Disruptive Innovation in Green Energy

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ADNVANCED TECHNOLOGY

Enervoxa Inc. can processing any type of waste to energy power generation industry, using the latest modern technologies, our facilities has no chimney or stack all gases and fumes are recycled back to the system gaining extra 18% efficiency. Visit our website for information at www.enervoxa.com

Patent protection
Modular design – high availability, scalable and expandable
Most modern Canadian technology – 100 % Made in Canada
High profit – very low production costs for electricity
The efficiency of gasification is unique. The gasification of carbon is more than 99 %

"Waste to Electricity"
Processing Waste for Electricity Production

NEXT WTE MODERN POWER GENERATION

PROJECT FOR PROCCESING MSW TO GENERATE ELECTRICUTY

- Enervoxa Inc. is Canadian company that owns Conversion Technologies and is prepared to deploy our technology globally to improve economic production, reduce emissions and produce electricity from municipal solid waste (MSW). Our mission is to provide cheap, clean consumable power and natural resources in emerging markets, preserving health, jobs, assets and economic growth.
- Enervoxa Inc. is focusing on production electricity by shredding and dehydrating solid waste (MSW) with a Waste converter technology. Because of the wide variety of functions available on converters, this technology has found best implemented in diverse waste-producing industrial segments.
- Enervoxa Inc. has accumulated significant technologic and commercial capabilities deriving from a set of closely interrelated technologies in Power Generation technology based on efficient application of Waste-to-Energy solutions for industrial and municipal waste solutions - technology that focuses on optimal waste to energy.
- Enervoxa Inc. technology is designed to process **ANY types** of industrial waste, municipal solid waste to be processed into electricity. For medium to large scale waste to energy projects in order to achieve best results it is highly recommendable to run a preliminary assessment study before supplying a complete turn-key solution as results of efficient waste utilisation is highly dependent on numerous chemical and physical parameters of waste
- During the stage the final technological solution, which may involve the integration of conversion technology in existing infrastructure (for example using some of already landfilled waste) and facilities takes place, Enervoxa may also be used to process the ash and other by-products to produce organic fertilisers. In this case Enervoxa can significantly reduce the operating costs and the volume of landfilled waste.
- Enervoxa Inc. is highly committed to own technology and believes it could bring very fast and substantial economic benefits to its partners and clients. To control and speed up build-to-market time and guarantee quality assurance, Enervoxa could structure its offer in two alternative ways:

1. **Build-Own-Operate** (BOO/BOOT), when Enervoxa gets a concession from the owner for a period of 20-49 years to operate upgraded PP. Enervoxa installs its technology and operates the facility

with the prime goal to recover the costs of investment and maintenance. Parties are also to agree on feedstock supply and electricity offtake conditions

2. **Build–Lease–Transfer** (BLT), when Enervoxa agrees to design and lease its technology to the owner of PP in a long term contract, where Enervoxa assures that technology is delivering designed results and PP is guaranteeing reasonable "take or pay" conditions

The Electricity production plant will process organic waste materials abundantly found in municipal solid waste such as food, plant material and paper. The efficient output of Enervoxa's plants will depend on a steady input of organic waste. The processing rate of the technology is 10 tons of waste material input per hour to produce 4-5 MW per hour. Conversion occurs as a closed chemical gasification conversion process and will produce acceptable emission levels as defined by Ministry of the Environment regulations.
Enervoxa's technology complies with stringent Canadian environmental standards for waste to electricity processing.
Increased production levels will allow Enervoxa to take advantage of economies of scale in terms of power and labour costs.

Enervoxa WTE plants will convert all feed stock as mention in the list below to clean Electricity.

- **Municipal Solid Waste (MSW)**
- **Residual plastics**
- **Wood Waste**
- **Medical waste**
- **Agricultural Waste**
- **Hazardous waste**
- **Animal Waste**

Summary of WTE plant.

