“WASTE TO ENERGY”

US-AFRICAN AND EUROPEAN BUSINESS GROUP, S.L.

WhatsApp: +34 644 388 296
mmontina@us-africa-eu-businessgroup.com
www.us-africa-eu-businessgroup.com

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TECHNOLOGY

VORAX, a scientific breakthrough in the ideal treatment of nearly all types of Waste such as MSW/Urban, Medical/Hazardous, Industrial, Pasty/Sludge, Liquid, Tires. There are 12 different models of Vorax which have capacities ranging from 2 Tons of Waste per day to our largest model which can treat 400 Tons of Waste per day. Models from 22T/day and up also have steam power generation packages available to create electricity, demonstrating VORAX's significant Waste to Energy (WtE) capability.

TECHNOLOGY

- Vorax is in a technological classification of its own after more than 10 years of R&D form a brilliant team of scientists and in the invention of DuoTherm technology which puts Vorax ahead of plasma, Incineration, Gasification and also traditional pyrolysis. Vorax is thought of as a quantum leap over traditional Pyrolysis in part because two thermal processes, one at 9000C and the other at 16000C, forming a thermal gradient, liquifying all solids completely, even inert materials such as sand or iron.

- Vorax completely destroys the garbage effectively and safely, without combustion or an auxiliary equipment. Vorax requires no combustion of waste and disintegrates as a whole, completely destroying infectious, pathological and organochlorined materials, having as a solid byproduct a ceramic matrix (do not produce ashes) and inert in the bottom of the fusion module, with commercial application - the gases formed in the process have no dioxins or furans and are of low volume because they only arise from the disintegration of the material and not from combustion or gasification traditional processes.

TECHNOLOGY

▪The fusion module, in turn, works in negative atmosphere, preventing gas leaks. The process is dry distillation of the waste, with absence of air, no combustion of waste, which provides extreme reduction of the exhaust gases as compared with conventional processes and, moreover, does not allow the formation of dioxins or furans, in view of lack of oxygen and high temperature. The garbage is not mixed with the atmospheric air and suffers a dry distillation, meaning it is completely disintegrated and liquified in the absence of air, which considerably reduces the formation of pollutants harmful to the environment and health, including carcinogens. The reduction in mass of organic waste in this process is by volume 100:1 up to 250:1, according to the category of waste processed.

▪The gases formed inside the fusion module, are suddenly sucked and cooled (quench) to then be treated and neutralized in an immersion tank, alkaline. Last generation filters, coalbased activated, ensure that the emissions meet environmental standards.

TECHNOLOGY

▪The fusion modul is not refractory, as in conventional models, except in the melting pot. Therefore, it is lightweight and low maintenance equipment, suitable for use in hospitals, factories, ships, among other places of waste treatment. For its operation, the Vorax - WTU DuoTherm only requires a 220V or 380V outlet. The equipment allows to operate continuously or intermittently, as needed by the user. Its power consumption is low and purely electric for example a 2T/day model consumes only 40kWh, depending on the category of garbage.

▪Control and Operation of Vorax is automatic - After feeding no operator is required, from departure to the disconnection of its cycle. Anyone can feed the fusion module with the material to be treated, which operates automatically. The waste to be treated does not necessarily require selectivity at first, everything can be processed: organic matter, iron, metals, and even sand. Training for operating Vorax is performed at the installation site and requires only one full day of instruction.

SCIENTIFIC CHALLENGE OF WASTE TREATMENT

- The fundamental challenge of garbage is to find an effective way to treat it. Modern garbage contains high doses of heavy metals, organochlorines, benzene, dioxins, furans, among others. Landfills emit pollution including methane and essentially many parts of the world are drowning in garbage.

- Incineration, Gasification and Partial Pyrolysis (with presence of atmospheric air), even via plasma processes, are known techniques but they fall short. Incineration or gasification (even with plasma technology) involves the presence of atmospheric air and it is for this reason that these technologies create environmental problems. The presence of air entails introducing a lot of oxygen in the process for combustion or gasification. Incineration, Gasification and Partial Pyrolysis (with presence of atmospheric air), even via plasma processes, are the all too common techniques given their problems.

SCIENTIFIC CHALLENGE OF WASTE TREATMENT

▪These techniques, despite reducing the weight and the initial volume of garbage, cannot be considered effective, they are unable to dispose the waste, once the waste remains toxic, being presented mainly in the form of ash. More seriously, it is produced large amounts of greenhouse gases, which need to be addressed. The ashes, despite concentrating on small volumes, are fine particulates of non-volatilizable materials and may contain high concentrations of active elements harmful to the environmental balance, such as heavy metals. The gases in turn require appropriate filters and intensive maintenance because they contain significant concentrations of pollutants.

