Confidential

REDONA

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1) Background and Purpose

The Electricity Market

The power supply market in North America has changed dramatically over the past decade. In the late 1990's the Federal Energy Regulatory Commission (FERC) enacted changes (deregulation) in the electric generation market. The effect of this deregulation was to develop a merchant generation market and eliminate the vertical integration of electric companies. Prior to the change, electric power utilities were vertically integrated[1], allowing a single, heavily regulated power company to produce, transmit and distribute electricity. Vertical integration allowed engineers to coordinate power plants and transmission lines in ideal ways. Planners who saw the need for new plants helped find a place for them to be built.

Additionally, the economies of China and India experienced dramatic growth, which created strong competition for the fuels that are used to generate electricity. With their combined population of over two billion people, they were experiencing greater than a 10% growth in their Gross Domestic Product (GDP). This strong growth requires large amounts of energy. China builds one new major coal plant every week.

By 2003, the effects of strong growth combined with deregulation began to show up in the price of electricity. In New England, the price of wholesale power more than doubled. The ability to purchase long-term (greater than three-year contracts) power disappeared. The hourly spot-market[2] prices became highly volatile.

Environmental Pressures

Over 50% of the electricity that is generated in the United States and the world comes from coal-fired generation facilities. Most of these facilities are aging and have limited emissions controls. Any emissions control has been designed to eliminate sulfur dioxide and particulates. As a result the amount of carbon dioxide in the atmosphere has risen dramatically resulting in global warming. The Intergovernmental Panel on Climate Change[3] published its comprehensive study results in 2007. This report conclusively establishes global warming as a direct result of human activity, with electricity generation identified as one of the major contributors to global warming.

[1] Vertical Integration allowed one utility to own the generation, transmission and distribution assets to serve a customer base.

[2] Bulk electricity is sold for cash and delivered immediately. A futures transaction that will expire in one month or less. In New England, this market closely tracks the price of Natural Gas.

[3] Recognizing the problem of potential global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988.

The pressure to find alternative solutions for electric generation has now become a top priority for most of the international community, as well as electric companies and their consumers. Wind and solar are an option for areas that are open and dry, however, the industrialized areas[4] of the world need to find other carbon-neutral[5] options.

Gasification as a Solution

Gasification occurs when any bio-mass feedstock (i.e.; wood, straw, municipal solid waste, sewage) is placed into a high temperature (1440 degrees Fahrenheit), oxygen-starved chamber. Instead of burning, the feedstock simply breaks down to a simple gas (Syngas[6]), which can be passed along to another chamber to be cleaned up to run an engine to produce electricity. The gasification process is low or zero emissions-free and carbon-neutral.

Gasification has been around for at least 200 years. Robert Gardner obtained the first patent with regard to gasification in 1788. The first commercially used gasifier was built in France in 1840. During World War II there were over a million gasifiers world-wide. Gasification fell out of use in the United States during the 1950's, when oil became a less expensive resource for generating energy.

Gasification has the potential to help North America produce its own renewable fuels in a way that maximizes the energy potential of energy crops (carbohydrates). Gasification is significantly more efficient than bio-fuel and ethanol production in converting a crop to energy in stationary applications. Gasification technology has developed to the point where the gas is clean and it is now commercially feasible to produce units in volume that can be distributed throughout North America. Two European manufacturers, Puhdas of Finland, and PowerHearth of New Zealand, have small biogas units that can be produced in quantity as turnkey units. Puhdas has a test gasifier successfully up and running at Tallon Lumber in North Canaan, Connecticut.

Carbohydrate fuels can be run through a gasifier to produce energy. The project would start with wood as a fuel source and develop a fuel standard. This would be compressed and turned into pellets to create a uniform fuel mixture with standard heat (BTU) content. Once the standards are developed, other carbohydrates can be introduced to develop a recipe. These fuels would include such raw

[4] The industrialized areas have limited space options and are often located in areas with limited solar exposure.

[5] Emitting no net additional carbon into the atmosphere. Biomass generation is generally accepted as carbon-neutral as it only moves existing carbons while fossil fuel generation adds carbon by pulling it from the earth and releasing it into the atmosphere.

[6] SynGas can be used for heat and/or power production and/or to produce hydrogen or commodities such as liquid alcohols (methanol/ethanol).

materials as soy, switch grass, corn stalks, and sewage sludge[7]. Pellets also have the advantage that larger amounts of fuel can be stored in a given space because they are uniform in the structure and composition. They do not decompose as easily as other biomass fuels because the pellet process results in a coating that protects the fuel.

Gasification and Co-generation

Cogeneration is a process that converts a fuel into both thermal and electrical energy. The thermal energy may be in the form of steam, hot water, or hot air, or any combination of the three. Cogeneration takes advantage of the waste heat of an engine, and uses it to perform work. Typically the quantity of waste heat is greater than the heat equivalent of the electricity. Figure 3 shows the benefits of cogeneration through the fuel flow cycle. Cogeneration utilizes the normal waste heat of the electric generation process, and therefore is more efficient in using the total fuel heat value.

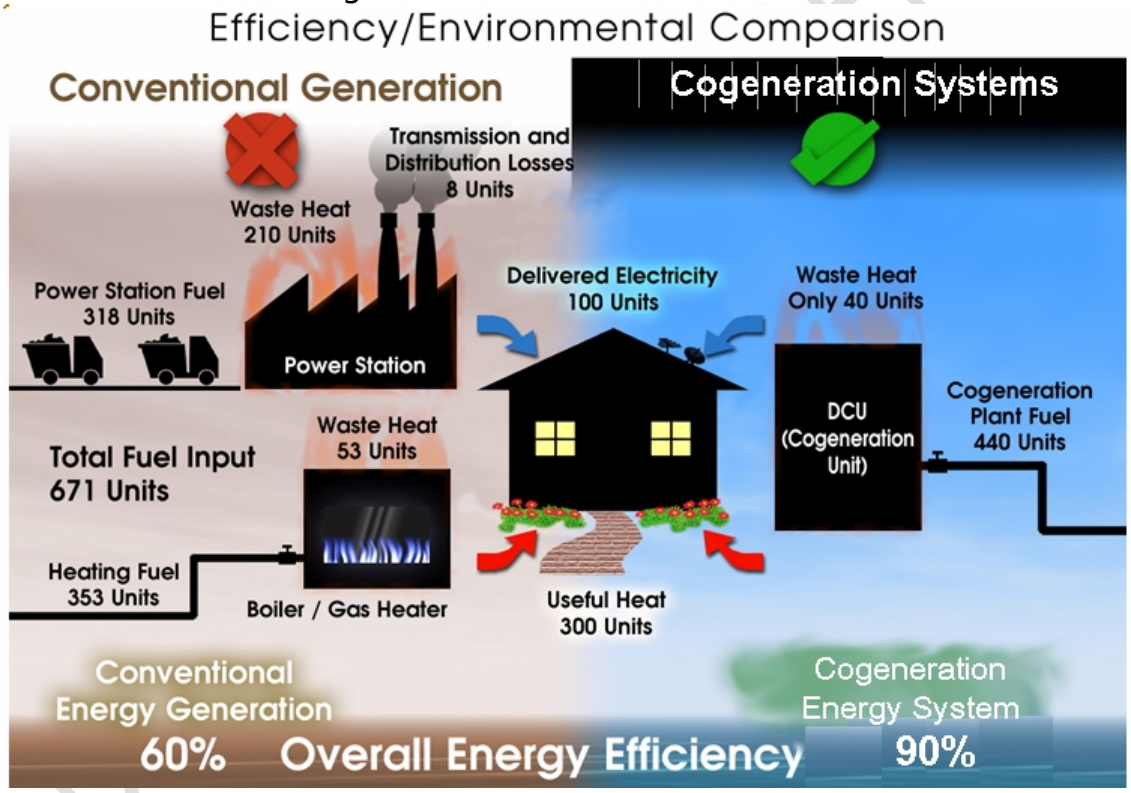


Figure 1 – Co-generation Efficiency Model

Gasification enables the introduction of new fuel sources for generation and creates carbon-neutral options for parts of the world where other solutions may not be viable. Combining gasification with co-generation substantially increases the efficiency of the fuel conversion process by putting the heat to use that is normally wasted

[7] Dried sewage sludge pellets possess a heat value that is half that of the coal.

in conventional generation. The new fuels that will be used with gasification will provide additional options to traditional sources.

