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Revolutionary Strain of Algae that Consumes CO2 and Green House Gas Emissions from Flue Gases produced in Manufacturing Plants and Power Generating Facilities

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"We have a technology that will allow us to provide clean energy from fossil fuels, and along with it brings a moral mandate to get the world to use it!"- Robert (Bob) M. Mroz

CEOCFO: ***Mr. Mroz, what is the idea behind HY-TEK Bio? Would you tell us about the company?***
Mr. Mroz: HY-TEK Bio's core mission is mitigation of greenhouse gas. We do that through intellectual property using a special strain of algae that consumes all of the CO2 and nitrogen oxides in greenhouse gasses from exhaust gas and other industrial processes.

CEOCFO: ***What is it about the algae that allows it to absorb?***
Mr. Mroz: It took us two years and state funding to isolate a strain of algae from one hundred and twenty-eight thousand strains of fresh water algae – testing it to survive in a high level of CO2 and a wide range of pH. Algae, in nature, uses CO2 basically as its building blocks to make more algae. As we breathe oxygen, it breaths CO2 and releases oxygen while we release CO2, so it is just the opposite from the human body. It "breathes" in CO2 and the nitrogen in the nitrogen oxides is what it uses for fuel or food. It separates the nitrogen from the oxygen and uses the nitrogen for fuel for photosynthesis to fix the carbon in the CO2. Therefore, it is a natural for mitigation of greenhouse gas.

CEOCFO: ***Was it a matter of finding the right algorithm to test it? Was there physical lab work testing? Did you just get lucky at some point? How do you go through one hundred and twenty-eight thousand strains?***
Mr. Mroz: With state funding; we had the University of Maryland Center for Environmental Science (UMCES) in Baltimore as our partner. All of those state funds would go to the university and we would add our required share to it. They would then do the work for us. We have Dr Feng Chen (Professor) that was contracted under the grant who he is an expert in the isolation of strains of algae. That is what he has done his whole career.

Therefore, we used the University of Maryland's collection of strains of algae and the University of Texas' collection of algae. Again, we used only the freshwater strains, because I didn't want salt water in the valves, so I used only fresh water strains of algae. It was not a matter of luck or getting lucky. It was a matter of a lot of hard work on the part of the University of Maryland. They used these trays of very small, basically one half inch in diameter, wells. There are ninety-six wells per tray and they will go through hundreds and hundreds of trays, putting them into a three percent CO2, five percent, seven percent, or ten percent. Most algae will die around ten to twelve percent CO2. Much of it dies in less than that. Our goal was to find a strain of algae that would thrive at 50% CO2.

We think trees and algae consume large amounts of CO2. If someone gives us too much oxygen, it's generally bad and could be toxic to us. We cannot breathe one hundred percent oxygen for any period of time. Therefore, algae cannot breathe one hundred percent CO2. However, in one hundred and twenty-eight thousand strains in a period of two years we determined there were six strains, out of one hundred and twenty-eight thousand, that actually could survive at eighty five to ninety five percent CO2. Those were our beginning marks.

We used those six and then we determined out of those six what other features they had. One strain had the ability to live in a wide range of pH down to four point six all the way up to eleven. Now, why is that important? Well, when you inject fifteen percent CO2 in exhaust gas into water, the first thing that happens is you get a drop in pH. Therefore, the more CO2 you put into the algae culture, the lower the pH. At a very low pH, you are eventually going to kill the algae. However, we found this one strain that would survive at four point six; very, very acidic. The advantage is we can put a lot of CO2 exhaust gas into the algae culture without killing the algae. The other advantage we had with this particular strain is that there are things called predators. Predators, like rotifers and cilia;are things that eat algae. Algae are one of the greatest food products in the world, so there are many things that eat algae. However, even those predators die at a low pH. Therefore, if you put in a large amount of CO2 with the exhaust gas it drives the pH down and you kill the predators or at least you stun them so that they are not eating. Therefore, you get the advantage of the low pH as long as your algae is capable of growing at a high growth rate in the low pH, which is what one of the specific strains could do. It just so happens that the best strain that we found in that two year program had never been isolated before. Therefore, we got to name the strain of algae, which is really cool! We named it HTB1 for HY-TEK Bio strain number 1. If we wanted to get fancy we could have called it Thor or Super Strain or something, but the fact is that we got to name it and s.HTB1 is now its official name!

