



DTE Green Waste to Fuel™ Technology

The DTE Green Waste to Fuel™ Series of Reports

A Report by Delta Thermo Energy Labs, a Division of Delta Thermo Energy™

June 25, 2016

Notice

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Disclaimer

Many of the competitive technologies identified within this report are many years old and some have been in use for many decades. Delta Thermo Energy may not be aware of the latest advances put in place by individual plant operators or by their suppliers and subcontractors. Comparisons with new Delta Thermo Energy DTE Green Waste to Fuel technology and the underlying core technology we use is based upon publicly available information available to us. Our core technology, DTE Hydrothermal Decomposition™, is supported by proprietary and unique intellectual property protected by existing and pending patents. Trade secrets are also part of our operating procedures and implementation and are necessary to achieve stated performance levels.

The reduction in pollutants released into the environment during and as a byproduct of DTE Hydrothermal Decomposition is significantly lower, in some cases by more than an order of magnitude, than most legacy waste processing practices. In any comparison with legacy Waste to Fuel and other widely used waste processing techniques our comparisons use generalized numbers based upon authoritative third party sources and the results of testing within our existing facilities. Individual plant key performance metrics will vary based upon many factors and which will vary amongst plants.

About The DTE Green Waste to Fuel Series of Reports

These reports highlight the results of our research into current or potential critical waste processing and Waste to Fuel issues. The DTE Green Waste to Fuel (GWE) report series are publications of Delta Thermo Energy Labs, a division of Delta Thermo Energy. The mission of Delta Thermo Energy Labs is to conduct important waste processing and Waste to Fuel analysis and investigation, and to report the findings back to the community at large through our publications. The Delta Thermo Energy Labs knowledge base benefits from information on waste processing shared with us during the operation of our facilities within the United States and those of partners which are in operation around the world.

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Executive Summary

In this white paper we overview the technology process utilized in the operations of our DTE Green Waste to Fuel™ systems and our DTE Green Waste to Fuel to Energy facilities. This report overviews the processes and unique technologies that enable our facilities to process Municipal Solid Waste (MSW) and Sewage Sludge with far lower emissions than any other commercial solution available within the United States today. We call this level of clean emissions performance Near Zero Emissions which refers to the emissions exhausted from any Delta Thermo Energy facility. In our Near Zero Emissions white paper and other detailed test results, we list them in detail and compare them to many current legacy incinerator plants. We compare our estimated levels of emissions and our permitted levels (from an actual permit) with the levels associated with legacy waste processing incinerators plants. In most instances a Delta Thermo Energy facility is cleaner by a significant margin. Of course, the core of this is the performance of our DTE Green Waste to Fuel systems which can be integrated with your existing incineration processes, or, part of a turnkey DTE Green Waste to Fuel to Energy facility.

DTE Green Waste to Fuel is not Waste to Energy. Incinerators burn trash – we do not. We process it into a clean fuel first. DTE Green Waste to Fuel implements new clean processes based upon DTE Hydrothermal Decomposition™ core technology. DTE Hydrothermal Decomposition includes a combination of innovative waste processing technologies licensed exclusively around the world assembled in conjunction with new intellectual property. DTE Hydrothermal Decomposition is a remarkable technology, one that promises to change our view of what is attainable in our fight to keep our environment clean.

DTE Green Waste to Fuel brings a highly disruptive and positive change to the legacy incineration of municipal waste. The Near Zero Emissions of a DTE Green Waste to Fuel facility challenge the entire industry in a positive way. Communities and industry can integrate our DTE Green Waste to Fuel systems with existing incineration processes, or, acquire new facilities from DTE directly. DTE Green Waste to Fuel and DTE Hydrothermal Decomposition technology will rapidly emerge as the solution of choice for communities and industry around the world.