2) Renewable Energy Development of North America, Inc. (REDONA)

Vermont Electric Cooperative, Sealander Waterworks from Washington, D.C., and ENERKEM from Sherbrooke, Quebec, have formed a partnership that will develop, test, and market a turnkey one megawatt gasifier – generator – heat recovery unit that would be used for distributed on-site generation combined with district heating and cooling. The research work will be fully funded from Canadian and American grants and no costs will be incurred by VEC's members. The project is called Renewable Energy Development of North America (REDONA) and this new venture will be operated separate and independent from VEC.

Vermont Electric Cooperative (VEC) is a consumer-owned electric distribution cooperative headquartered in Johnson, Vermont. The Co-op was founded in 1938 in Eden Mills, Vermont to serve residents in parts of rural Lamoille County who had been bypassed by investor-owned utilities. Early service extensions continued into Chittenden and Franklin Counties. From the 1940's until the early 1960's, the service territory continued to expand in Northern Vermont through the construction of new lines and the acquisition of small private companies. In 1969, VEC expanded into Southern Vermont through a merger with Halifax Electric Cooperative. In 1970, VEC acquired the International Electric Company serving the Derby Line area located along the Canadian border.

On April 1, 2004, VEC completed the acquisition of Citizens Communications Company's Vermont Electric Division, more than doubling the membership-base. More recently, on December 8, 2006 VEC sold its Southern District in the Windham and Windsor counties to Central Vermont Public Service(CVPS). This district was comprised of approximately 2,770 members. VEC's Southern District also included twelve members in three towns in Massachusetts on the Vermont border. On December 8, 2006 VEC sold these members to Western Massachusetts Electric Company (WMECO).

Today VEC serves approximately 34,000 member-customers in 74 towns throughout Northern Vermont. VEC's territory stretches across the following counties: Addison, Caledonia, Chittenden, Essex, Franklin, Grand Isle, Lamoille, Orleans.

Sealander Waterworks is a company that is owned by Evans Sealander, a real-estate investor (Sealander Brokerage) whose family has over 30 years of experience in real estate management and construction development. Sealander is involved in a wide range of

real estate projects and excels in the realigning of large commercial facilities to fit the needs of the current market. Sealander -Waterworks acquired the Union Butterfield complex that straddles the border between Derby Line, Vermont, and Stanstead, Quebec. Sealander recognized the importance of the Union-Butterfield location because it is one of the few places in North America that straddles the United States and Canadian border. The facility is located in the Northeast and has easy access to Montreal and the US Interstate highway system.

Figure 2 - Location of REDONA

ENERKEM is a company that was founded by Esteban Chornet, a long-time professor at Sherbrooke University in Sherbrooke, Quebec, Canada. ENERKEM Technologies Inc. focuses on bringing technologies to market which produce energy and fuels from biomass (forest and agricultural residues) as well as from waste products such as municipal solid wastes, non-recyclable plastics and residual streams from oil fields and refineries. Converting these “low grade feedstocks” into usable energy (gas, electricity, steam or liquid fuels) creates a source

of added value for local economies. The money spent on fuels will be kept local and will create jobs. The process has significant technical and economic breakthrough from a commercial and environmental point of view in that the process is simple and easy to manage, and the syngas that is created is cleaner than natural gas.

3) Development Plan

ENERKEM has several gasifiers in operation and is continuing to develop gasifiers under contract for customers. REDONA will develop a specific gasifier for the mass market. The first gasifier will be one megawatt. Through specific research with Vermont Electric Cooperative customers, as well as overall market analysis, the one megawatt size addresses the market for many commercial and industrial settings. A commercial or industrial setting needs to be big enough to be able to absorb the added responsibilities that an on-site generator adds to the organization, yet not so large that the number of sites becomes so limited that the generation benefits to the utility becomes too small. The host site needs to be able to use the thermal output of the gasifier/generator to maximize the efficiency and the revenue. One megawatt would cover 20% of the base load power needs of a utility, while three megawatts would drop the opportunity down to 8%.

The development of a commercial gasifier for the mass market has five major components;

1) Fuel Pellet Standardization
2) Process Optimization
3) Size Reduction
4) Standards Development
5) Commercial Implementation

1) Fuel Pellet Standardization – Rock Island Pellets (see section 4)

The biomass fuel market is in its infancy. As a result, fuel has been developed to match the user technology. Fuel can be purchased in chips, pellets, or shredded. While the ENERKEM gasifier can use any of these fuels, development of a biomass fuel standard would provide significant benefits. With a standardized pellet, the gasifier settings will not need to be modified to match the different fuel characteristics. Today, pellet manufacturers take ground wood, waste wood, paper, bark and other combustibles and turn them into bullet-sized pellets. These pellets vary in terms of size, shape, moisture, density and energy content according to the manufacturer. Pellet standards would create pellets that are easily traded, physically delivered, and stored for a reasonable period of time. The will result prices that are determined on the basis of an active market, rather than by the supplier (or other seller) on a "cost-plus" basis. All manufacturers

could produce pellets for this market, enabling pellets to be traded anywhere with customers who will know precisely what they are purchasing. These standards will create an energy trading market for fuel pellets.

Figure 3 – Fuel Pellets

Pelletized bio-mass has strong advantages over other bio-mass fuel mediums. The moisture content of pellets is controlled. Reducing moisture content means more fuel can be transported in a given truck space, reducing the transportation costs (you aren't paying to transport the water). It also takes energy to remove the moisture, reducing the efficiency of the combustion process. Most unprocessed bio-mass fuels have a moisture content of 50%. The ENERKEM gasifier requires an optimum moisture content of 20%.

The density of pellet fuel is substantially higher than other choices. This improves the container storage efficiency by allowing more energy to be stored in a given space. For example, pellets use 1/3 the volume of wood chips.

Pellets are more easily and predictably handled in a large-scale application. Their uniform shape and size allows for a smaller and simpler conveying system that reduces costs. The high density and uniform shape can be stored in standard silos, transported in rail cars and delivered in truck containers. In transport, as well as end use, pellets pose none of the risk of explosion that other fuels do.

Pellets do not decompose as quickly. Wood chips and logs begin to decompose as soon as they are placed in storage. Logs and chips often have to be watered to keep from combusting due to the heat created from decomposition, while pellets do not. Pellets also do not suffer from odor and dust as a result of storage and handling. Other fuels have an explosion risk as a result of the dust associated with handling and storage. The compression used in creating the pellets results in a fuel that is relatively free of dust and the resulting explosion hazards.

Finally, a standardized pellet allows for the variation in fuel to be managed as part of the process of creating the pellets. Standard recipes will be developed to enable a pellet manufacturing facility to produce a consistent pellet based on the different fuel choices. It is much easier to handle variation in fuels by creating a pellet recipe rather than modifications to the gasifier settings. Standardized pellets ensure that the gasifier will always run at its optimum performance level.

Completion of this milestone will include the creation of fuel selection and sourcing plan that addresses the fuel requirements.

1) *Unit One - Process Optimization*

The first gasifier unit produced for REDONA will be used to provide heat and power for the Tivoly manufacturing facility located in Derby Line, Vermont. Tivoly is part of the original Union Butterfield complex of buildings that now houses Sealander Waterworks, where REDONA also will be located.

Figure 4 – Tivoly Vermont Facility

The gasifier will be constructed in place in the boiler building located on the site. The building currently houses a non-function diesel generating unit and boilers. These units will be removed and replaced by the gasifier. The fuel for the gasifier will be fed via piping from the Sealander Waterworks facility located on the Canadian side of the building. This is where the fuel pellet research will be conducted.

While ENERKEM has a number of gasifiers in operation, including a 600 kilowatt unit in Sherbrooke, Quebec (35 minutes northeast of Derby Line, VT), the first one megawatt unit will be developed as a research unit for process optimization. It is important to identify all the process parameters that will need to be monitored and controlled. The goal is to have units that are sold fully equipped and ready to operate. While the gasifier will be sold for a wide variation in customer settings, no custom settings, designs, or accessories shall be required. Therefore it will be important to develop process standards based on the unit, the unit components and the fuel pellets. As a result of developing process standards, a full operating procedure will be developed.