CEOCFO: ***What are your next steps? What is happening now?***
Mr. Mroz: Through the Department of Energy, we have received about a quarter of a million dollars to get started, through the state we have received just under a million and we won a World Challenge Grant for mitigation of Greenhouse Gas emissions from a Canadian organization 2 years ago called the Climate Change and Emissions Management Corporation (CCEMC) of another half million. That has put us where we are now which is on the verge of commercialization.

We have been able to put up a fully industrial scale mitigation plant in Baltimore, co-located at Baltimore City's Back River waste treatment plant. It is a building that is thirty feet by thirty feet by thirty feet tall. It sits right next to the engines that take the biogas from the waste water treatment plant and make electricity out of it. Therefore, if you stop and think about what a waste water treatment plant does, it takes all this municipal waste from the community, cleans the water with chemicals such as chlorine and so forth and eventually puts that water back into the local environment – in our case, that's the Chesapeake Bay. It takes the solids in that municipal waste and pulls all of the methane gas out by digesting it with bacteria. When the solids are no longer producing methane those solids go to become small balls of biomass. They get powdered with nitrogen, phosphorus and potassium and they go out the door as commercial fertilizer for golf courses and commercial landscaping. The biogas from the digestion process gets treated and filtered so it no longer has impurities in it that will junk up engines. That biogas, which is now pretty high quality methane, goes to these large engines that run on the biogas to make electricity. Beat your chest and say, "Gee, we have done a great thing!"

The problem is that when those engines burn that biogas it pushes all of that exhaust gas right into the atmosphere. This is done at every landfill and every waste water treatment plant in the world and you get CO2 and nitrogen oxide, which effects the local environment, impacts the ozone layer that saves us from the harmful energies of the sun and creates acid rain.

This is where we come in. We now take that exhaust gas and instead of venting it into the atmosphere we take it and feed it to our algae. The algae eats all of the CO2 and nitrogen oxides and produces high grade, ninety five to ninety seven percent, photosynthesis oxygen and un-combusted nitrogen gas, (N2). The N2 get vented into the atmosphere, because there no harm done there (since we breathe 79% nitrogen) and the algae produced is saved and sold as a byproduct of the photosynthesis process. We actually have a Business Plan that not only sells the oxygen, but the algae that we produce. Remember the algae selection process I mentioned earlier? Well, part of that selection process was also to select a strain of algae that was valuable for its contents. Our HTB1 is extremely high in lutein and zeaxanthin, which is an anti-oxidant that sells for eighteen thousand dollars a liter. Therefore, we sell the algae to brokers. The brokers then sell it to companies like Unilever and DuPont and other companies who will extract the valuable components of HTB1 for high value products in the marketplace.

Our technology mitigates greenhouse gasses while producing valuable algae and oxygen. Our business model sells the oxygen and the algae which pays for the installation and maintenance of our technology while producing a profit for HY-TEK Bio as well as our investors and users of our technology.

CEOCFO: ***What has been the interest from the community, the people that should be paying attention?***
Mr. Mroz: We started out pretty "stealthy" but within the past 2 years, we have been featured at clean air and water shows, clean energy conferences, sustainable campuses and algae growing conventions. We're pretty well known at this point.

We have had China representatives come over and visit with us. We have had the Mayor of Copenhagen come over, Germany, Spain; Korea and many others tour our facilities. We have just had a large international group visit through the Department of Energy at Baltimore City. Baltimore City has been very, very instrumental in basically catering to that market. If anyone comes into Baltimore City they send them over to see what we are doing here at the waste water treatment plant. We recently had an article in "Culture" Magazine that drew at least a half a dozen international scientists to come over and see what we are doing. We were the keynote tour of the Algae Biomass Organization (ABO) Convention last year. They had their convention in Washington, DC and they had Greyhound busses of their convention participants come up to visit.