The 6-Step DTE Green Waste to Fuel™ to Energy Process

The DTE Green Waste to Fuel to Energy process using the DTE Hydrothermal Decomposition is unlike anything in use in the Waste Processing industry today. DTE Hydrothermal Decomposition substantially reduces the emissions and byproduct production of pollutants to a very small percentage of existing legacy waste processing techniques. Simply put, we don't burn trash.

Our core technology, DTE Hydrothermal Decomposition, converts the Municipal Solid Waste (MSW) and sludge to Engineered Pulverized Fuel (EPF). This EPF burns hotter, more efficiently and cleaner than coal. We use this fuel to power generators that deliver clean electric energy back to the community.

DTE Green Waste to Fuel takes all of the waste from the community, processes it cleanly and delivers green electric energy and beneficial use byproducts. Your need for landfills disappears.

Engineered Pulverizer Fuel (EPF) has a meaningful heating value for energy recovery that is similar to coal, and superior, in that it contains, in many cases, low levels of naturally occurring HAP and conventional air pollutant precursors and carbon derived from biomass rather than fossil sources. Hence it burns both hotter, more efficiently and most important, cleaner than coal. This clean fuel burns without the production of the dangerous and toxic compounds such as furans and dioxins typical of incinerator stack emission.

Most important is that our facilities absolutely do not burn municipal solid waste (MSW). Delta Thermo Energy facilities include all necessary equipment and systems to receive municipal solid waste (MSW) and biosolids and then convert it through our proprietary processes into prepared fuel (DTE Engineered Pulverized Fuel or EPF). This EPF is then combusted at temperatures close to 2000 degrees fahrenheit to produce steam for the Resource Recycling System (RRS) process and for electrical power generation. Because pure combustion is done near 2000 degrees fahrenheit, and because we use MSW which has been converted EPF, we do not produce dangerous pollutants such as Dioxins and Furans. In fact, they cannot be created at these temperatures!

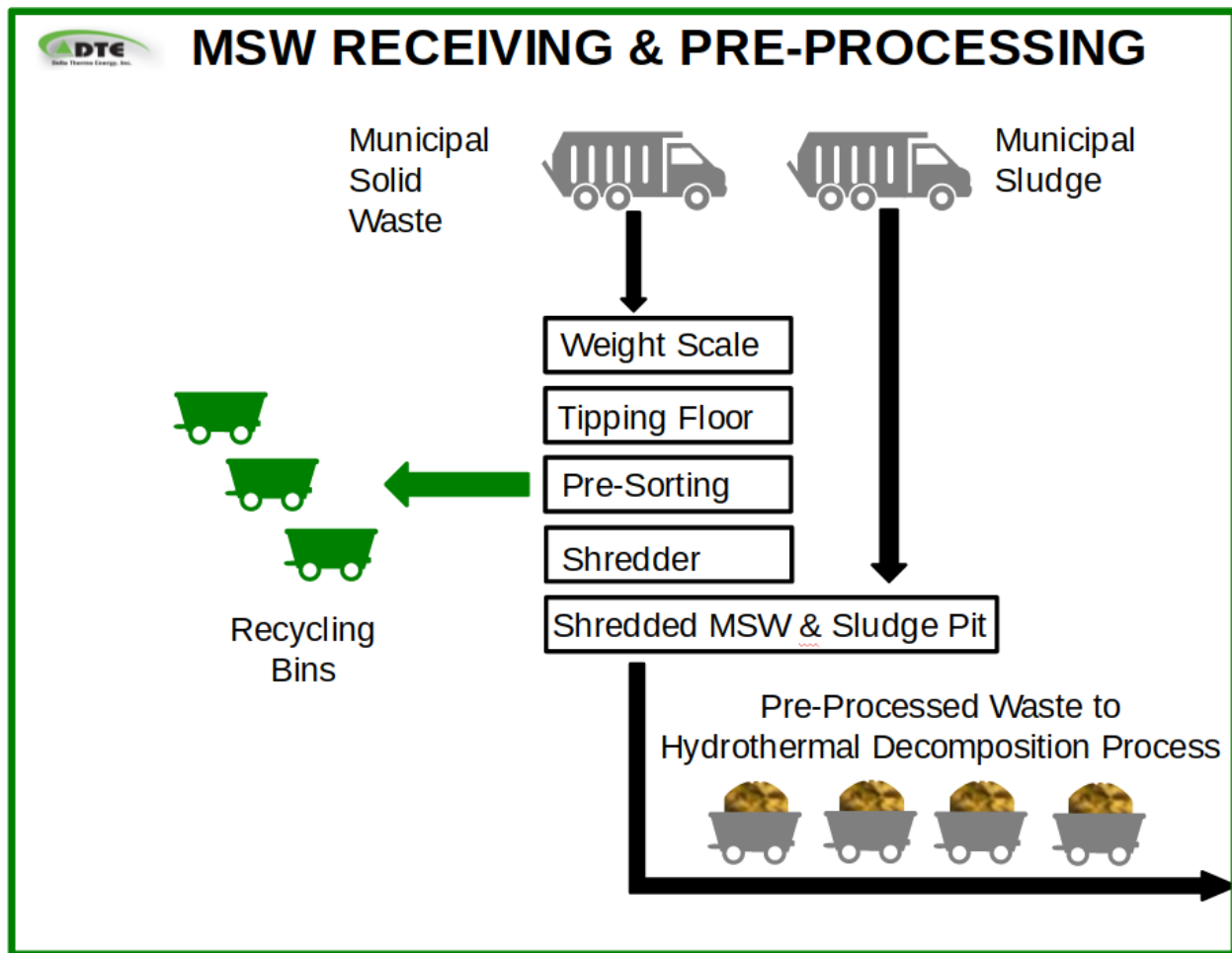
The DTE Green Waste to Energy process consists of the following major process areas:

- MSW Receiving and Pre-Processing;
- Thermal processing of MSW and bio-solids into pulverized fuel;
- Dewatering and drying of the pulverized fuel;

Additional processes for DTE Green Waste to Fuel to Energy:

- Combustion of the pulverized fuel;
- Steam production and electric generation, and;
- Wastewater treatment and air pollution control.

MSW Receiving and Pre-Processing

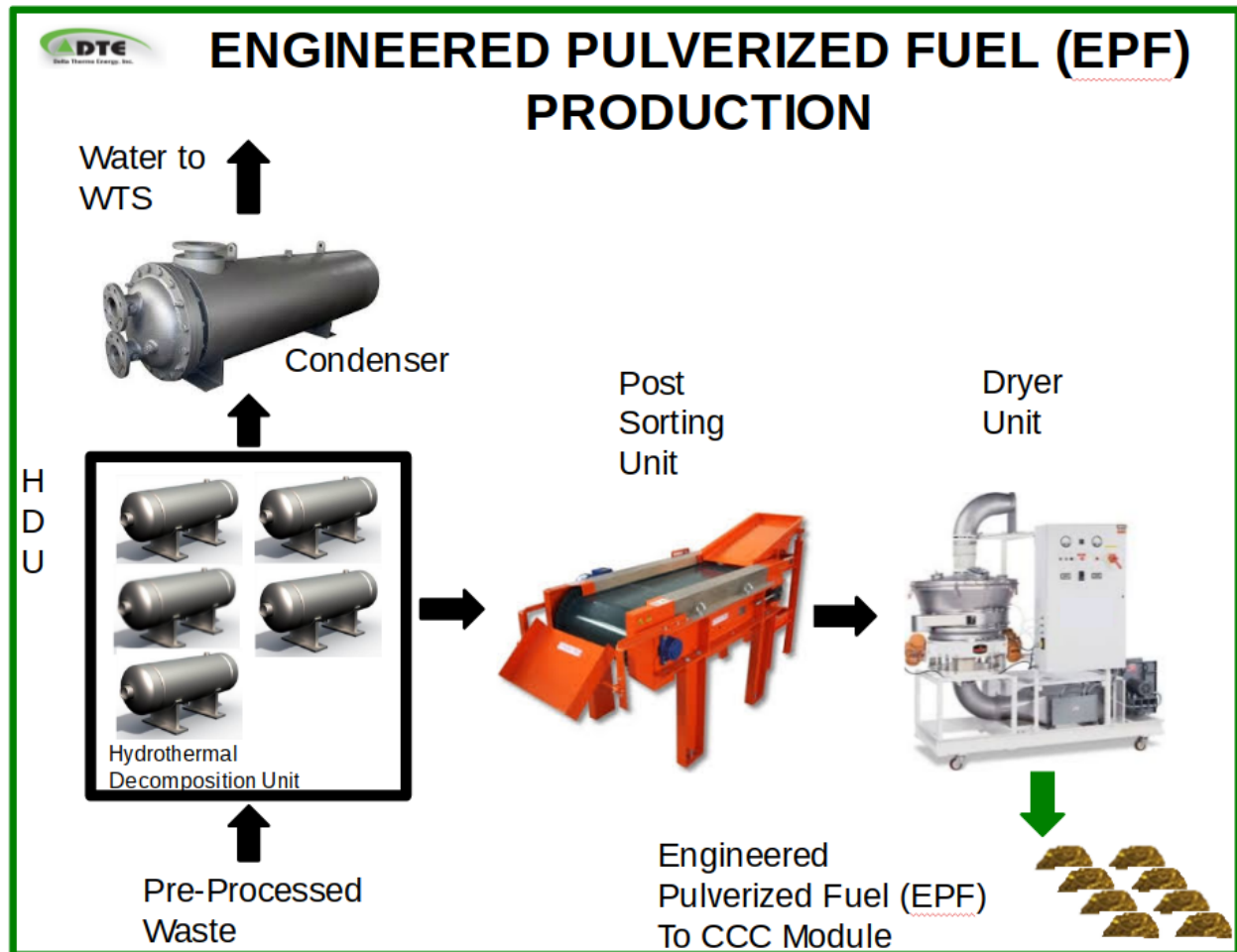


Municipal Solid Waste (MSW) is received at the facility, weighed and then dumped onto the tipping floor. Our pre-sorting operation is designed to find materials which can be returned via other recycling processes.

Once our team completes the pre-sorting the MSW moves into the shredder where it is mixed with municipal sewage sludge cake. The entire mixture is shredded such that the size of any piece of waste is no larger than approximately 2" in diameter.

The pre-processed MSW is now loaded into hoppers and moved to the Hydrothermal Decomposition Units (HDU).

Creation of Engineered Pulverized Fuel (EPF)