2) *Unit Two - Size Reduction*

While the work of developing unit one was to optimize the process, the work of developing unit two will be to reduce the overall size of the unit. Unit two will also be located at the Tivoly facility on the United States side of the border. The goal for this unit is to develop a modular systems that will be built into standard ISO (International Organization for Standardization) Intermodal shipping containers that can be transported on a few tractor trailers with a quick connect scheme to allow interchangeability of the modular components. This

will minimize down-time for the end customer as entire subsystems can be swapped out for maintenance, repair and upgrade.

The size goal is to fit into a 1200 square foot building with less than 20 foot ceilings. Quick connect/disconnects will be used for plumbing and electrical connections where possible. This standardization will allow fast permitting and set-up. The building construction, footings, storm-water run-off, ventilation, and pellet storage facilities will all be the same so that state and local pre-approval can be simplified. The only parameters left for individual consideration would be the exterior color and finish to meet local desires and zoning requirements.

Included in the development cycle of unit two will be developing a certified vendor list for components and sub-systems. Vendor selection will include long-term reliability and support considerations. Vendors will be required to meet standards that were developed in unit one and long-term supply and support contracts will be negotiated. Vendor contracts and management programs will be developed as part of this phase. While the goal is to purchase most items "off the shelf"[8] components to ensure supply and low cost, some sub-systems may be designed specifically to help reduce size. These arrangements will be considered as part of the development of unit two.

3) *Unit Three - Standards Development*

Unit three will be used to develop the construction and installation, operations, maintenance, and training documentation.. These documents will enable the gasifiers to be maintained and operated by Vermont Electric Cooperative and other franchised distribution utilities. Unit three will be located in the REDONA facilities on the Canadian side of the border and will be used to provide heat and power to the Canadian operations. Part of unit three developments will be the identification of key process parameters and the design of monitoring and reporting systems, including those to be monitored by the utility via its Systems Control and Data Acquisition (SCADA)[9] systems. Unit three will also finalize the design of feedback and buffer systems to ensure robust performance of the gasifier/generator in varying conditions.

a) Construction and installation standards and procedures will be designed to be used and understood by the utilities and their designated subcontractors. These standards and procedures will include the construction drawings, approved suppliers, and interconnection specifications. The electrical interconnections

[8] The technologies employed are time-tested and proven, therefore new and dedicated designs are not needed.

[9] A process control application that collects data from sensors and switchgear on the electrical grid or in remote locations and sends them to a central computer in a dispatch center for management, control and stability of the electrical grid.

will meet all American National Standards Institute (ANSI) and National Electric Code (NEC) requirements. This ensures that the system will meet all state, local and utility specifications. These standards and procedures will also be used for the planning and permitting process.

b) Operating procedures will be developed to address all the aspects of daily operation and support of the gasifier/generator to ensure optimum performance under all conceivable operating environments and conditions. While the distribution utility will assume responsibility for all aspects of the gasifier/generator, some work will be sub-contracted to the host[10], as there is some daily inspection and feedstock work. The host will receive compensation for this work based on the contract that VEC (or the distribution utility) establishes with the host.

c) Maintenance procedures will be developed to ensure the gasifier/generator always works to its optimum performance level. Regular daily system will also be designed to identify problems early on. These maintenance procedures will include hourly, daily, weekly, monthly and other regularly scheduled events. Logs will be provided to document compliance to the maintenance requirements. Included in the procedures will be operation and operations and maintenance of the performance monitoring equipment, as well as how to respond to out-of-limit conditions, both local and SCADA based.

d) Training documentation will be developed to cover all aspects of the gasifier/generator and the fuel pellets. The training shall include;

(i) Operation of the pellet equipment, repair and maintenance
(ii) Gasifier/generator operation, repair and maintenance
(iii) Feasibility studies
(iv) Economic justification, funding, tariff design and green credit markets
(v) Gasifier/generator setup and interconnection
(vi) State and local permitting

4) Commercial Implementation

The market potential for gasifiers is quite large. With today's assumptions[11], the following numbers reflect the number of installed units that are possible. These numbers represent between 20% to 25% of the base-load requirements;

- Vermont Electric Cooperative – 15 megawatts
- State of Vermont – 150 megawatts

[10] The host is defined as the customer site. The customer site will typically be a commercial or industrial facility.

[11] These assumptions are based on the current bio-mass market capacity. Long-term forest and agriculture planning could easily double the capacity of the market.

- New England – 4050 megawatts
- Contiguous 48 states (U.S.) – 106350 Megawatts

The price goal is $1 Million per megawatt for the gasifier/generator and $2 Million per Megawatt installed[12]. This installed price is roughly ½ of the current cost of installing generation[13].

In 2009, the first commercial unit will be installed at Smugglers Notch Resort in Jeffersonville, Vermont. Smugglers Notch Resort has a number of outside pools and hot-tubs, as well as hydronic heating and cooling systems. Smugglers Notch is a four-season resort that prides itself in green energy programs and is very interested in a commercial demonstration unit. The resort makes an excellent backdrop for providing tours for those who are interested in gasification and bio-mass technology.

Also during 2009, three more units are planned at member[14] sites;

1) Qimonda in Williston, VT – A DRAM[15] Research and Design Facility
2) Blue Seal Feeds in Richford, VT – Animal and Pet Food Manufacturer
3) Ethan-Allen Interiors, Inc. in Beecher Falls, VT – Furniture Manufacturer

In 2010, following the successful commercial demonstration, Vermont Electric Cooperative will begin training other utilities in Vermont and Canada to develop the North American market.

[12] This price includes all cost related to the unit, including permitting, transportation, set-up, installation, interconnect and unit costs.
[13] Based on pricing for biomass generators which will be placed on line in 2010.
[14] Vermont Electric Cooperative is a member-owned utility, thus customers are referred to as members.
[15] Dynamic Random-Access Memories – a type of memory used in most personal computers.

4. Rock Island Pellets

Company Goal

The goal of Rock Island Pellets is "Re-engineering and packaging of existing off-the-shelf equipment to produce organically based pellets to be used for the production of energy."

Company Overview

There is a well-recognized and growing need to replace fossil fuels with locally renewable fuels that are sensitive to the environment. Wood pellets – pencil-sized pellets produced from condensed wood waste that are uniform in size, shape and BTU content – are the ideal renewable green fuel for the Vermont/Quebec region because of its natural resources. Wood pellets can be used to generate heat and electricity for local homes and businesses at a fraction of the cost of oil. Pellets are environmentally friendly because they burn much cleaner than fossil fuels. Indeed, the US EPA considers wood pellet heat to be one of the cleanest-burning, most renewable energy sources on earth. They are convenient for the user, energy efficient, and can be manufactured using renewable resources readily available in this community, such as wood waste and other so-called biomass, such as hay and grass. In fact, given proper forest and agricultural management, the raw fiber needed to produce wood pellets is virtually limitless, and as a result, wood pellets have proven to be price stable fuel.

Wood pellets command a rapidly rising share of the US and Canadian renewable energy market; more than 1 million North American homes and businesses are heated or powered by wood pellets. Over the past several years, however, the demand for wood pellets has far outpaced supply. Most large-scale Canadian pellet producers sell their entire annual production before the first of the year, and there are already shortages in the American consumer market for the upcoming winter. In Europe, where pellets are being used to power large-scale heating and electricity plants, the estimated shortfall for this year is 4-5 million tons. In Canada and the US, sales of pellet stoves, boilers and appliances have risen sharply, and technology has been developed to convert existing heating systems to pellet-based fuel. Not enough, however, has been done to increase the supply of wood pellets. Rock Island Pellets will change that.