Size: The plant required concrete slab with shed or Industrial building

The total floor space required for the plants is 360 feet long by 140 feet wide for a total of 50,400 square feet and is subdivided as follows:

Material handling = 220 X 106 feet = 23,320 square feet

Pyrolysis flue gas cleaning = 100 X 106 feet = 10,600 square feet

Electricity generation = 40 X 106 feet = 4,240 square feet

Plant outside space requirement

The total outside space required for the plant is 7,640 square feet and is allocated as follows:

Syn-fuel storage tanks = 32 X 40 feet = 1,280 square feet

Heat recovery system = 60 X 58 feet = 3,480 square feet

Substation = 60 X 48 feet = 2,880 square feet

Electricity: Not required, provides its own need from an internal turbines – self sustained.
Water: Not required, provides some of its own need from an internal source.
Capacity Input: 10 Tons of feed stock per hour (86 400 MT per year for 360 days a year operation)
Capacity Output: up to 4.2 MW of electricity per hour (or up to 7.5 MW with a high efficiency waste heat generation system). The calculation of output electricity made by standard Canadian morphology of the MSW. If the plant processing hazard and medicine waste the output of electricity will be lower (the more combustion gas going to up the internal temperature of the plant's reactor)

Scheduled maintenance: As in maintenance schedule, during working shifts.

The ideal morphology of MSW that Enervoxa WTE plants can convert:

Components	General %	Content,%		
		Fraction (mm)		
		+200	200 +/-80	80-
Waste paper (paper, cardboard, etc.)	22,00	6,60	11,40	4,00
Food and vegetable waste	35,00	0,00	9,20	25,80
Textile	5,50	3,30	2,00	0,20
Plastic	2,00	0,15	1,60	0,25
Polymers, plastic bags	4,00	1,45	2,50	0,05
Leather, rubber	1,50	0,05	1,45	0,00
Wood	1,50	1,30	0,20	0,00
Bones	1,00	0,00	0,30	0,70
Ferrous metals	4,00	1,30	2,50	0,20
Non-ferrous metals	0,70	0,00	0,70	0,00
Glass	7,00	0,00	6,80	0,20
Stones, ceramics	1,50	0,75	0,55	0,20
Others (including dropouts)	14,30	1,00	5,00	8,30
Total:	100,00	15,90	44,20	39,90

Advantages of our WTE plants:

- Rapid return of the investment
- Substitution of natural gas and fossil fuels
- Disposal of organic waste in the area
- Direct production of heat through thermal power stations
- Energy efficient use of the complete energy content
- Each organic compound can be used as basic material
- Profitability through chemically usable gas transformation
- Extremely high life expectancy of each individual system

- No use of foodstuffs for the production of energy
- Closed production cycles
- Noise: 54 - 59 dB(A)

The following is a list of these plant operations components:

- Waste handling
- Separation of combustible from non-combustible materials
- Non-combustible waste separation and recycling
- Pyrolysis gasification
- Primary electricity generation
- Waste heat recovery and secondary electricity generation
- Production of bio-char

Waste handling

Waste handling involves taking the waste delivered to the plant by the waste pick up companies and putting it into the plant processing system. This subsystem utilizes scales to weigh the waste and transfers the waste from concrete pits where it has been deposited by the garbage trucks to the plant hopper using specialized cranes with waste grapples.

The process is fairly standard regardless of the type of WTE plant being used. Current waste handling technology has been used for at least twenty years. Once the waste is in the plant process, it is transported by conveyors. The block diagram above provides a description of how the waste material is processed once it enters the plan system.

Materials sorting and separation

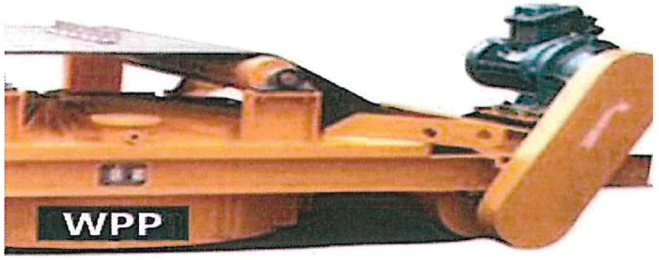
Eneroxa uses a multi-treatment sub-system to separate non-flammable from flammable materials. The process begins by sorting non-flammable materials from the waste stream until only the flammable materials are left. Flammable materials are delivered to the pyrolysis gasification subsystem. The non-flammable materials are sorted according to ferrous metals, non-ferrous metals and glass using the equipment shown on the following pages.

Separation of ferrous metals from other materials

Electromagnetic drum system for separating ferrous metals - Designed to be fed from underneath, the axial pole electromagnetic drums are the best in-line solution for superior ferrous metal recovery at high production rates. In addition, to strong drum shells, limiting ring, bearing housing and adjustment arm designs, the axial pole system flips and cleans the scrap before releasing it.