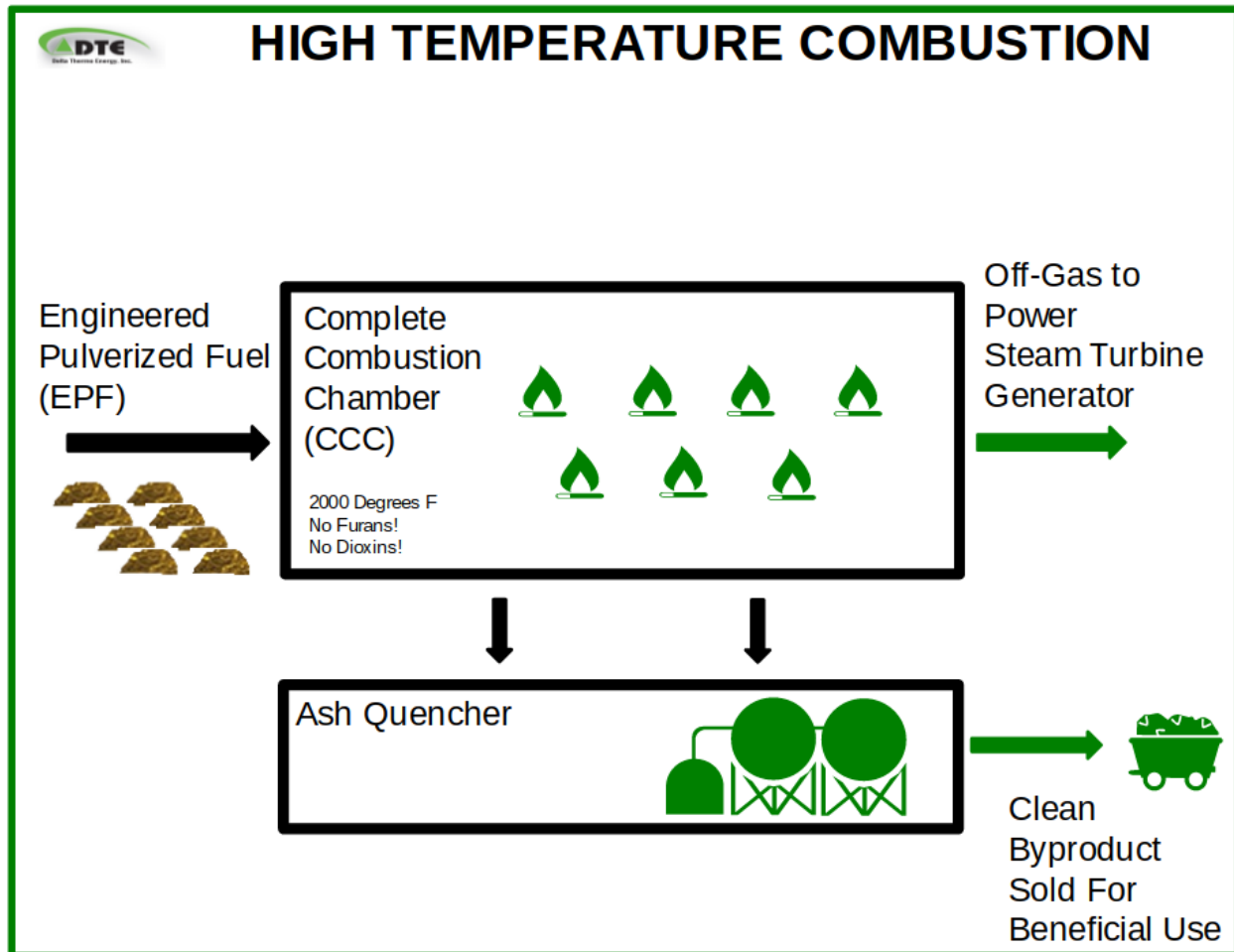


The pre-processed MSW is now loaded into one of the five Hydrothermal Decomposition units where it processed for 1 to 1.5 hours each. During this process complex compounds are broken down and converted using our proprietary processes and the resulting mix moves onto the automated post sorting unit for additional metals removal. This material is now designated Engineered Pulverized Fuel (EPF).

At this stage the Engineered Pulverized Fuel is produced, it contains between 45% to 55% water. The Dryer Unit then reduces this to approximately 18% to support the proper combustion in a later step of our combustion process.

This EPF, which is now classified as a fuel, moves on to the combustion process.

