



# Everything You Always Wanted to Know About Incineration

*(But were afraid to ask!)*

## Our “Did You Know?” Series

There are sometimes more questions that arise that we can't give one or two word responses to, but remain important to the overall understanding of this technology. We hope that this series of questions and answers (also known as FAQs), and a few “fun facts” will help you appreciate the value of giving us energy and protecting our environment at the same time.

### What is incineration?

Incineration is the process of destroying something through fire. It's as old as throwing food scraps on a wood fire, and in fact, in many developing nations, garbage is still routinely burned in drums and boxes on city streets. Modern incinerators use high temperatures, controlled air mixture, and a method of moving it around to change the chemical, physical, and biological character or the composition of the waste material. These systems are equipped with air pollution control devices to capture particulates and gaseous emissions.

### Why is the Firebird V-III™ system different?

Incinerators are usually multi-chamber, or have a moveable grate where the waste sits while burning. In those units, the waste material is allowed to smolder, thereby producing odors, harmful emissions, smoke, and even fly ash. They require expensive and complex scrubber systems that clean the exhaust before going into the atmosphere.

The Firebird V-III™ is a single-chamber, grateless combustion system (combustor) that burns the shredded material while fully in suspension in a vortex (tornado), where the combination of high temperature and high speed doesn't allow for smoldering, therefore no odors, harmful emissions, fly ash, or even smoke. In addition, through our unique and patented process, the material is re-circulated continuously back into the vortex until it reaches complete and perfect combustion.

As you can tell, the V-III™ technology is very advanced, and goes well beyond anything that we would consider as an incinerator. It is extremely efficient, not only in the processing of waste material, but for the production of energy.

**Did You Know...?**

... that municipal waste incineration produces only .0035 the amount of CO<sub>2</sub> that is produced by fossil fuel combustion for our energy and transportation?

## What exactly is “complete combustion?”

There are 2 basic states of combustion:

1. Complete and Perfect combustion...

This is when sufficient air (oxygen) is supplied to convert all of the fuel into CO<sub>2</sub> and H<sub>2</sub>O. So, whatever you are burning (usually hydrocarbon) burns or reacts completely with oxygen gas (O<sub>2</sub>) to form *ONLY* CO<sub>2</sub> (carbon dioxide) and water (H<sub>2</sub>O).

2. Incomplete combustion...

This is when insufficient air (oxygen) is supplied, and the fuel doesn't completely convert to CO<sub>2</sub> and H<sub>2</sub>O. Some carbon monoxide (CO) and carbon (C) as soot can also form. This is considered to be a harmful emission, such as you get from vehicle exhausts, industrial furnaces, etc.

Note: If incinerators are currently giving off smoke and other emissions, then they aren't achieving complete and perfect combustion. Keep in mind that their scrubber systems are removing any of the harmful emissions before they enter the atmosphere.

## Why do people hate incinerators so much?

It's very understandable considering that most of the incinerators that are used for municipal waste disposal are massive, unpleasant monstrosities that belch nasty smoke and odors from their towering smoke stacks.

However, there are also misconceptions that have lingered in this debate for decades. The EPA requires

that any system that adds exhaust into the atmosphere *MUST* meet strict air quality guidelines. Even knowing that they can't pollute with harmful emissions, something known as NIMBY (Not In My Back Yard) has played into the emotional aspects of this issue, mostly because the big incinerators are also eyesores.



**Did You Know...?**

... that there are over 3,000 active landfills, and nearly 10,000 old municipal sites here in the United States?

## So what exactly comes out of the stack?

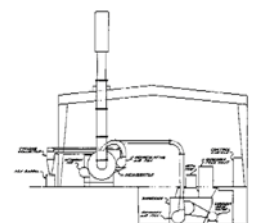
Simply put; hot air. Because our unique and patented process not only combines high temperatures and a high speed vortex, but the re-introduction of the material into the vortex to continuously burn, it doesn't produce these harmful emissions. The shredded waste also acts as its own fuel, and burns to complete combustion.

## Where would this be installed?

Many communities have a landfill nearby, or perhaps a remote Public Works facility that could be used. This modular design is capable of being installed in an existing building, or set up in a newly constructed, simple building that could also be designed to blend in with the surrounding location.

## How much space will this take up?

The Firebird V-III™ has a very small footprint, as well as having an exhaust stack that is less than 50 feet high. Depending on the usage as a stand-alone combustion unit, or as part of an energy recapture system, it can be installed in a building 65' by 150' and 30' tall.



**Did You Know...?**

... as published in *Medical News Today*, that air pollution experts say modern incinerators are no significant threat to public health?

## How far from populated areas should this be placed?

The Firebird V-III™ not only doesn't give off smoke and odors, but with its small footprint, it can be installed closer to populated areas than current systems. With appearance as being one of the biggest factors that people are concerned with, these buildings can easily be made to fit into the surrounding area.

## What about truck traffic?

Again, with the ability to locate this system in a variety of areas, the local planning board will need to assess the potential increased truck traffic that would occur. This is one of the reasons that existing landfills seem to be a natural location.

## Where does the garbage go before it is incinerated?

The process after curbside collection can be tailored to each community's needs. For those municipalities that don't have a landfill nearby, they could simply collect the trash, and instead of driving long distances to the current disposal site, they could take it directly to where the combustor is located. With the ability to run the system on a 24-hour basis, most small communities would have a consistent flow of refuse to be shredded and incinerated.

## How many people are needed or will be employed to run the facility?

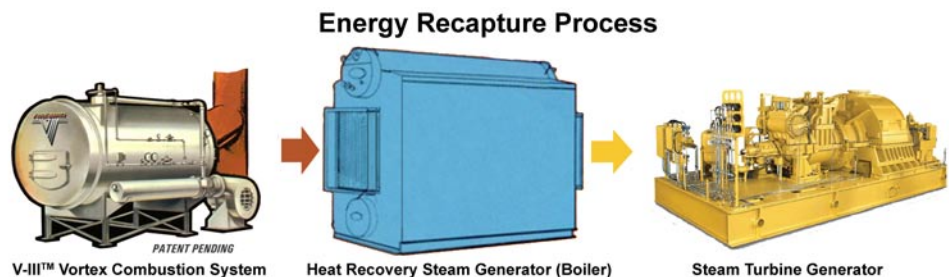
One of the real advantages of this system is the simplicity of operation. With state-of-the-art sensors, remote-access monitoring, and proven safety features, the stand-alone combustor would require 7 people on a 24-hour basis. (3 for the primary shift, and 2 for the other shifts) Part time or temporary employees can also be used for pre-sorting and maintenance.

## How does this system produce electricity?

One of the most exciting features of this system in addition to the eco-friendly operation for waste management is the ability to produce a significant amount of electricity. This process is known as waste-to-energy (WtE), and has been in use for decades. Having a combustor as the combustion source is also very common in the production of energy.

**Did You Know...?**

... that nearly 80% of all of the electricity in the world is generated with the use of steam turbines?



## How quickly will this system with energy recapture start to pay off?

With the reduction of energy costs as well as secondary savings such as reduced long-haul transportation, this system could start to pay for itself in between 18 to 24 months. Part of the reason for a short return on investment is due to the lower cost of the system. A system as described is about 1/4<sup>th</sup> of the cost to produce electricity from wind turbine generators.