

Carbon Cap Business Plan (Draft February 2018)

The name Carbon Cap Inc. was registered in 2016. However, we have been working on this heat recovery project since 2015. The current product is called the FGR-10. We have designs for 3 additional models, FGR 5, FGR 15 and FGR 25.

Overview

Historically the high-rise apartment rental business enjoys a stable revenue stream regardless of what the economy is doing. However, the recent double digit Carbon tax in Ontario and other provinces is forcing this sector to explore new ways to cut operating costs. This is helping remove barriers for businesses with "clean technology" products and services. Changing incandescent lights to LED's, using low volume toilet's, upgrading door seals or demand controlled features on various utilities are just a few fairly economical ways to improve a building's efficiency. However, the only way to see substantial efficiency improvements is by making large capital investments in new windows, heating or cooling systems. The collective increase in the buildings efficiency from doing all of the above could range between 20-30 percent. Unfortunately ROI's can take dozens of years to pay back. Our single FGR energy recovery system can provide similar efficiency increase with ROI's under 2 years in most cases. The funds they save after that can be used to finance the balance of upgrades thus lowering the overall ROI time and pushing up the total efficiency further yet.

Carbon Cap Inc. has discovered an opportunity to provide mid to high rise building operators with an innovative and economical way to lower their carbon footprint and save money at the same time on their natural gas consumption. If you have ever driven by a large high rise building during the winter months you will have noticed several clouds of smoke billowing from the top. The clouds you see are escaping exhaust flue gas. It actually exit's the average atmospheric boiler at 300 degrees Fahrenheit or so. One of the main goals of our system is to lower the exhaust temperature as much as possible. We accomplish this by diverting the exhaust gas to our heat recovery plenum via a controlled venting system. A set of heat exchanger coils are waiting inside the plenum to absorb the heat. The captured energy will be then distributed to several areas within the building.

Every building owner / property management and engineer that we have spoken to said they have not seen anything like our FGR heat recovery system before. The FGR energy recovery system is a modular packaged system invented to uniquely provide energy conservation in the high rise building sector. It has been designed to address the space constraints in high rise buildings by being easily transported through a standard door, and up a standard elevator. It is the only system of its kind developed and will reduce energy costs and CO2 emissions in high rise buildings around the world by ten to twenty five percent Once installed, it converts a non-condensing boiler system into a condensing boiler system with additional benefits. It is a tri-conservation system saving natural gas, electricity and water simultaneously. The boilers flue gas is used to preheat domestic hot water, return heating lines and can even send excess heat energy to rooftop air handlers. Other advanced options utilize the captured condensate greywater for reuse in other areas of the building. A solar panel can also be used to take the heat recovery systems fan and pump off the grid. The same lines that feed the air handlers can also provide a boost to the air conditioning system. This also means a reduction in hydro consumption.

Objectives

Our first goal has already been achieved by setting up a mock boiler room so we can test the FGR heat recovery system. This has allowed us to prove how efficient our system can make a typical boiler in addition to streamlining the controls and general functionality.

The project's next objective is to install the system in an actual building where ongoing efficiency monitoring will help us build a case study to prove our technology and eventually mass commercialization. We confirmed this during a meeting in December 2017 with the owner of O'Shanter developments. They have 25 building in the greater toronto area.

Industry Partnerships

An important part of our marketing efforts will be sharing our technology and aligning ourselves with an organization that can add value on several levels to our FGR heat recovery project. Receiving endorsements from related industry experts and organizations will help build integrity and confidence in our FGR system and ultimately help us further commercialize the product.

To date we have already opened conversations and met with the Toronto Atmospheric Fund. The executives there were all thrilled to hear about our system. They made several recommendations and are happy to continue conversations working towards an eventual partnership in terms of endorsing proven case studies and offering financing options to buildings interested in our system. They will also be making intro's to Toronto Housing for us when the time is right. www.taf.ca

Econoler is yet another important industry partner. They have 35 years of experience in the design, implementation, evaluation and financing of energy efficiency and renewable energy programs and projects. We intend to retain their services as our case studies roll out. www.econoler.com

One current customer, O'shanter Properties in Toronto is willing to test our FGR heat recovery system in several of their large apartment buildings. The minister of environment has previously endorsed them as good stewards of energy conservation. www.oshanter.com

Our other project objectives including the live building tests, creating critical baseline reports and formal case studies is further developing our chain suppliers, manufacturing relationships, financing growth strategies and various other commercialization and labour related needs.

Engineering

Carbon Cap has been very fortunate to be founded in a city like Hamilton whose city has helped grow much of the country's industrial growth primarily in the steel industry. This has accounted for the vast amount of boiler and combustion related experts who have been instrumental in confirming our technology has a sound and useful design.