Rock Island Pellets will manufacture and supply wood pellets by assembling pelletizing systems that allow pellets to be made from wood waste and other organic materials using existing and affordable equipment from domestic and foreign manufacturers. The company will re-engineer and assemble an easily transportable set of tools that will allow users to produce pellets on site, at the location of the biomass, on a relatively small scale as compared to large, industrial

pellet plants. The assembled kit will include: grinders, conditioners, dryers, pelletizing machines, coolers and storage machinery. These basic components will be brought to the Rock Island Pellets facility in Stanstead, Quebec, re-engineered for heavy use, and licensed to end users so that they can produce pellets. The re-engineering process includes re-powering the machines with commonly available drive systems and replacing or re-engineering weak components of the equipment. The various pieces of Rock Island Pellets' system are designed to quickly interconnect, so that set-up, field replacement and servicing can be quickly achieved. The system is mounted and transported in a standard ISO cargo container (Isotainer) for security, ease of transport and delivery to the service area.

Rock Island Pellets is also a strategic partner of REDONA, Renewable Energy Development of North America, which has the technology required to produce electricity from organic pellets. REDONA was formed in 2007 as a joint project of Sealander Waterworks, Enerkem Technologies Inc. and Vermont Electric Cooperative Inc. in response to the current rural energy crisis facing the United States and Canada. REDONA's goal is to refine and produce gasifiers so that they can be used for a multitude of rural applications in order to provide a combined heat and electrical power system (cogeneration efficiency of up to 90%) to existing businesses and electrical grids. This brand new energy technology, clean-burning and entirely dependent on renewable, green fuel sources, will create job opportunities in rural areas across a broad spectrum of the economy, from forest and energy management to electrical and chemical engineering and research. The cogeneration efficiency allowed by REDONA's gasifiers will allow rural companies to move toward greater energy independence by providing them with locally generated power produced from renewable local energy sources such as wood and carbon-based waste products. In support of REDONA, Rock Island Pellets will research and develop organically based pellets to power REDONA's gasifiers, including pellets made from municipal waste, and the pelletizing systems necessary to produce fuel for the REDONA system.

Company Mission

- To enable local communities and businesses to convert their own locally based biomass fuel sources into pellets. This will allow users to produce their own heat and electricity as well as allow them to sell pellets to others, and will keep a larger portion of the region's energy dollars in the area. In fact, the Wood Pellet Association of Canada estimates that 70% of every dollar spent on biomass stays in the local community (as compared to 10% of every dollar spent on oil).
- To help communities transition from fossil fuels to renewable green energy. By converting wood waste and other biomass into

pellets, local communities and companies will be able to reduce their reliance on oil and begin the process of becoming energy self-sufficient.

•To bring heat and energy to areas underserved by existing power companies.

•To promote sustainable forestry by providing landowners and lumber companies with the opportunity to benefit economically from the wood waste produced on timberland that is otherwise discarded. Existing lumber companies in the Vermont/Quebec region already have the necessary equipment to process logs in staging areas but do not have the machinery or expertise needed to produce pellets from waste. Rock Island Pellets' pelletizing system will:

•add to the value of existing forestry equipment already in place;

•contribute to the full use of wood waste left after lumbering operations are completed and ensure that lumbering sites are left clean; and

•enable forestry companies to participate in the transition to renewable green energy by providing them with the economic incentive to do so.

•To empower local residents by employing highly skilled local workers to engineer, manufacture, assemble, distribute, support and maintain pelletizing systems at the Stanstead, Quebec plant.

•To reduce the transportation required to successfully produce wood pellets. The company's versatile pelletizing system, mounted on an easily transportable ISO container, can be moved to and used in a multitude of environments, including on timberland. Making pellets on-site using the Rock Island Pellets system, rather than trucking wood waste to a centralized pellet-producing facility, reduces the transportation costs and environmental impact of manufacturing wood pellets.

Company Goals

•To develop a standard pellet manufacturing system with portable equipment that uses locally based and renewable organic materials to produce the pellets, and to develop, research, test and assemble new lines of organic pelletizing systems.

•To convert current heating systems in existing buildings to pellet-based heat and to use those facilities to demonstrate the cost savings that can be achieved by using pellets rather than oil.

•To develop new products for local businesses to sell and demonstrate the potential of existing unused wood wastes.

•To develop a pelletizing system that can be connected to REDONA's gasifier system, but can also stand alone

Company Location and Infrastructure

- Rock Island Pellets is housed in the former Butterfield complex located on the international boundary between the United States (Derby Line, Vermont) and Canada (Stanstead, Quebec). The facility was started by Lewis Young in the 1880s when he developed and patented in both the US and Canada a revolutionary wagon wheel axle-cutter. The plant eventually became North America's largest manufacturer of high quality metal cutting tools (patented taps, dies, screw plates, reamers, drills, counter bores, cutter, end mills, etc.), employing over 700 employees form both the US and Canada, and supplying customers in both countries as well as overseas. Although Butterfield's ceased operation in more than twenty years ago, because of it and other local industries, the local workforce includes many highly skilled engineers and machinists.
- The complex is adjacent to two ports of entry (Trans Canada Highway No. 55 into Canada and US Interstate 91 into the United States). Its close proximity to US and Canadian universities, urban centers and international airports further enhances the location. Burlington, Vermont (US) and Montreal, Quebec (CA) are less than two hours away by motor car.
- Being located so near to the Port of Montreal enables Rock Island Pellets to minimize the delivery time of equipment purchased abroad (i.e., pellet presses and wood crushers manufactured in Lithuania).
- The plant is the only cross-border manufacturing facility on the US/Canadian border, and will continue the spirit of international cooperation that is a hallmark of the Derby Line, VT/Stanstead, QC community in which the plant is located. The Canadian side of the installation is the home base for REDONA, while the US portion houses Tivoly Inc., a manufacturer with expertise in tool assembly. The US and Canadian plants share basic systems, and are joined by a foot-bridge over the Tomifobia river, and by an indoor walkway that leads from one side of the plant to the other.
- Manufacturing space of fifty thousand square feet (50,000) expandable to seventy-five thousand square feet (75,000) with existing floor loads of 250-400 lbs. per square foot.
- Office space, laboratory space, shipping and receiving areas, security and control areas available up to thirty thousand square feet (30,000).
- Ample parking space for US and Canadian workers and visitors (200 spaces or more).
- Excellent interconnections and security among the buildings and between the US and Canadian sides of the plant in all weather, including an indoor walkway and an outside footbridge.

•The existing infrastructure has access to electricity provided from both the US (Vermont Coop) and Canada (HydroQuebec), as well as fiber optic connections both in Canada and US.

Company Services

•Equipment Packages

•Rock Island Pellets have selected the OGM-1.5A Pellet Press, which is manufactured by the Radviliskis Machine Factory, as our basis for our portable pelletizing system. With over 20 years of experience manufacturing this press, Radviliskis has the expertise and abilities to deliver this equipment at a competitive price. The OGM-1.5A Pellet Press consists of the following parts:

- Press with batcher and mixer
- Screw transporter
- Bin
- Cooler
- Cyclone-ventilator
- Sorter
- Electric Box
- Water System

•Rock Island Pellets will reconfigure these parts to fit in ISO containers, while also incorporating electronic controls and measuring devices that will allow the unit to be monitored from a central station. The SCADA System (System Control and Data Acquisition) will enable end users to monitor the production level of the system and determine its operational condition.

•Income will be generated from the licensing of the equipment package as well as the brokering of fuel pellets to customers of Vermont Coop and others using pellet produced using our wood pelletizing system.

•Income will also be generated from the bulk sale of pellets to institutions (hospitals, schools) and private consumers using pellets supplies by Pacific BioEnergy. Through its partnership with Pacific BioEnergy, Rock Island Pellets will distribute 200 tons of pellets per month to local end users. The pellets will be received from Pacific BioEnergy and delivered to bulk-users from the Rock Island Pellets storage facility by Bordeau Brothers, an existing distributor located in Vermont.

•Rock Island Pellets will also work with equipment manufacturers to produce a portable pelletizing system for on site production of non-wood-based organic pellets that can be used to run the gasifier conversion system developed by REDONA. Rock Island Pellets will identify equipment, develop a pelletizing system, and establish the interconnection protocols required by the REDONA system. After development, these non-wood-based pellets will be sold to Vermont

Coop to run its gasification conversion energy system. Use is projected at around 8,670 tons per year for each gasifier Vermont Coop brings into service.