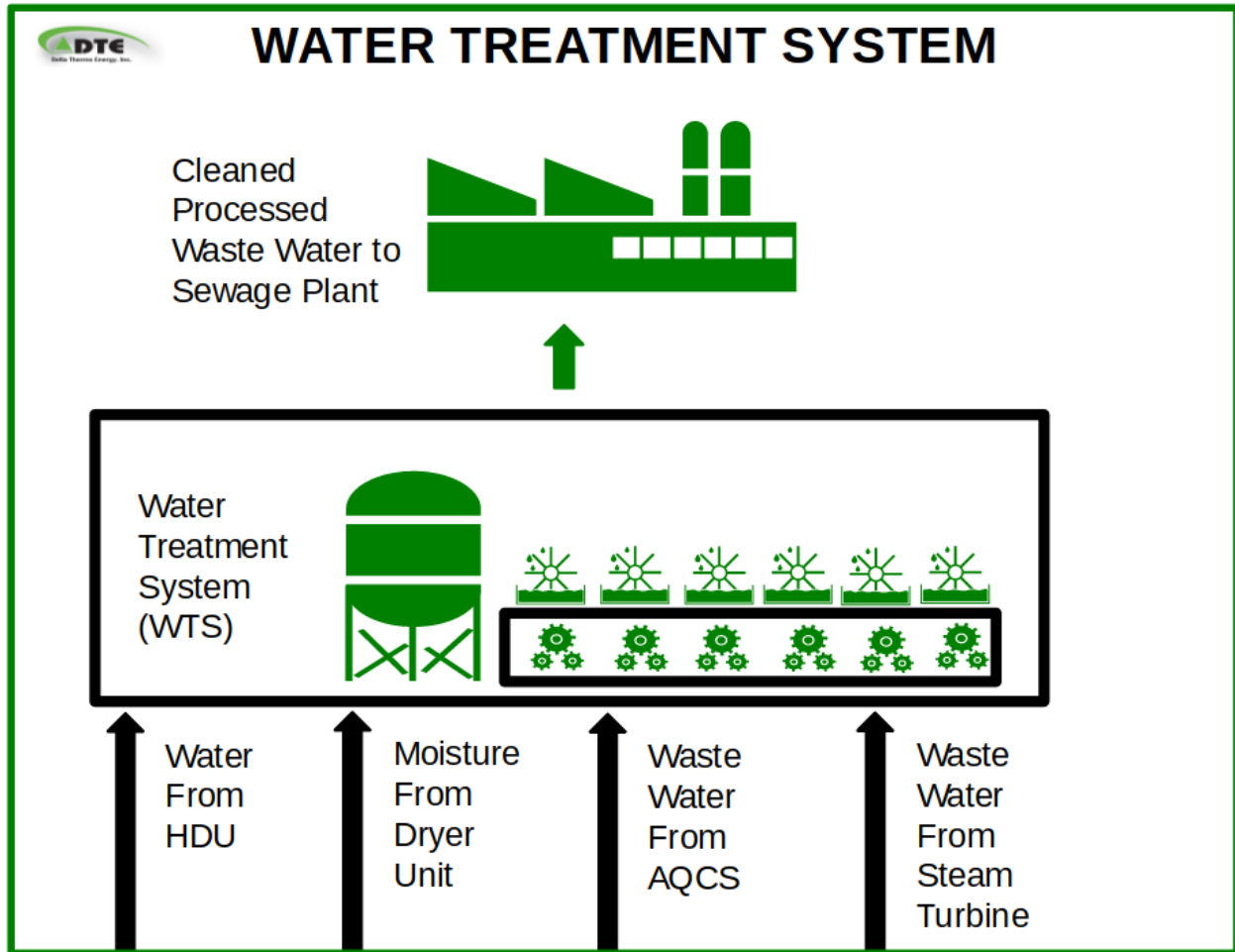
Clean Burning High Temperature Combustion



The Engineered Pulverized Fuel (EPF) moves into the Complete Combustion Chamber (CCC). EPF burns cleaner and hotter than coal. This EPF is then combusted at temperatures close to 2000.

This clean combustion is done near 2000 degrees fahrenheit. We use EPF, which was created from the original MSW directly. Unlike incinerators, we do not burn MSW. Therefore, we do not produce dangerous pollutants such as Dioxins and Furans. In fact, the ingredients within EPF and the physics of combustion do not allow their creation at these temperatures.

