2001	199	4		20	223
2002	222	4		21	247
2003	227			66	293
2004	230	4		60	294
2005	204	10	3	62	279
Torbay:					
2001	48				48
2002	80				80
2003	91			2	93
2004	73			0	73
2005	91			2	93
Other Centres:					
2001	97			2	99
2002	127			2	129
2003	134			2	136
2004	172	2			174
2005	127	2			129

Appendix 4



Source: CMHC.

Note: Single-Detached consists of Bungalow, Split Level, 1.5 Storey, and 2 Storey dwellings.

APPENDIX 5
PROFORMA INVOICE
HEATER W/ BAKEOVEN AND ALBIECORE™

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	05188	LARGE GLASS DOOR	665.00	*665.00
1	04853H	or LARGE GLASS DOORS	848.00	848.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDEPULL/END PULL DAMPER	195.00	195.00
10	TAP	TAPCON SCREWS	1.85	18.50
15'	04001	FIBERGLASS TAPE	.50	7.50
1	04980	2" MINERAL WOOL	9.00	9.00
6	04978	KAST SET 50 LB BAG	34.00	204.00
4	04977A	SAIRSET 50LB TIN	41.00	164.00
8'	ROPE	1-1/2" ROPE	2.00	16.00
60	04987	1/4" MINERAL WOOL	1.50	90.00
1	CORE	ALBIECORE™	1100.00	1100.00
4	04979	FIREBRICK	8.00	32.00
4	YTONG	YTONG	16.50	66.00
3	05162	SOOT DOORS	42.00	126.00
1	04998	BY-PASS CHANNEL	290.00	290.00
1	04947	BAKEOVEN DOOR	501.00	501.00

CRATING/HANDLING 195.00

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

*Total is for this cost.

TOTAL \$3820.00

PROFORMA INVOICE
SEE THRU HEATER W/ALBIECORE™

<u>QUANTITY</u>	<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
2	05188	LARGE GLASS DOORS	665.00	*1330.00
		or		
2	04853H	LARGE GLASS DOORS	848.00	1696.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDE PULL/END PULL DAMPER	1850.00	170.00
20	TAP	TAPCON SCREWS	1.85	37.00
30'	04001	FIBERGLASS TAPE	.50	15.00
1	04980	2" MINERAL WOOL	9.00	9.00
6	04978	KAST SET 50 LB BAG	34.00	204.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
1	04998	BY-PASS CHANNEL	290.00	290.00
4	04979	FIREBRICK	8.00	32.00
8'	ROPE	1-1/2" ROPE	2.00	16.00
1	CORE	ALBIECORE™	1100.00	1100.00
60	04987	1/4" MINERAL WOOL	1.25	75.00
8	YTONG	YTONG	16.50	66.00
3	05162	SOOT DOORS	42.00	126.00
		CRATING/HANDLING	195.00	<u>195.00</u>

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

TOTAL \$4010.00

*Total is for this cost.

**PROFORMA INVOICE
STANDARD HEATER W/ALBIECORE™**

QUANTITY	ITEM NUMBER	DESCRIPTION	UNITPRICE	TOTAL
1	05188	LARGE GLASS DOORS	665.00	* 665.00
		or		
1	04853H	LARGE GLASS DOORS	848.00	848.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDE PULL/END PULL DAMPER	195.00	195.00
10	TAP	TAPCON SCREWS	1.85	18.50
15'	04001	FIBERGLASS TAPE	.50	7.50
1	04980	2" MINERAL WOOL	9.00	9.00
6	04978	KAST SET 50 LB BAG	34.00	204.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
1	04998	BY-PASS CHANNEL	290.00	290.00
4	04979	FIREBRICK	8.00	32.00
8'	ROPE	1-1/2" ROPE	2.00	16.00
1	CORE	ALBIECORE™	1100.00	1100.00
60	04987	1/4" MINERAL WOOL	1.50	90.00
4	YTONG	YTONG	16.50	66.00
3	05162	SOOT DOORS	42.00	126.00
		CRATING/HANDLING	195.00	<u>195.00</u>

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

*Total is for this cost.