5. Communication and Oversight

Web technology has evolved to the point where it has the potential to be a powerful tool to provide project managers and principals with detailed updates and status. REDONA will have the ability to broadcast video and project updates all over the world in a matter of seconds via a secure web site that will be designed and maintained by REDONA. This technology will help REDONA share its development with not only its investors, but the world as well. It is an opportunity to provide a unique tool to allow funding organizations to monitor the project and oversee the performance of the operation. The REDONA website will host several pages; in depth descriptions of REDONA and gasification, timeline for overall goals and achievements, daily written journals, weekly video updates, password protected pages for live web cam feeds and video conferencing.

REDONA will provide the highest level of network and web security to protect against unauthorized access to information and secure web pages through using the most advanced tools available, REDONA will also focus on communicating its knowledge and learning's quickly to help the country achieve its energy goals.

Several pages will host an overview of REDONA and the gasification process. Text and images will show what REDONA is and what the main goals are. This website will be an educational resource for distributed generation, gasification, and renewable fuels.

The section of the webpage devoted to written journals and work blogs, will be updated daily. They will show, over time, the progress REDONA has made towards reaching its goals. They will account for experiments, meetings and breakthroughs. These pages will also provide timely video updates of key events and project status.

Weekly video updates will be five to ten minute clips summarizing the previous week's progress. Each update will include interviews of key people involved; what they did or saw that week. There will be scenes detailing any testing and experiments done that week. The videos will also reference the timeline to see where things are at and where they are headed.

Real-time access will also be available. This will be done through a portal with high security and restricted access. This is the key part of oversight. This part of the website will includes web cams with live feeds of the REDONA site. These web cams are available 24 hours a day. They will cover the production floor, experiments, meetings and

an overview of the site. There will also be a page for video conferencing and blogs for important meetings and topics.

REDONA will also provide roaming tools to allow coverage of meetings and events in any locale. These tools will enable all the key principals, stakeholders, and project participants to stay informed. The project will progress at the fastest speed possible, with the highest level of involvement.

This web technology will allow for REDONA to be selectively open to everyone. Everyone can be a part of the progress in the growth of this unique renewable energy technology. The web provides a valuable tool for this innovative communications strategy.

6. Timeline

Item	Description	Completion Date
1	Memorandum of Understanding	April 2, 2007
2	Business Contracts between the parties in	June 30, 2007
3	Place	January 31, 2008
4	First Year Financing in Place	March 1, 2009
5	Unit One Online	June 15, 2008
6	Fuel Selection and Sourcing Plan Complete	June 30, 2009
7	Unit Two Online	September 30,
8	Unit Three Online	2009
9	Permitting started for Smugglers Notch Unit	September 15,
10	Permitting started for Qimonda Unit	2009
11	Smugglers Notch Construction Begun	October 31,
12	Permitting Started for Blue Seal Feeds and	2009
13	Ethan Allen	April 1, 2010
14	Smugglers Notch Unit Online	December 15,
15	Qimonda Unit Online	2009
16	Blue Seal Feed Unit Online	December 15,
17	Ethan Allen Unit Online	2009
	2011 Budget and Plan in Place	June 30, 2010
	∅ Balance of VEC system	August 31, 2010
	∅ Roll-out plan with other utilities	October 31, 2010
		December 31, 2010
		November 31, 2010

7. Societal Benefits

National Grid and Homeland Security

The massive outage that left 50 million North American residents without power on August 14, 2003 is an excellent example of how the electrical grid is highly dependent on generation plants. Although the root cause of the failure was failure to adequately maintain transmission rights of way, the outage began with a generator failure. Through the use of REDONA gasifer/generators, the grid can become highly stable and it could become virtually impossible to create this kind of massive outage.

The way electricity is generated and distributed today is inefficient[16] and requires extensive and costly transmission infrastructure. Generation facilities are large and often located great distances away from the consumers. The generation output is sold into the forward-capacity market[17] and depends on the ability of transmission to move the electricity freely from the generator to the consumer. As a result, transmission must be designed with a high amount of capacity and redundancy. In many parts of North America, these transmission assets experience congestion during peak usage.

There are key changes in technology that allows REDONA to solve the electricity grid instability problem;

1. Information technology has evolved to the point that even the smallest electrical utilities have complex, secure, and comprehensive Systems Control and Data Acquisition (SCADA) systems. These systems are capable of monitoring power quality at the feeder level, and many utilities are now monitoring power quality and voltage at the residential meter level, and
2. Generation controls and interconnection technology has also evolved. The use of solar panels, farm methane and wind has created a market for low-cost interconnection technologies that meet the requirements to tie to the electrical grid. These low-cost, off-the-shelf technologies will be used by the REDONA gasifier/generators.
3. A supplier market exists today that makes wide range of equipment that meets all the required technical specifications and is readily available to enable small generators to be distributed strategically throughout the electric system.

Today, most distribution utilities have 24-hour dispatch centers monitoring the electric distribution system for problems. These utilities have fully equipped dispatch centers with redundant data loops, secure facilities and back-up power.

[16] Less than 1/3 of the original thermal content of the fuel is received by the user as electricity. Typical generators on the grid today are less than 40% efficient, and another 10% of the energy is lost through the transmission and distribution facilities (line loss).

[17] The Forward Capacity Market (FCM) procures capacity to meet New England's forecasted demand and reserve requirements three years into the future. Generation and Demand Resources are selected through a competitive Forward Capacity Auction process.

The REDONA gasifier generators are sized to enable distribution throughout a local electrical grid. Instead of having one centralized generation facility that sends its power to a location via one or two transmission networks, REDONA eliminates the transmission network, and the insecurity that exists as a result of those networks. For example, instead of using a 200 Megawatt generator that is located 100 miles away from a population center, 200 one Megawatt REDONA generators can be placed within the population centers, located adjacent, or within a few miles to the user. Not only does this eliminate the need, and exposure, of the transmission, it creates a highly stable and secure electrical network. Dispatch centers now will provide local generation for local voltage and support. Instead of having the risk of one large generator failure, the grid now has many small generators with the ability of the system to keep functioning normally in the event of single generator failures.

Centralized generation has been targeted very effectively during times of war, most notably in Germany during World War II. Electric power was the vital part of the German electric distribution system… Albert Speer, Hitler's strategist, wrote that, "The destruction of all industry can be achieved with less effort via power plants," highlighting the danger of vulnerable power facilities.

In Japan, however, such destruction was far more difficult to achieve due to the relative decentralization of Japan's power grid. The electric power system in Japan was never a primary target because most of the power facilities in Japan were so numerous, small and inaccessible that their destruction would have been impractical, if not impossible.

The ability of REDONA gasifier/generators to use local fuels adds another layer of security to the electrical grid. By using any variety of municipal solid waste, sewage, and locally grown crops, it becomes virtually impossible to stop the generation by cutting off fuel supply.

Economic Benefits

Using local fuels keeps the dollars local. Rather than using fuels that were mined hundreds and thousands of miles away, and sometimes from politically unstable areas, REDONA generators are capable of developing the fuel sources locally. This creates and supports local jobs through growing, harvesting and creating the fuel pellets. Keeping the fuel sources local takes advantage of the multiplier effect of local economies[18]. Providing incomes to the local fuel developer results in money for local stores, who also provide jobs; these stores pay suppliers, who also provide jobs.

[18] How many times dollars are re-circulated within a local economy before leaving through the purchase of an import. Economist John Maynard Keynes first coined the term "Local Multiplier Effect" in his 1936 book The General Theory of Employment, Interest and Money.

Through capturing the heat output (normally a waste product) of the gasifier/generator, the cost of energy is significantly reduced. Today, commercial and industrial users pay for their electricity, and also pay for their heating and cooling. Large industrial users, such as manufacturers, typically have energy as one of their top three cost of operation. Reducing these costs enables these users to become more successful in the competitive global markets.

Environmental Benefits

REDONA gasifier/generators produce an emissions profile that is better than natural gas. Natural gas is recognized as one of the cleanest sources of electricity. As REDONA gasifier/generators become integrated into the grid, it will eliminate older and dirtier generation facilities.