Separation of aluminum from other material

The Eddy Current Separator – Eccentric Pole System Technology shown below uses an eccentric rotor that is self-cleaning and can be adjusted for the best performance given a specific waste stream. High-quality neodymium magnets, a thin conveyor belt and non-conductive drum shell maximize separation forces. This system is especially efficient in sorting aluminum cans and other coarse-grained aluminum from impure composites.

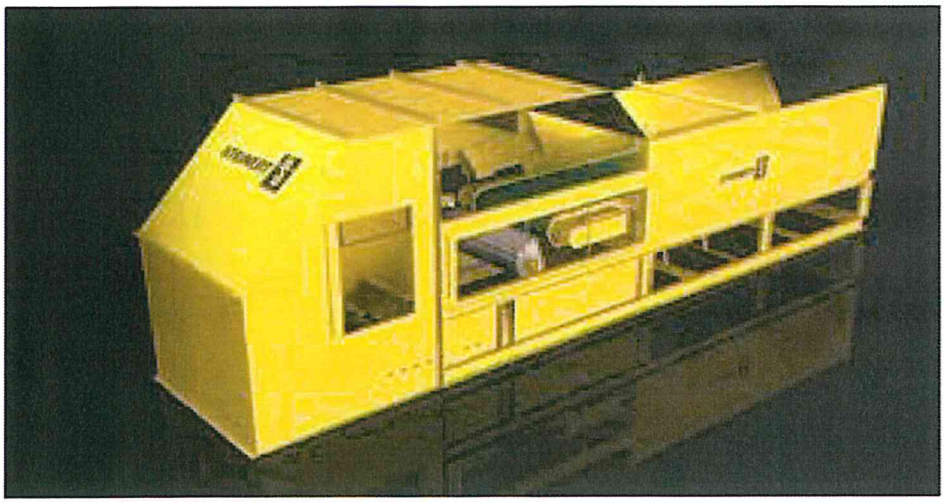


Magnetic Slag Minerals Wood Chips Glass Machine

The Magnetic Head Pulley removes tramp iron from the remaining waste stream after treatment from the Electromagnetic Drum System and the Eddy Current Separator.

Induction sorting system

Induction sorting system ejects non-ferrous metals and sort's stainless steel sorters can with a combination of smart sensors and computer-controlled air jets, induction detect and eject any metals quickly and efficiently. When configured with an optical selective sensor, it can separate remaining stainless steel from other non-ferrous metals.



Glass Sorting System

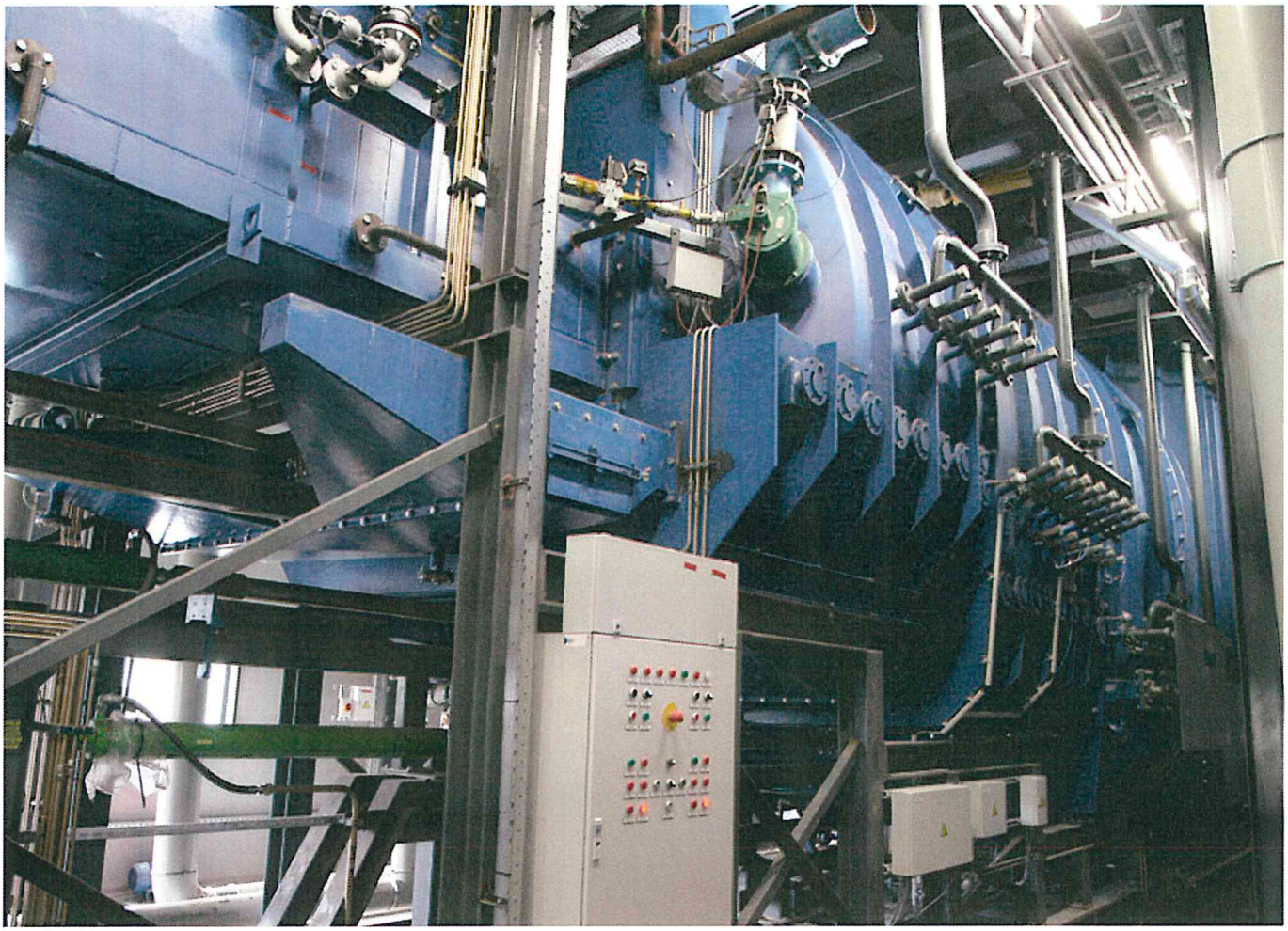
This system operates in a similar way to the non-ferrous metal color sorting system except that it works after the metals have been removed. All glass is sorted by color so they can be more readily sold and at higher prices than mixed color glass residue. The remaining material is flammable except for some non-flammable materials not automatically sorted.