TOTAL \$3319.00

PROFORMA INVOICE
SEE THRU HEATER W/BAKEOVEN AND ALBIECORE™

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
2	05188	LARGE GLASS DOORS	665.00	*1330.00
		or		
2	04853H	LARGE GLASS DOORS	848.00	1696.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDE PULL/END PULL DAMPER	195.00	195.00
20	TAP	TAPCON SCREWS	1.85	37.00
30'	04001	FIBERGLASS TAPE	.50	15.00
1	04980	2" MINERAL WOOL	9.00	9.00
6	04978	KASTSET 50 LB BAG	34.00	204.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
1	04998	BY-PASS CHANNEL	290.00	290.00
4	04979	FIREBRICK	8.00	32.00
8'	ROPE	1-1/2" ROPE	2.00	16.00
1	CORE	ALBIECORE™	1100.00	1100.00
60	04987	1/4" MINERAL WOOL	1.25	75.00
8	YTONG	YTONG	16.50	66.00
3	05162	SOOT DOORS	42.00	126.00
1	04947	BAKEOVEN DOOR	501.00	501.00
		CRATING/HANDLING	195.00	<u>195.00</u>

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

TOTAL_ \$4511.00

*Total is for this cost.

**PROFORMA INVOICES
STANDARD RUSSIAN FIREPLACE W/OVEN & FIREVIEWING**

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	05197	MEDIUM DOOR	630.00	630.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDE PULL/END PULL DAMPER	195.00	195.00
8	TAP	TAPCON SCREWS	1.85	14.80
35'	04001	FIBERGLASS TAPE	.50	17.50
2	04980	2" MINERAL WOOL	9.00	18.00
22	04978	KAST SET 50 LB BAG	34.00	748.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
1	04958	BYPASS CHANNEL	110.00	110.00
70	04987	1/4" MINERAL WOOL	1.50	105.00
5	05162	SOOT DOORS	42.00	210.00
1	04947	BAKEOVEN DOOR	501.00	501.00
		CRATING/HANDLING	100.00	<u>100.00</u>

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

TOTAL \$2954.30

**PROFORMA INVOICE
STANDARD RUSSIAN FIREPLACE**

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	04902	SINGLE DOOR	241.00	241.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDE PULL /END PULL DAMPER	170.00	170.00
25'	04001	FIBERGLASS TAPE	.50	12.50
4	TAP	TAPCON SCREWS	1.85	7.40
2	04980	2" MINERAL WOOL	9.00	18.00
22	04978	KAST SET 50LB BAG	34.00	748.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
1	04997	BYPASS CHANNEL	110.00	110.00
70	04987	1/4" MINERAL WOOL	1.50	105.00
5	05162	SOOT DOOR	42.00	210.00
CRATING/HANDLING			100.00	<u>100.00</u>

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

TOTAL **\$2052.40**

**PROFORMA INVOICE
STANDARD HEATER W/BAKEOVEN**

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	05188	LARGE GLASS DOORS	665.00	*665.00
		or		
1	04853H	LARGE GLASS DOORS	848.00	848.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158-N	SIDE PULL DAMPER	195.00	195.00
10	TAP	TAPCON SCREWS	1.85	18.50
15	04001	FIBERGLASS TAPE	.50	7.50
1	04980	2" MINERAL WOOL	9.00	9.00
6	04978	KAST SET 50 LB BAG	34.00	204.00
4	04977A	SAIRSET 50 LB BAG	41.00	164.00
1	04998	BY-PASS CHANNEL	290.00	290.00
6	04979	FIREBRICK	8.00	48.00
60	04987	1/4" MINERAL WOOL	1.25	75.00
4	YTONG	YTONG	16.50	66.00
3	05162	SOOT DOORS	42.00	126.00
1	04947	BAKEOVEN DOOR	501.00	501.00
		CRATING/HANDLING	100.00	<u>100.00</u>

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

TOTAL **\$2625.00**

*Total is for this cost.