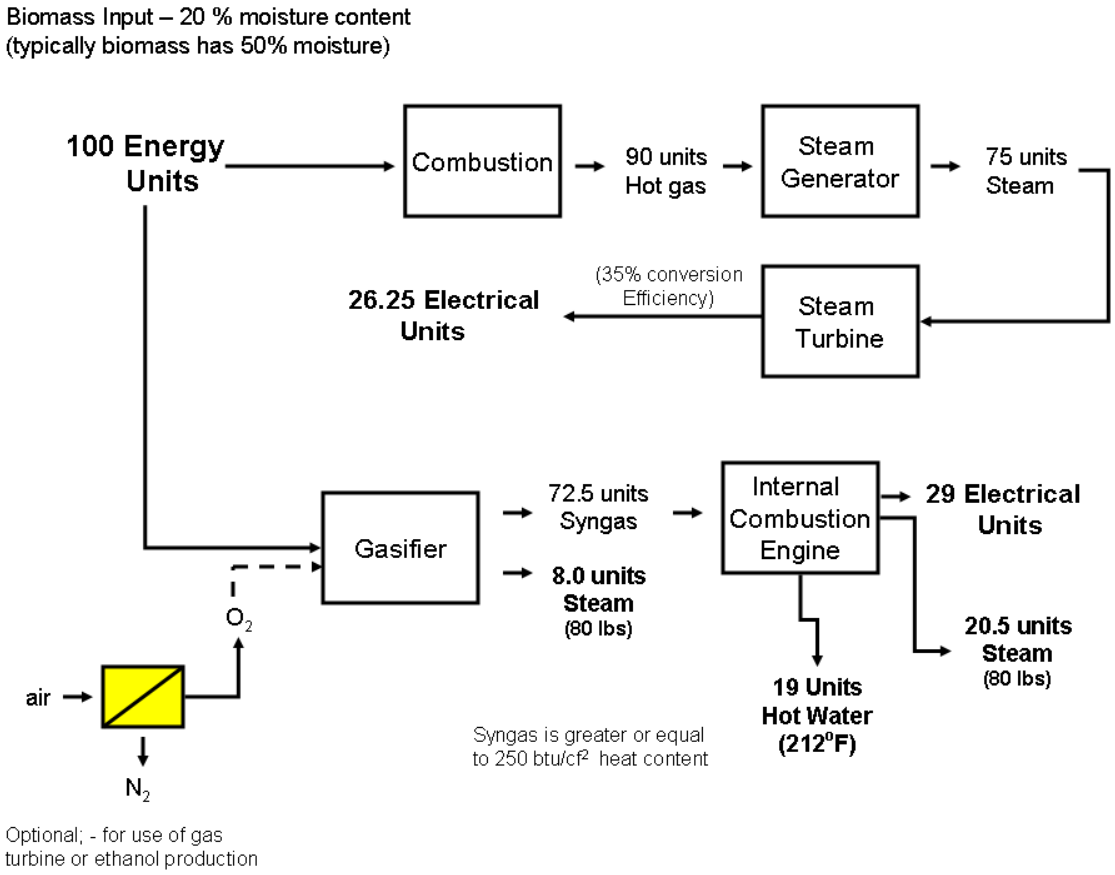
Using local biomass feed-stocks reduces the need to use fuels that have been mined from deep beneath the earth. This eliminates the release of carbon dioxide gas that has been stored which adds to the present problem of global warming.

By gasifying the bio-mass, the impact to the earth's atmosphere is substantially reduced as opposed to allowing the material to decompose naturally. Natural decomposition results in the release of methane (CH4) gases. These gases contribute twenty-nine times more to the greenhouse effect then the carbon dioxide gas that results from gasification. No new carbons are added, and the impact to global warming from natural decomposition is significantly reduced.

The use of fuel to transport the fuels needed for generation is significantly reduced by using local fuels. Today, fuels are mined and then transported thousands of miles to the electric generation facility. This capture and transportation contributes to the global environmental problems.

8. Financial Model

The REDONA gasifier, through the use of an internal combustion engine, has much more useable heat than a traditional combustion process. While a traditional combustion process coverts 25% of the input energy to electricity, the combustion process has virtually no useable heat left over at the end of the process. With the ability to convert 29% of the input energy to electricity, the REDONA gasifier has slightly higher electric conversion efficiency. However, the REDONA gasifier also provides 28.5% of the original energy as useable steam. It also provides another 19% of the input energy as hot water[19] that can be used for hydronic heating and cooling.



The following models show the cash flow available from a typical REDONA gasifier for the first three years.. During year one, the fuel will be 100% wood pellets purchased off the market to give REDONA the time to focus on the gasifier itself. Year two REDONA will now work on the fuel process; the fuel will be 25% municipal solid waste with a negative fuel cost of $40/ton[20] combined with wood at a cost of

[19] At a temperature of 212°F

[20] Present tipping fees on municipal solid waste exceed $90/ton. REDONA would assume a fuel processing cost of $50/ton, which would result in positive cash flow to the gasifier of $40/ton for the municipal solid

$85/ton. Year three represents steady-state, with 50% municipal solid waste at a negative cost of $50/ton combined with wood at $75/ton. Other alternate carbohydrates, such as straw-grass, farm bedding, and sewage will be considered as the markets evolve. REDONA believes these markets will naturally evolve as a result of developing a fuel pellet standard.

Terms used in the Model:

- Host credit is a payment made to the owners of the site that the gasifier is located on. The host site will use the heat output of the gasifier for district heating and cooling, as well as process steam. The host will pay an agreed upon price (heat rate) for the heat output. The host will continue to pay the utility tariff for its electricity. The utility will treat the output of the generator as part of its power supply portfolio and pay an agreed upon rate to the project for the electrical output. The host receives financial benefit through the host credit, and through a heat rate that is below market. The host credit will start at 1¢ per kilowatt-hour and grow to 1.5¢ per kilowatt-hour on year three.
- LICAP, Locational Installed Capacity, is a term that ISO[21] New England has applied to a fee that encourages generating plant operators by giving greater compensation to build and operate facilities in locations where electricity demand is the highest and likely to exceed supply. This is a fixed number that is established through a tariff.
- Line-Loss savings are a result of locating the generator close to the load. Line losses are typically 11% to 15% when purchasing from the New England market.
- Renewable Energy Certificates (RECs), also known as Green tags, Renewable Energy Credits, or Tradable Renewable Certificates (TRCs), are the property rights to the environmental benefits from generating electricity from renewable energy sources. These certificates can be sold and traded and the owner of the REC can legally claim to have purchased renewable energy. While traditional carbon emissions trading programs promote low-carbon technologies by increasing the cost of emitting carbon, RECs create incentives for carbon-neutral renewable energy by providing a subsidy to electricity generated from renewable sources.

  In states which have a REC program, a green energy

waste component of the fuel cost.

[21] An Independent System Operator (ISO) is an organization formed at the direction or recommendation of the Federal Energy Regulatory Commission (FERC). In the areas where an ISO is established, it coordinates, controls and monitors the operation of the electrical power system.

provider (such as a wind farm) is credited with one REC for every 1,000 kWh of electricity it produces (for reference, an average residential customer consumes about 300 kWh in a month). A certifying agency gives each REC a unique identification number to make sure it doesn't get double-counted. The green energy is then fed into the electrical grid (by mandate), and the accompanying REC can then be sold on the open market. The REDONA gasifier qualifies for REC's.