▪Additionally, the combustion process can form at inappropriate temperatures, by means of reactions catalyzed by the ashes, a family of hydrocarbons, usually cyclical, high-destructive power of genomic features of human cells, which results in the production of cancer cells. Other procedures applied on a smaller scale such as autoclaving and destruction by radiation (including from sources of microwave), for not reducing the volume of disposable material, are not considered appropriate for the disposal of waste.

SCIENTIFIC CHALLENGE OF WASTE TREATMENT

- In the case of hospital and industrial waste, due to the components present in it, the quantity of heavy metals in the ash coming from the incineration is absurdly high, greatly increasing the risk of contamination of groundwater when accommodated in landfills.

- The increased presence of chlorine components in these types of waste can also greatly enhance the generation of carcinogenic residues, which are present in the exhaust gases of combustion and in the generated microparticles. The laws currently in force (as the National Solid Waste Policy, enacted in August 2010, which stipulates the prohibition of dumps) may become even more expensive the treatment of these special wastes, which practically requires the search for new technologies for waste treatment that can make the process cheaper and less polluting.

- It is for all the reasons above that VORAX was invented as total solution to satisfy the scientific challenge summarized above. “Vorax”, has appropriately received its name thanks to its power to “swallow” almost any type waste disposal and providing an economical and highly efficient environmental destination.

ALL TYPE OF WASTE ACCEPTED

Waste types that vorax can process:

- Medical/Drugs/Sharpies
- Municipal and Urban Waste
- Industrial
- Pesticides and their containers
- Biomass
- Animal Housing
- Coal
- Ashes from incinerators
- Sewage
- Galvanic sludge
- Organic sludge from petrochemical
- Materials with low radioactivity
- Used oils
- Batteries
- Tires
- Waste of explosive material
- Hazardous industrial waste
- Plastics (no restrictions)

SOLVING MEDICAL WASTE

VORAX TREATS ALL WASTE TYPES & SOLVES THE UNIQUE PROBLEMS OF MEDICAL & BIOHAZARD

- Medical waste generated at health care facilities, includes a large component of general waste and a smaller proportion of hazardous waste, which contain infectious agents, toxic chemicals or pharmaceuticals, radioactive and genotoxic.

- All individuals exposed to hazardous health-care waste are potentially at risk, including those within health-care establishments that generate hazardous waste, and those outside these sources who either handle such waste or are exposed to it as a consequence of careless management.

- According to the U.S. Environment Protection Agency, improper management of discarded needles and other sharps can pose a health risk to the public and waste workers. For example, discarded needles may expose waste workers to potential needle stick injuries and potential infection when containers break open inside garbage trucks or needles are mistakenly sent to recycling facilities. Janitors and housekeepers also risk injury if loose sharps poke through plastic garbage bags. Used needles can transmit serious diseases, such as human immunodeficiency virus (HIV) and hepatitis.

SOLVING MEDICAL WASTE

- Measures to ensure the safe and environmentally sound management of health care wastes can prevent adverse health and environmental impacts from such waste including the unintended release of chemical or biological hazards, including drug-resistant microorganisms, into the environment thus protecting the health of patients, health workers, and the general public.

- Proper measures to deal with medical and biohazard waste typically come at a high cost of up to $2500 per ton depending on the region.

- Current best practices and often laws state that the hazardous waste must be separated, treated and disinfected. Common practice now is that all infectious medical wastes are disinfected by autoclaves, strong heated containers used for chemical reactions and other processes using high temperatures, and steps must be taken to dispose them.

SOLVING MEDICAL WASTE

- Even the non hazardous medical waste is not often considered normal waste, as long as the governing bodies in a territory have not approved the wastes being harmless, in accordance with the waste management laws, medical wastes are still considered infectious.

- Landfills are not equipped to handle the unique requirements of medical waste and often don’t have the most basic infrastructure such as water, electricity and etc.

PROJECT REQUIREMENTS

- Feedstock/Fuel, Waste of all types.
- One unit of VORAX “ORION”, capable of adding more units in the future
- One Unit of Siemens or GE/Baker Hughes Steam Boiler and Turbines Package for Electricity Generation.
- Client must provide a steady stream of feedstock to support the electrical energy output of the VORAX System 16.66 tons per hour, per unit, is the ideal flow rate to achieve maximum power generation potential.
- Ground space required per unit: Dimensions 60,0m (Length) x 24,0m (Width) x 15,0m (Height)
- Environment Satisfactory for noise between 77dB to 90dB
- VORAX can be both an On – Grid or Off – Grid deployment as it generates its own electricity after startup. If necessary we can provide cold startup power during the commissioning stage.

For more information, please contact:

Prof. Michelet Montina
e-mail: mmontina@us-africa-eu-businessgroup.com
Telephone: (34) 644 388 296

Or

Dr. Yolanda Jiménez Ruiz
e-mail: info@us-africa-eu-businessgroup.com
Telephone: (34) 685 361 950