**PROFORMA INVOICE
STANDARD HEATER**

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	05188	LARGE GLASS DOOR	665.00	*665.00
		or		
1	04853H	LARGE GLASS DOOR	848.00	848.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
3	05162	SOOT DOOR	42.00	126.00
1	05158N/05190-N	SIDE PULL/END PULL DAMPER	170.00	170.00
25'	04001	FIBERGLASS TAPE	.50	12.50
60	04987	1/4" MINERAL WOOL	1.50	90.00
12	TAP	TAPCON SCREWS	1.85	22.20
1	04980	2" MINERAL WOOL	9.00	9.00
1	04998	BY-PASS CHANNEL	245.00	245.00
6	04978	KAST SET 50 LB BAG	34.00	204.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
2	04979	FIREBRICK	8.00	16.00
4	YTONG	YTONG	16.50	66.00
		CRATING/HANDLING	100.00	<u>100.00</u>

TOTAL \$ 2100.70

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

*Total is for this cost.

PROFORMA INVOICE
COOKER W/CASTIRON OVEN

<u>QUANTITY</u>	<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1	04940	COOK TOP	758.00	758.00
1	04944	FIREBOX DOOR	209.00	209.00
1	04945	BAKEOVEN KIT W/GLASS	680.00	680.00
3	05162	SOOT DOOR	42.00	126.00
1	05056	NARROW GRATE	39.00	39.00
15'	04001	FIBERGLASS TAPE	.50	7.50
1	04958	BY-PASS CHANNEL	115.00	115.00
4	04489	HONDA SPOKES	1.85	7.40
1	05156	SHUT OFF DAMPER	58.00	58.00
20	04987	1/4" MINERALWOOL	1.50	30.00
1	04977A	SAIRSET 50 LB TIN	41.00	41.00
3	YTONG	YTONG	16.50	49.50
		CRATING/HANDLING	100.00	<u>100.00</u>
				TOTAL
				\$2221.40

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

PROFORMA INVOICE
COOKER W/MASONRY OVEN

<u>QUANTITY</u>	<u>ITEM NUMBER</u>	<u>DESCRIPTION</u>	<u>UNIT PRICE</u>	<u>TOTAL</u>
1	04947	BAKEOVEN DOOR	501.00	501.00
1	04940	COOK TOP	758.00	758.00
1	04944	FIREBOX DOOR	209.00	209.00
1	05056	NARROW GRATE	39.00	39.00
20'	04001	FIBERGLASS TAPE	.50	10.00
3	05162	SOOT DOORS	42.00	126.00
1	04958	BY-PASS CHANNEL	115.00	115.00
8	04489	HONDA SPOKES	1.85	14.80
1	05156	SHUT OFF DAMPER	58.00	58.00
1	04977A	SAIRSET 50 LB TIN	41.00	41.00
20	04987	1/4" MINERAL WOOL	1.50	30.00
3	YTONG	YTONG	16.50	49.50
		CRATING/HANDLING	50.00	<u>50.00</u>
			TOTAL	\$2001.30

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.

**PROFORMA INVOICES
STANDARD RUSSIAN FIREPLACE W/OVEN & FIREVIEWING
(2 STORY)**

QUANTITY	ITEM NUMBER	DESCRIPTION	UNIT PRICE	TOTAL
1	05197	MEDIUM DOOR	630.00	630.00
1	04913	ASHBOX DOOR	102.00	102.00
1	05056	NARROW GRATE	39.00	39.00
1	05158N/05190N	SIDE PULL/END PULL DAMPER	195.00	195.00
8	TAP	TAPCON SCREWS	1.85	14.80
35'	04001	FIBERGLASS TAPE	.50	17.50
2	04980	2" MINERAL WOOL	9.00	18.00
62	04978	KAST SET 50 LB BAG	34.00	2108.00
4	04977A	SAIRSET 50 LB TIN	41.00	164.00
1	04958	BYPASS CHANNEL	110.00	110.00
70	04987	1/4" MINERAL WOOL	1.50	105.50
9	05162	SOOT DOORS	42.00	378.00
1	04947	BAKEOVEN DOOR	501.00	501.00
		CRATING/HANDLING	100.00	<u>100.00</u>
		TOTAL		\$4482.30

All prices quoted are FOB Norridgewock. They do not include freight charges. Please ask us for an estimated freight quote to your home, business or job site. For Maine residents and instate purchases we also add 5% state sales tax.