Year One Analysis

Year One Analysis

Total Annual Hours	8760	
Electric output	1000	kw
Steam Output	3354155	btu
Pellet input	1435	lb/hr
Pellet energy	8200	btu/lb.
Availablility	92.00%	
Electric Thermal Equivalent	3413000	btu
Heat Input	11768966	btu
Electrical Efficiency	29.0%	
Steam Efficiency	28.5%	

Costs			*Annualized*
Pellets	$100.00	/ton	($578,344.19)
O&M	$0.015	/kw	($120,888.00)
Host Credit	$0.010	/kw	($80,592.00)
Gasifier	$1,325,000.00		
Generator	$75,000.00		
Interconnect	$100,000		
Pelletizer	$100,000		
Site-Prep	$300,000		
Installation	$100,000		
Total Installed Cost	$2,000,000.00		
Interest Rate	7.50%		($150,000)
Payback Period	20	Years	
		Total Annual Costs	($929,824.19)

Sales			
Electric	$0.070	/kw	$564,144.00
Heat	$11.25	/mmbtu	$304,107.83
		Total Sales	$868,251.83

Total Input Energy	11768966		
Total Output Energy	6767155		
Overall Efficiency	57.50%		

Return			
REC's	$0.02	/kw	$161,184.00
Profit	($0.008)	/kw	($61,572.36)
LICAP	0.005	/kw	$40,296.00
Line Loss	$0.007	/kw	$56,414.40
Federal Renewable Tax Credit	$0.01	/kw	$80,592.00
		Total Annual Return	$276,914.04

Year Two Analysis

Total Annual Hours	8760	
Electric output	1000	kw
Steam Output	3354155	btu
Pellet input	1435	lb/hr
Pellet energy	8200	btu/lb.
Availablility	92.00%	
Electric Thermal Equivalent	3413000	btu
Heat Input	11768966	btu
Electrical Efficiency	29.0%	
Steam Efficiency	28.5%	

Costs			*Annualized*
Pellets	$71.67	/ton	($414,499.28)
O&M	$0.015	/kw	($120,888.00)
Host Credit	$0.013	/kw	($100,740.00)
Gasifier	$1,325,000.00		
Generator	$75,000.00		
Interconnect	$100,000		
Pelletizer	$100,000		
Site-Prep	$300,000		
Installation	$100,000		
Total Installed Cost	$2,000,000.00		
Interest Rate	7.50%		($150,000)
Payback Period	20	Years	
		Total Annual Costs	($786,127.28)

Sales			
Electric	$0.073	/kw	$584,292.00
Heat	$11.25	/mmbtu	$304,107.83
		Total Sales	$888,399.83

Total Input Energy	11768966		
Total Output Energy	6767155		
Overall Efficiency	57.50%		

Return			
REC's	$0.02	/kw	$161,184.00
Profit	$0.013	/kw	$102,272.55
LICAP	0.005	/kw	$40,296.00
Line Loss	$0.007	/kw	$58,429.20
Federal Renewable Tax Credit	$0.01	/kw	$80,592.00
		Total Annual Return	$442,773.75

Year Three Analysis

Total Annual Hours	8760	
Electric output	1000	kw
Steam Output	3354155	btu
Pellet input	1435	lb/hr
Pellet energy	8200	btu/lb.
Availablility	92.00%	
Electric Thermal Equivalent	3413000	btu
Heat Input	11768966	btu
Electrical Efficiency	29.0%	
Steam Efficiency	28.5%	

Costs			Annualized
Pellets	$50.00	/ton	($289,172.09)
O&M	$0.015	/kw	($120,888.00)
Host Credit	$0.015	/kw	($120,888.00)
Gasifier	$1,325,000.00		
Generator	$75,000.00		
Interconnect	$100,000		
Pelletizer	$100,000		
Site-Prep	$300,000		
Installation	$100,000		
Total Installed Cost	$2,000,000.00		
Interest Rate	7.50%		($150,000)
Payback Period	20	Years	
		Total Annual Costs	($680,948.10)

Sales			
Electric	$0.075	/kw	$604,440.00
Heat	$11.25	/mmbtu	$304,107.83
		Total Sales	$908,547.83

Total Input Energy	11768966
Total Output Energy	6767155
Overall Efficiency	57.50%

Return			
REC's	$0.02	/kw	$161,184.00
Profit	$0.028	/kw	$227,599.73
LICAP	0.005	/kw	$40,296.00
Line Loss	$0.008	/kw	$60,444.00
Federal Renewable Tax Credit	$0.01	/kw	$80,592.00
		Total Annual Return	$570,115.73

9. Division of Responsibilities

Vermont Electric Cooperative, Inc.
Power & Energy Sales
Interconnection Equipment
Billing of all energy in its territory
Environmental Permits for Gasifiers
Training for operations and maintenance of interconnect equipment and systems
Consulting and implementation of electrical (BTU Permits)
All other matters concerning utility matters and public service commissions

Sealander Waterworks, Ltd.
Management of all Real Estate matters
Development-Site management, site construction
Permits, site contracts and leases.
Sales Agreements for on site (local) fuel pellets to system

Rock Island Pellets Inc.
Fuel Pellets development
Manufacturing process and equipment packaging
Sales new formulated pellets to system
Pelletizing equipment manufacturer and design

Enerkem, Inc.
All Gasification and process matters of energy conversion
Equipment manufacturing support and design

Training of operational personnel
Monitoring of systems and supervision

Redona
Sales and Support
Product Manufacturing

Appendix A – Memorandum of Understanding/

Vermont Electric Cooperative, Inc.
42 Wescom Road
Johnson, Vermont 05656-9717
Tel: (802) 635-2331
Toll-Free: (800) 832-2667
Fax: (802) 635-7645

November 9, 2006

We, the undersigned, promise and agree to cooperate and negotiate in good faith to enter into a legally binding CONTRACT including at least the following terms and conditions:

1. VEC management will form a non-profit tax exempt Vermont corporation (the "Corporation"), in which it has equal power with all other members, for any lawful purposes.

2. The Corporation will have not less than three or more than four members.

3. The Corporation shall be operated solely for the purposes of developing for commercial production, sale and operation a transportable fluid bed gasifier to produce three Megawatts of electric power, or below, and the standardized fuel pellets for the gasifier utilizing solid municipal waste, sewage sludge, wood waste, and any other feed stock.

4. The Corporation shall be funded solely from sales and from tax-free grants from the respective federal governments of the United States of America and the Dominion of Canada, and tax-free grants from any other lawful source.

5. Members of the Corporation, respectively, each shall be compensated fairly and in the ordinary course of business for material and services they provide to the Corporation, and the Corporation shall be organized and operated to assure that the funds of the Corporation are expended and disbursed only with unanimous approval of the Board of Directors of the Corporation in each instance.

6. At such time that the members of the Corporation (the "Members") unanimously agree that the fluid bed gasifier has been developed and ready for commercial sales, distribution and operation, they shall form a new for-profit Vermont limited liability business entity which may be a limited liability company, a stock corporation, or any other form of limited liability for-profit

business entity available under the laws of the State of Vermont (the "Company").

7. Each of the Members shall have equal power in, and distribution of profits from the Company.

8. Each of the Members shall be compensated fairly and in the ordinary course of business for material and services they provide to the Company, and the Company shall be organized and operated to assure that the funds of the Company are expended and disbursed only with unanimous approval of the governing body of the Company, be it a board of directors or other form of governance, in each instance.

9. No interest in the Company shall be conveyed to any other person, party or entity except with the unanimous consent of the governing body of the Company.

Accepted and agreed as of the
date first above written for Vermont Electric Cooperative, Inc.

By:_(signature on file)
_____

Accepted and agreed as of the date first above written
for Enerkem Technologies Inc.

By:_(signature on file)

Accepted and agreed as of the date first above written
for Sealander Waterworks Limited

By:_(signature on file)

Appendix B – Research and Development Budget

a) Unit one - Gasifier Development (Enerkem)

ENERKEM TECHNOLOGIES INC.
10,000 TONNES PER YEAR DRY BIOMASS
Unit One - Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Gasification Unit	$179,243	$13,722	$56,800	$249,766	1.60	$399,625	$399,625.13
200	Water treatment	$135,543	$0	$24,051	$159,594	1.60	$255,351	$255,351.05
400	Gas conditioning	$217,277	$0	$31,131	$248,409	1.60	$397,454	$397,453.78
500	Heat recovery	$75,134	$0	$9,810	$84,944	1.60	$135,910	$135,910.07
700	Flare et compression air	$75,783	$0	$7,787	$83,570	1.60	$133,713	$133,712.51
850	Water discharge	$7,545	$0	$178	$7,722	1.60	$12,356	$12,355.83
900	Utilities, building and connections	$57,009	$37,761	$17,756	$112,527	1.60	$180,043	$180,043.20
1000	Shredding, Feedstock storage & ash handling	$41,100	$0	$0	$41,100	1.60	$65,761	$65,760.71
3100	Site preparation & civils	$0	$51,414	$0	$51,414	1.60	$82,262	$82,261.68
3200	Engine						$1,197,656	$1,197,655.65
	TOTAL DIRECT COST (TDC)	$788,635	$102,897	$147,514	$1,039,046	1.60	$2,860,130	$2,860,129.62
	INDIRECT COSTS - LABOR						$643,529	$643,529.16
	PROJECT MANAGEMENT						$214,510	$214,509.72
	TOTAL CONSTRUCTION COST						$3,718,169	$3,718,168.50
	ENGINEERING & LICENSE						$1,072,549	$1,072,548.61
	TOTAL COST						$4,790,717	$4,790,717.11

b) Unit Two - Gasifier Development (Enerkem)

c)