Manual Material Picking Process

Automated systems are great and they catch most of the material that needs to be sorted but they are not perfect. Thus, Enervoxa uses a manual picking system to refine the sorting process. The benefit of this part of the system is that very little additional sorting is required but that which is done, makes the fuel stream for the pyrolysis process just that more effective and allows it to produce pristine bio-fuel for use in the electricity generator internal combustion engine drivers. This maximizes their efficiency and longevity.

Pyrolysis gasification

Pyrolysis gasification is a transformation technology in which solid waste is changed in a furnace-like device to high energy gas. The transformation of solid waste takes place in an indirect heated vessel, which uses a proven super low nitrous oxide burner.
There is little or no oxygen present in the system. The gasification process vaporizes the waste and creates a high heat value syn-gas. The syn-gas is approximately 35% hydrogen with smaller amounts of



carbon monoxide, carbon dioxide, methane and various other hydrocarbon gases. This syn-gas is then combusted in an internal combustion engine that drives a generator to produce electricity.

Waste is thermally degraded using an indirect external source of heat at ~500oC (In the processing hazardous waste we up the temperature to 930oC), - in the absence of free oxygen supply, the carbon is almost completely (> 99 %) thermally converted into a tar-free high-energy synthesis gas Solid residuals of the pyrolysis process are removed via a wet discharger.

These Enervoxa's systems are much more efficient than traditional mass burn technology that uses turbines in driving electricity generators. For example, a 240 metric ton per day mass burn plant will usually in average generate up to 4.2 MW of electricity per hour (or up to 7.5 MW with a high efficiency waste heat generation system)

The exhaust gas is thoroughly cleaned in the emission control subsystem in order to achieve the full compliance with the emissions limits. The volatile portion of the feedstock produces syngas, which is sent to the cooling, cleaning and compressing units and after that into gas turbine generator.
The pyrolysis facility operation is monitored and controlled from the control room.

The prevailing conditions during the process exclude the build-up of pollutants like tar, dioxins and furans. Cleaning and cooling of the synthesis gas occurs in a multi-staged process. Hereby, the synthesis gas is conveyed through a heat exchanger cyclone, waste heat boiler, hot-gas filter and a multi-staged wet scrubber. After the treatment, the synthesis gas is completely free of dust and pollutants.
The process-related residual heat is used for drying of the conditioned residues during the waste conditioning.

System Control Topology Biomass Plant