**PYROLYSIS AS APPLIED TO THE PROCESSING OF WASTE**

To: NY Climate Action Council

From: Kevin M. Dailey, CEO

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Green Waste Energy, Inc. and C6 Technology

-Summary-

I am forwarding this statement with some information on our company. Green Waste Energy, Inc. (“GWE”). Green Waste Energy, Inc. owns a patented Advanced Thermal Conversion Technology known as “C6”. Our process is capable of converting virtually any form of carbon based waste into a clean syngas – and from there into “green” electricity, renewable natural gas or with additional processing into hydrogen. Our technology operates through a pyrolysis process, featuring prominently an oxygen starved technological process – with the significant result that we do not create emissions or greenhouse gases. The C6 conversion process is an endothermic reaction as opposed to many other technologies now being employed worldwide – which are exothermic (burning).

With environmental standards continuing to tighten worldwide, it would appear that incineration and landfilling will soon no longer be acceptable solutions to the problem of “what to do with the waste”. Plans to address the problem with new landfills and new burn plants are not politically acceptable as such facilities are directly harmful to the environment, are costly in the extreme and create unacceptable greenhouse gas emissions, toxic residues and ground water pollution. Moreover, any such plans are met almost immediately with a storm of environmentalist opposition.

Our equipment is both modular and scalable, so we can adjust the size of the facility to the local need. Our C6 technology can dispose of any form of carbon based waste, which includes, besides municipal solid waste (“MSW”), C&D debris, agricultural waste, manure, abattoir waste, tires, medical waste, municipal sewer cake, FOGS (fats, oils and grease), electronic waste and maritime oil sludge. In terms of re-cycling, we capture 95%+ of the recyclables in the waste stream, where elsewhere best efforts get in the neighborhood of 30%.This aspect of our technology goes hand in hand with the already commendable environmental efforts in many communities.

The first stage of our process for processing Municipal solid waste involves autoclaving, which is a sterilization system that removes pathogens and converts MSW into a homogeneous feedstock while reducing volume by two-thirds. There is no need to either pre-shred or open trash bags prior to loading into the autoclave, as an internal auger in the unit performs this function. Batches of MSW are loaded and heat applied at 160 degrees centigrade for 55 minutes. The autoclaves in a “train of equipment”, operate in pairs, as one is being loaded, the other is emptying out and heat is transferred between the autoclaves as a cost savings measure. This preconditioning system creates no emissions. The material that emerges is transferred to a classification system, where the recyclables (clean metals and glass) are separated out mechanically, leaving a pathogen free cellulose product (composed of bits of organic material, paper, wood and textile), which is mixed with ground up plastic obtained from the waste stream, providing the feedstock (of carbonaceous material) for the C6 pyrolysis unit.

The heart of the C6 system is the pyrolyser, for which we have patented the technology (US Patent No. 9,410,094 B2). This advanced conversion technology converts the feedstock at a high temperature (900 degrees centigrade) from a solid to a liquid to a gas, in the absence of oxygen, thus enabling the production of an energy laden synthetic gas (syngas). The principal factors that distinguish the C6 technology as superior are: the efficiency of the system, the quality and consistency of the gas, exceedingly low emissions, the “swallow all” capacity for virtually any form of carbon based waste and the swallowing capacity – for high volumes of material. The system operates by taking back a very low parasitic load of electricity to operate the plant and can be established on a small footprint, less than 4 acres for a 440 ton per day facility. In the process of achieving the above we initiated several novel design concepts for the support equipment, which were incorporated into the US Patent application. The result of our development was a “Flash Pyrolyser” that is vertically oriented, has several heat paths to retain a high heat flux and is multi zoned. The transformation time to gas is 8 seconds.

ENERGY VALUE – The syngas as mentioned above, can be used to produce electricity but can also be compressed into a renewable natural gas or can be further processed into hydrogen. By using pyrolysis instead of gasification ( the two are distinct), we will achieve a higher volume of syngas with a greater energy value, resulting in a syngas that has a higher energy value of 20% more than any other form of waste processing. This is very significant.

GWE’s plants take approximately 14 months to build and as mentioned above, are fully scalable to accommodate increased demand. The facilities operate 24 hours a day, seven days a week in all weather. The green electricity can be sold as base load electricity – or directly to a retail customer, such as an industrial plant or office campus. GWE’s facilities derive revenue from: 1. tipping fees from incoming waste streams; 2. the sale of electricity, RNG, hydrogen pursuant to power purchase agreements; 3. the sale of renewable energy credit (RECs”) and carbon credits, where available; and 4. the sale of recovered metals, recycled plastics and recycled glass. This approach is faithful to the concept of a “circular economy”.

The implementation of a C6 Technology facility will drive numerous financial, economic and environmental benefits for the host community. A $90 Million plant designed to handle 450 tons per day of MSW, will include $20 Million in local construction and economic activity and add roughly $6 Million in annual payroll to the local economy, with the project creating 70 new jobs. Additionally, with the diversion of waste from the local landfill, the carbon footprint is diminished dramatically. A “C6 Technology” facility will be more efficient and have a smaller capital cost per MW of electricity produced than any other power generating system. Generally a trash incineration plant equipped with the latest scrubbing technology (which is a must by standards today) will cost half again as much to build as a GWE C6 facility- for the same tonnage of waste to be disposed of. However, a GWE facility utilizing C6 Technology will produce 50% more electricity. In addition, unlike incineration plants, C6 does not produce a toxic ash waste residue as an end product, that needs to be disposed of at a landfill and carrying a substantial cost. The C6 end product after pyrolysis, is an inert material that can be vitrified and added as a component to blacktop or concrete. This end product has potential commercial value.

We believe that GWE offers to New York a “best in class” technology that is far superior to any other waste disposal solution available in the marketplace – at an affordable price and at a premium in terms of energy produced – that is, from an often overlooked source, MSW (or other streams of carbon based waste). GWE’s pyroyisis technology stands apart from all other pyrolysis technologies in the ability to process large volumes of material, offer a “swallow all waste streams” capability and features a pyrolysis process that takes eight seconds to operate. General Electric in evaluating the technology referred to C6 as an “elegant solution” to the global waste problem. To sum up, when we state that GWE’s C6 process offers a “best in class” technology, we intend that a discerning client understand the following:

* the C6 facility requires a small parasitic load to operate, taken from the electricity produced by the facility, so no power is required to be purchased from the grid;
* requires a relatively small footprint, approximately 4.0 acres for a 440 tpd (tons per day) facility;
* the technology is scalable, so additional trains of equipment can be added as demand for electricity, or the supply of waste increases or becomes available;
* has a high “swallowing” capacity, in terms of volume of waste processed – and types of waste (“swallow all”);
* produces a high calorific value gas – which can be used to produce electricity – or can be converted to renewable natural gas or hydrogen – and where desired to a liquid fuel.;
* has a high power yield per unit, with 11.5 MW produced in a 440 ton per day facility; and 25 MW produced in a 1,000 ton per day facility;
* plant emissions are for the most part non-existent, or at best negligible – and are far below European Union and US environmental standards.

Lastly, we at GWE believe that present methods of waste disposal, for the most part incineration or landfilling, are in the long term unsustainable. I believe that most informed people in New York would likely agree.

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