ENERKEM TECHNOLOGIES INC.
10,000 TONNES PER YEAR DRY BIOMASS
Unit Two - Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Gasification Unit	$179,243	$13,722	$56,800	$249,766	1.60	$399,625	$267,748.84
200	Water treatment	$135,543	$0	$24,051	$159,594	1.60	$255,351	$171,085.20
400	Gas conditioning	$217,277	$0	$31,131	$248,409	1.60	$397,454	$266,294.04
500	Heat recovery	$75,134	$0	$9,810	$84,944	1.60	$135,910	$91,059.75
700	Flare et compression air	$75,783	$0	$7,787	$83,570	1.60	$133,713	$89,587.38
850	Water discharge	$7,545	$0	$178	$7,722	1.60	$12,356	$8,278.41
900	Utilities, building and connections	$57,009	$37,761	$17,756	$112,527	1.60	$180,043	$120,628.94
1000	Shredding, Feedstock storage & ash handling	$41,100	$0	$0	$41,100	1.60	$65,761	$44,059.68
3100	Site preparation & civils	$0	$51,414	$0	$51,414	1.60	$82,262	$55,115.32
3200	Engine						$1,197,656	$802,429.29
	TOTAL DIRECT COST (TDC)	$788,635	$102,897	$147,514	$1,039,046	1.60	$2,860,130	$1,916,286.84
	INDIRECT COSTS - LABOR						$643,529	$431,164.54
	PROJECT MANAGEMENT						$214,510	$143,721.51
	TOTAL CONSTRUCTION COST						$3,718,169	$2,491,172.90
	ENGINEERING & LICENSE						$1,072,549	$718,607.57
	TOTAL COST						$4,790,717	$3,209,780.46

c) Unit Three - Gasifier Development (Enerkem)

ENERKEM TECHNOLOGIES INC.
10.000 TONNES PER YEAR DRY BIOMASS
Unit Three - Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Gasification Unit	$179,243	$13,722	$56,800	$249,766	1.60	$399,625	$159,850.05
200	Water treatment	$135,543	$0	$24,051	$159,594	1.60	$255,351	$102,140.42
400	Gas conditioning	$217,277	$0	$31,131	$248,409	1.60	$397,454	$158,981.51
500	Heat recovery	$75,134	$0	$9,810	$84,944	1.60	$135,910	$54,364.03
700	Flare et compression air	$75,783	$0	$7,787	$83,570	1.60	$133,713	$53,485.00
850	Water discharge	$7,545	$0	$178	$7,722	1.60	$12,356	$4,942.33
900	Utilities, building and connections	$57,009	$37,761	$17,756	$112,527	1.60	$180,043	$72,017.28
1000	Shredding, Feedstock storage & ash handling	$41,100	$0	$0	$41,100	1.60	$65,761	$26,304.28
3100	Site preparation & civils	$0	$51,414	$0	$51,414	1.60	$82,262	$32,904.67
3200	Engine						$1,197,656	$479,062.26
	TOTAL DIRECT COST (TDC)	$788,635	$102,897	$147,514	$1,039,046	1.60	$2,860,130	$1,144,051.85
	INDIRECT COSTS - LABOR						$643,529	$257,411.67
	PROJECT MANAGEMENT						$214,510	$85,803.89
	TOTAL CONSTRUCTION COST						$3,718,169	$1,487,267.40
	ENGINEERING & LICENSE						$1,072,549	$429,019.44
	TOTAL COST						$4,790,717	$1,916,286.84

d) Unit One - Gasifier Installation and Support

Vermont Electric Cooperative
10,000 TONNES PER YEAR DRY BIOMASS
Unit One Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Electrical Interconnect	$1,000	$20,000	$5,000	$75,000	1.60	$161,600	$210,080
200	Electrical Controls	$25,000	$40,000	$5,000	$15,000	1.60	$136,000	$176,800
	TOTAL DIRECT COST (TDC)	$26,000	$60,000	$10,000	$90,000		$297,600	$386,880
	INDIRECT COSTS - LABOR							
	Legal Services						$50,000	$65,000
	Regulatory Compliance						$30,000	$39,000
	Financial Management						$50,000	$65,000
	Engineering						$70,000	$91,000
	Training and Development						$125,000	$162,500
	Information Technology and Communications						$325,000	$422,500
	Third Party Project Quality Assurance Oversight						$100,000	$130,000
	Project Management						$70,000	$91,000
	TOTAL INDIRECT COSTS						$820,000	$1,066,000
	TOTAL COST						$1,117,600	$1,452,880

e) Unit Two – Gasifier Installation and Support

Vermont Electric Cooperative
10,000 TONNES PER YEAR DRY BIOMASS
Unit Two Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Electrical Interconnect	$1,000	$20,000	$5,000	$75,000	1.60	$161,600	$161,600
200	Electrical Controls	$25,000	$40,000	$5,000	$15,000	1.60	$136,000	$136,000
	TOTAL DIRECT COST (TDC)	$26,000	$60,000	$10,000	$90,000		$297,600	$297,600
	INDIRECT COSTS - LABOR							
	Legal Services						$50,000	$50,000
	Regulatory Compliance						$30,000	$30,000
	Financial Management						$50,000	$50,000
	Engineering						$70,000	$70,000
	Training and Development						$125,000	$125,000
	Information Technology and Communications						$325,000	$325,000
	Third Party Project Quality Assurance Oversight						$100,000	$100,000
	Project Management						$70,000	$70,000
	TOTAL INDIRECT COSTS						$820,000	$820,000
	TOTAL COST						$1,117,600	$1,117,600

f) Unit Three – Gasifier Installation and Support

Vermont Electric Cooperative
10,000 TONNES PER YEAR DRY BIOMASS
Unit Three Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Electrical Interconnect	$1,000	$20,000	$5,000	$75,000	1.60	$161,600	$145,440
200	Electrical Controls	$25,000	$40,000	$5,000	$15,000	1.60	$136,000	$122,400
	TOTAL DIRECT COST (TDC)	$26,000	$60,000	$10,000	$90,000		$297,600	$267,840
	INDIRECT COSTS - LABOR						$50,000	$45,000
	Legal Services						$30,000	$27,000
	Regulatory Compliance						$50,000	$45,000
	Financial Management						$70,000	$63,000
	Engineering						$125,000	$112,500
	Training and Development						$325,000	$292,500
	Information Technology and Communications						$100,000	$90,000
	Third Party Project Quality Assurance Oversight						$70,000	$63,000
	Project Management						$820,000	$738,000
	TOTAL INDIRECT COSTS						$1,117,600	$1,005,840
	TOTAL COST							

g) Fuel Supply and Pellet Development

Rock Island Pellets
Year One Research and Development Budget

Location	Description	EQUIP UNIT $	MAT'L UNIT $	Transport Budget $	EQUIP FOB SITE $	Instal Factor	Unit Install $	Total Install $
100	Pellet Equipment	$265,000	$10,000	$3,000	$0	1.60	$444,800	$444,800
200	Electrical Controls + Hardware	$5,000	$1,200	$300	$0	1.60	$10,400	$10,400
	TOTAL DIRECT COST (TDC)	$270,000	$11,200	$3,300	$0		$455,200	$455,200
	INDIRECT COSTS - LABOR							
	Legal Services						$50,000	$50,000
	Safety Compliance						$10,000	$10,000
	Financial Management						$50,000	$50,000
	Engineering						$70,000	$70,000
	Training and Development						$125,000	$125,000
	Information Technology						$200,000	$200,000
	Third Party Project Quality Assurance Oversight						$50,000	$50,000
	Marketing & Trade Show						$70,000	$70,000
	Project Management						$70,000	$70,000
	Facility Costs						$101,600	$101,600
	Utility Costs						$75,000	$75,000
	TOTAL INDIRECT COSTS						$871,600	$871,600
	TOTAL COST						$1,326,800	$1,326,800