The FGR system crosses over a few areas within the HVAC industry. Therefore it was necessary to utilize several trade and engineer experts depending on their area of expertise. Union Boiler, AVL manufacturing and BlackHawk Combustion were the initial project experts providing the confirmation of the technology and design feasibility.

As the FGR design progressed there has been support from field technicians, part suppliers, instrumentation and control experts like, Nobel Trade, ABB, Davis Controls and FRS Instrumentation. We suspect as the system grows its design options and case studies diversify, there will be a continued need from these experts and others. Carbon Cap also intends to involve nationally recognised, "benchmark," consulting firms and organizations like Econoler, Watershed and TAF who will be providing ongoing confirmation of our systems efficiency.

Timelines

Our project has been rolling out in a series of stages. The mock boiler room in Ancaster Ontario took six months to set-up starting in April 2017. There are have two large boilers, a Laar's 818,00 BTU boiler which represents the average size used to supply building heat and a slightly smaller boiler 590,000 BTU which represents a size used for heating domestic hot water tanks. We also have a 2800 gallon water storage tank in place that creates similar heat demand of a large apartment building. Our mock boiler room will continue to serve as a staging and testing facility for further developing and refining our technology. Additional boilers and other items like air handlers and a cooling tower will be added to create constant demand for ongoing data collection reasons.

Several tests have already been conducted with our first working prototype, including a test to determine how quickly the hot water tank is heated with and without our FGR unit. On average our tests clearly shows how cold ground water is instantly heated from 55F to over 70F and a return boiler line from 110F to 130F. The longer the boilers stay on to create a steady state, the boilers exhaust temps rise and improve the numbers further yet.. This key data has been documented via videos and our own recorded and surpassed all our expectations.

The next stage will be installing the system in a live building. Our hope is have the FGR energy recovery system fully operational in a live building by March 2018. While this is happening we will invite potential customers, partners and project related supporters to view our system. This will give all involved a chance to witness the effectiveness of our system.

Engineering Data Acquisition

Carbon Cap has been providing most of the necessary trades and engineering to operate the mock boiler room. The collection of our demonstration data has been an important part of our project. To date we have manually recorded this info. As we move forward this data will be electronically collected by the FGR's system PLC and made available online all parties involved. Watershed Technologies, a highly regarded building automation and engineering firm in Toronto along with others will also be supporting this data collection. We have also reached out to several local colleges and universities. We intend to setup a dedicated laptop for this that is uplinked daily. Converting this collected data to a broader digital medium via the internet will be another important task. We have a very talented service provider who will help us accomplish this. This data format and information will be shared and implemented with our partners. The same service provider will begin the process of exposing our project and company via various digital mediums including the website we have reserved, www.carboncapinc.com

Migrating the FGR system to a live building will be a substantial project on its own. Having the ability to streamline our data collection will ultimately support the commercialization process. We have already had meeting with several service providers who will help support these challenges.

In December 2017 Watershed Technologies Inc. did a full 3rd party efficacy report that was very encouraging. They concluded that our FGR system will have the unique ability to boost the vast majority of boilers efficiency in most buildings by 15-25%. Watershed will also be documenting the efficacy of our first install at the 660 Briar Hill building in Toronto. This information will be used to build a solid case study for our sales and marketing program.

Understanding the Marketplace

One must first understand the uniqueness of our particular sector client to fully comprehend their needs. The high-rise building owner unfortunately has limited opportunities in securing cost saving measures. Due to this fact, the building owner shifts its focus on the day-to-day operations and heavily screens any incoming attempts to provide new savings opportunities. Simply put, the focus remains on the maintenance of their building. Building owners and their management groups accomplish this by attempting to effectively maintain their exterior including windows and doors. Other areas of maintenance are heating, cooling, ventilation, water and lighting. For decades these operating costs have remained relatively consistent with little change. The harsh reality is that there have been few opportunities for these customers to reduce their overall operating cost. In recent years a limited exception would be LED lighting as a scarce example. This change in lighting has provided the building owner with savings of some substance. Other examples such as low volume toilets and time of use controls have provided some marginal savings.

Low velocity fire tube boilers in general have few heat recovery options. There just isn't many manufacturers that offer a cost effective way to recover heat energy from these types of boilers. The few systems that are available have a cost that is completely disproportionate to what the sector would expect. By contrast our system will have average payback of 2 years or less. In some cases depending on the amount of natural gas used the ROI could come within the first year.

Technology

Using economizers or coils to capture heat has been well documented over the years. The law of thermodynamics is one of the formulas used to determine how "economizers" or "heat sinks" are made.

