VanNatta worldwide

"Our flame is igniting the world"

Our technology, applications, & markets at a 30,000 foot view

1. ***What is this technology?***

We use a concept known as energy recovery, in which a heat source produces enough heat exhaust, which is then used by a waste heat boiler to create steam that is used by a steam turbine to generate electricity. Our specific part is the heat source, which is a vortex combustion unit, using a 90 mph vortex (tornado on its side), to burn the shredded waste material in full suspension at an average of 2,000°F. We introduce a powerful gas flame into the chamber, and as the waste material is inserted, and the chamber reaches the appropriate temperature, the waste material becomes its own fuel, and the external burner is shut off. The system can operate 24 hours a day by only using the continuous feed of shredded waste material without a need for external fuel.

Through a patented process, we re-introduce any particulate matter that has mass to it, even microscopic dust, back into the vortex for a continuous burn time. Because of this process, we achieve complete and perfect combustion, meaning that we not only don't produce harmful emissions, but we don't have ash residue, fly ash, fumes, or even smoke. Any non-combustible materials or heavy metals that are missed in the pre-sort, are pulled off during the process with the use of a cyclone separator.

2. ***What makes it different?***

Compared to conventional combustion technologies, the main difference is that we not only shred the waste material, which promotes a more efficient burning process, but the waste materials are never allowed to sit and smolder on a grate, which is known as incomplete combustion, and could produce harmful emissions, fumes, and smoke. An easy way to think of it is like comparing a regular baking oven to a convection oven that uses hot forced air for a more efficient process. If you bake a cake in a regular oven at 350°F, it may take 30 minutes to finish. If you bake that same cake in a convection oven also at 350°F, it may only take 20 minutes to complete, because of the turbulence and the high level of efficiency it creates.

3. ***Describe the process of generating, transmitting, and distributing electricity.***

80% of the electricity generated in the world uses a steam turbine in the process. This concept of energy recovery can be thought of as a recycled energy production, since we use heat exhaust as a by-product of another operation to boil the water and produce the steam. Cogeneration is a process by which the overall system output could have a dual purpose, such as generating heat and also producing electricity. We have coined the phrase "micro power generation" because our small footprint allows us to provide significant volumes of electricity, which is then used by power utilities. If an electric company produces its own power, it's called centralized distribution, but if they buy power from several sources, it's known as distributed generation.

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4. ***What types of market resources are available?***

This is probably one of the things that makes this concept so very exciting! Virtually all other traditional methods of waste-to-energy (WtE) are limited to one or perhaps two fuel sources. Not only can we use various fuels, but we can blend them together at the same time to optimize the thermal value of the waste materials.

The primary markets/applications/fuel sources we have identified are:

- Biomass, both forest resources (woody biomass) and agricultural resources (corn, sugar cane and other crops)
- Municipal solid waste (MSW), including residential, commercial and institutional waste. Industrial waste is also included in this category, which comes from a production facility's manufacturing process. C&D (construction and demolition) also provides a significant volume of construction waste materials.
- Landfills, both active and closed. Landfill reclamation is the process of cleaning up the land used for landfill purposes, and attempting to reclaim that land for other use.
- Waste coal, is coal residue that contains approximately 3% sulfur, and can't be used in conventional coal burning processes.
- Scrap tires – our unique vortex system achieving complete and perfect combustion, can destroy shredded tires without producing smoke or harmful fumes and emissions.
- Hospital/medical/infectious waste. Through our innovative process, and the temperature range of 1,800°F and 2,200°F that the US EPA requires to destroy all pathogens and biologically active materials, we can process these types of waste that are referred to as hazardous materials.
- FEMA / Disaster cleanup – Because this system offers such a small footprint, it can be mounted on the back of a flatbed truck for mobile applications, and can be deployed within hours to a natural disaster, such as the recent Superstorm Sandy. It can also be used to process materials on a continued basis, with or without producing electricity.

5. ***How does this compare in cost to other similar methods and other renewable/alternative energy programs?***

Because of the efficient design and operation, a facility with complete energy recovery will cost approximately $1 million per megawatt, as compared to $3 million to $4 million per megawatt from other combustion technologies, or wind and solar facilities. Return on investment or ROI can be as short as 6 months for a stand-alone system using tipping fees charged for depositing waste materials, or between 18 and 24 months for a complete energy recovery facility.

6. ***What are the primary benefits?***

The most important benefits this technology offers come from the small size and the extreme level of efficiency for operation. The size is important to allow quick deployment and implementation, and the efficiency provides higher throughput of waste materials, and significant volumes of clean, renewable energy. These further provide a lower cost base, which in turn offers increased profitability for a facility owner and operator.