Where we are right now, to continue answering that question you asked before, we have a fully functioning facility, which mitigates about a ten percent slip stream of that power plant's exhaust gases. We are not mitigating one hundred percent, just because this is a demonstration project to prove our technology and business plan works. Right now we have one tank operational and we will have four tanks operational in two months. That is all being funded right now by a British company who needs our technology to mitigate anaerobic digesters and gasifiers in the UK. Friday we just finished signing a contract with them for half a million dollars to push us forward to complete our facility here, all the way to the point of harvesting the algae in centrifuges. Our plan is to be fully operational by August/September.

We have already signed an agreement with a commercial food processor in Downtown Baltimore to start our first commercial project this Fall". We are going to put in a twenty tank system which will eventually wind up being a six hundred tank system to mitigate their process. They run boilers and we can do engines or boilers; exhaust gas. Then the University of Maryland College Park is in the process of signing a contract to start a project in 2018 to mitigate a twenty seven megawatt natural gas fired power plant on the grounds of their College Park campus in Maryland. They are very interested in what we are doing.

I have given talks at the Algae Biomass Organization conferences, clean water and clean air conventions as well as the sustainable campuses conferences that the universities hold. We have two other universities that are talking to us right now that want to be a follow on to the University of Maryland College Park for mitigation. There is a lot of activity in many different ways to what we are doing.

CEOCFO: ***Is it a challenge to stay focused when you are getting interest from a variety of places or is it easy enough until you really get commercialized?***
Mr. Mroz: What a great question! My degree is in electrical engineering and computer science. Therefore, my training is technical, I'm trained to take one step at a time, do not get excited until it is successful. That is the way engineers are trained to solve problems. However, I also come from thirty years of running a large field office for the Federal Communications Commission. For thirty years of my career I was given the responsibility of being in charge of a field office which teaches you patience. You are always between a rock and a hard place, between the public and Headquarters. Therefore, I got used to that. The last four years I was the FCC's Director for Advanced Technology, so again, technology. That is what I have done my whole life - technology. Therefore, is it difficult to stay focused? Yes, absolutely. I have managed to acquire that trait of being patient over many years. I will be seventy three, next month, so I have a couple of years behind me of panicking and learning how not to panic. The big issue for any CEO is not keeping yourself focused, but keeping your people focus – and challenged. They want to go off and do a million things! They are young, they are full of energy, they want to move and do things, they are bouncing off the walls and they have great knowledge, so to keep them focused, to get things done is a challenge. It's not impossible, but it is a challenge. I think it is a challenge every CEO has. I think I'm lucky in this regard because I have a technology that is so exciting and bleeding edge that my entire team is always eager to push forward and make things happen.

CEOCFO: ***What is the takeaway for our readers? Why is HY-TEK Bio an important company, an important idea?***
Mr. Mroz: Last year I could have told you one thing, but this year with Trump in and the changing of the concept of the value of mitigation and global warming, it is going to be an interesting minefield to walk through. However, the takeaway is

that we are finding that irrespective of the federal government's view on global warming and our responsibility as humans to make that change, the individual companies; the waste water treatment plants, the landfills, the companies that use boilers and are carbon emitters of the world; they have their nose to the grind stone and they are moving forward with clean energy and clean water and clean air, irrespective of what funding the government provides or what regulations the government has or does not have. Therefore, the takeaway is that what we are doing is important to the world. It is important to humanity and we have a technology that really will provide clean energy from fossil fuels, which is a core driver of our energy in the world; maybe not the United States, but China and India and other growing economies that are going to be relying on fossil fuels for many years. Therefore, I think it is smart and wise to be in a technology that allows clean energy from fossil fuels. We have a technology that will allow us to provide clean energy from fossil fuels, and along with it brings a moral mandate to get the world to use it!

HY-TEK Bio, LLC.