Our project engineers have calculated the expected performance information based on existing, relevant technologies. For example; the average high rise building has 3-5 boilers. Usually atmospheric. These boilers have flue gas temperatures of 300 to 400 degrees F. Each boiler stack would also have an exhaust pressure equivalent to 100 -200 CFM. It's not uncommon for 2 or 3 of these boilers to all be on at the same time. Especially during the heating season. We used this relevant information and developed a standard size set of coils that have the ability to recover approximately 200,000 extra BTU per hour. This extra BTU would be enough to heat 6-8 extra apartments on average. Obviously each building will be different and some boiler rooms will generate far more flue gas depending on the age of the boilers and total available BTU.

The natural gas used to heat large buildings is typically measured in cubic meters. We believe it's reasonable to assume the average high rise building could consume several hundred thousand cubic meters of natural gas. Especially during a cold winter. A 20-25% average reduction would be substantial amount of natural gas saved.

Carbon Cap Experts

Carbon Cap Inc. has two equal partners, Raphael Kolenko and Angelo Procopio.

Raphael Kolenko is currently the projects inventor and spearheads the innovation development and sales initiatives. Raphael also serves as CEO and Managing Director of Moristic Group Canada and the President of UpWeeGo Children's Products. Raphael is the former President and Managing Director of Tree Fresh Juices Inc. which eventually become the largest single strength juice supplier to Costco in Canada. Within the food industry he gained valuable hands on experience setting up several manufacturing and processing plants. This involved the construction of a 5,000 square foot cooler, installing plate heat exchangers and several mechanical and production line systems. Following the sale of this company to Ault Foods in 1992 Raphael operated a privately held company called VendTech Refreshment Services. The main customer was Petro Canada which also helped him acquire additional knowledge regarding the refinery operations. Beyond this he has worked with a wide variety of retail and consumer good companies, with emphasis on strategic planning and business development. Raphael's experience also involves successfully raising venture capital including ODC/EDC government loans. Raphael currently holds one US patent and a Canadian patent pending. Serves on board of directors for Harrrp (charity) and executive positions to several other organizations. Ran for public office 2010

Angelo Procopio, as a result of a life changing accident, Angelo struck by a car as a pedestrian walking to school at the age of 5 left him severely disabled. Miraculously through several years of intense therapy he ultimately graduated from McMaster University with a HBA in Humanities. Born in Thunder Bay, Ontario Angelo has spent most of his life in Hamilton, Ontario. After a few years working as a Bilingual Claims Specialist he saw the value of helping other disabled people and pursued this calling. Angelo Procopio founder of WorkAid & Associates Professional Corporation (1997) has represented hundreds of disabled and injured workers assisting them in claims to recover millions of dollars for over 20 years. Angelo has begun another chapter in his life by now dedicating time and resources towards sustainable solutions. His current focus is re-thinking how we use existing fossil fuels by limiting the amount of GHG emissions. Ultimately making the world a better place to live for his children and future generations.

Engineering Project Partners

AVL Manufacturing, Davis Controls, ABB, FRS Controls, Dexter Energy Control Solutions, Noble Trade, Murray Hydraulics, E H Price

www.daviscontrols.com

new.abb.com/ca

www.frscontrols.com

www.ehpricesales.com/

www.avlmfg.com

Helping the Environment

We have documented natural gas bills from several buildings in Toronto and Hamilton. These numbers have been plotted and a spreadsheet are completely agree with the following: TAF has provided us with documented natural gas consumption numbers of \$750 per unit per year. A mid-rise building with 100 units will consume \$75,000 per year in natural gas. Most high rises have 200 plus units and consume over \$100,000 in natural gas. Our FGR energy recovery system will show that any boiler system atmospheric, forced air, condensing or non-condensing will see its efficiency completely maximized to 98 plus percent. This will equal 15-25 percent increases in overall boiler efficiency.

On average each building with the FGR system will have the potential to save the natural gas used to heat 6-8 apartments per year. Our pro forma has projected 390 FGR units installed in building by the end of 2020. This would mean a total CO2 reduction equal to the natural gas used to heat about 25 apartment building (6-8 apartment units x 390 buildings / 2340-3120 units) I believe over a 10 year period we could easily save the equivalent of natural gas used to heat several hundred full size high rise buildings. Beyond these economic advantages, we are simultaneously providing a greener tomorrow for our society.

Job Creation

We intend to manufacture our FGR System in Southern Ontario which has the second highest concentration of high-rise buildings in North America after New York. The vast majority of high-rise buildings are heated with atmosphere boilers. Depending on the boiler's age and condition they allow 15-25 percent of their energy to escape through the exhaust flue gas. Our proposed cleantech solution will be a practical and affordable way to help capture this escaping energy. In an effort to keep pace with the aggressive carbon reduction expectations set forth by governments and invested green organizations, the Carbon cap system will help reach these hefty milestones. Without question this project will create manufacturing and installation jobs and additional investment. Lowering the GHG emissions by these amounts will help portray Canada as a world class leader in efforts to to lower their cities highrise emissions!

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