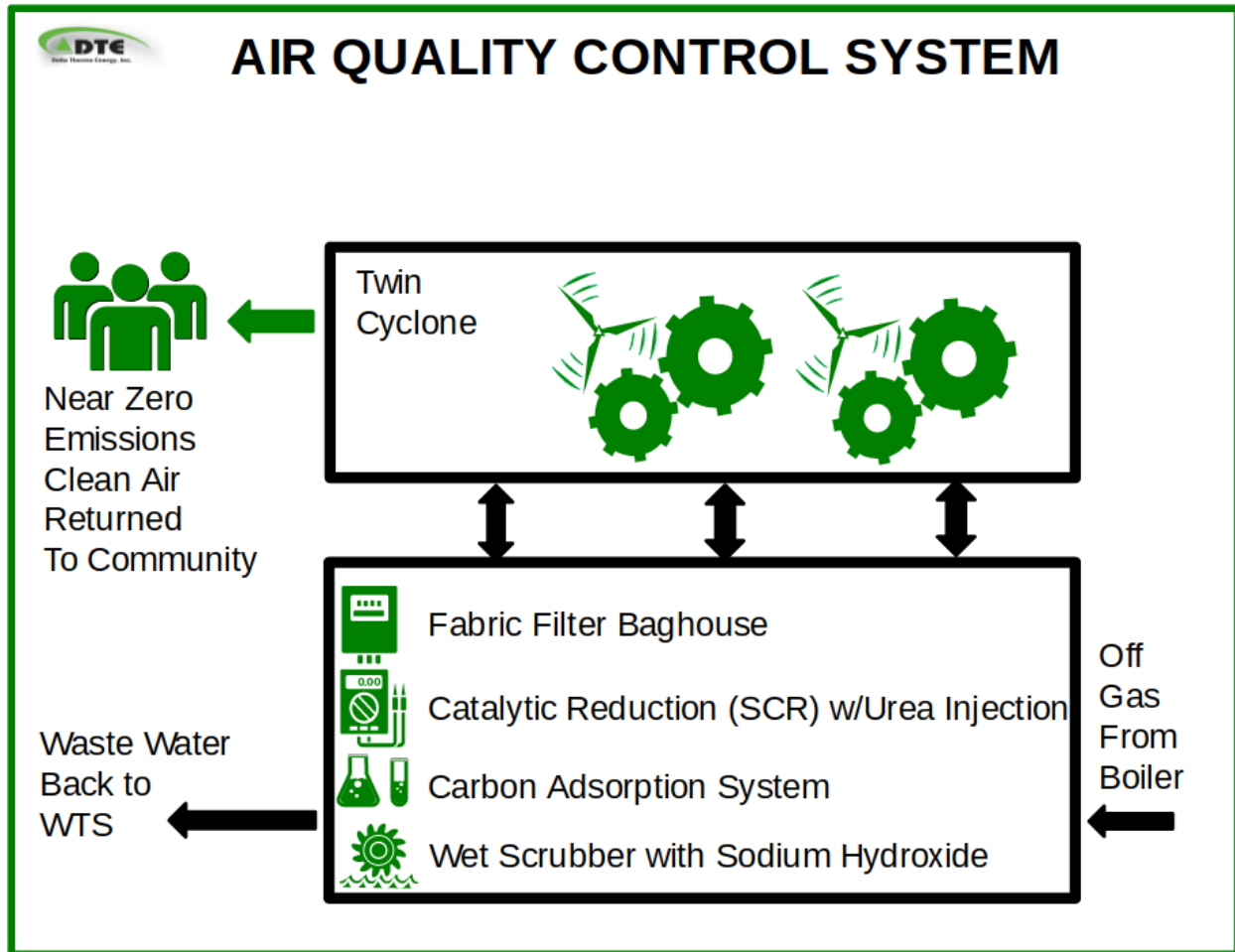
Water Treatment System



Water treatment is a key component of our system architecture. At almost every step water involved with processing is cleaned and returned to the municipality wastewater sewage plant.

Water is returned from the Hydrothermal Decomposition unit, and moisture is also returned from the Dryer Unit used in the last step of the EPF manufacture. Water is supplied for the Ash Quencher which cools the burned EPF ashes. Wastewater is returned from the Air Quality Control System and from the Steam Turbine which is used to power the electric generator.

Air Quality Control System

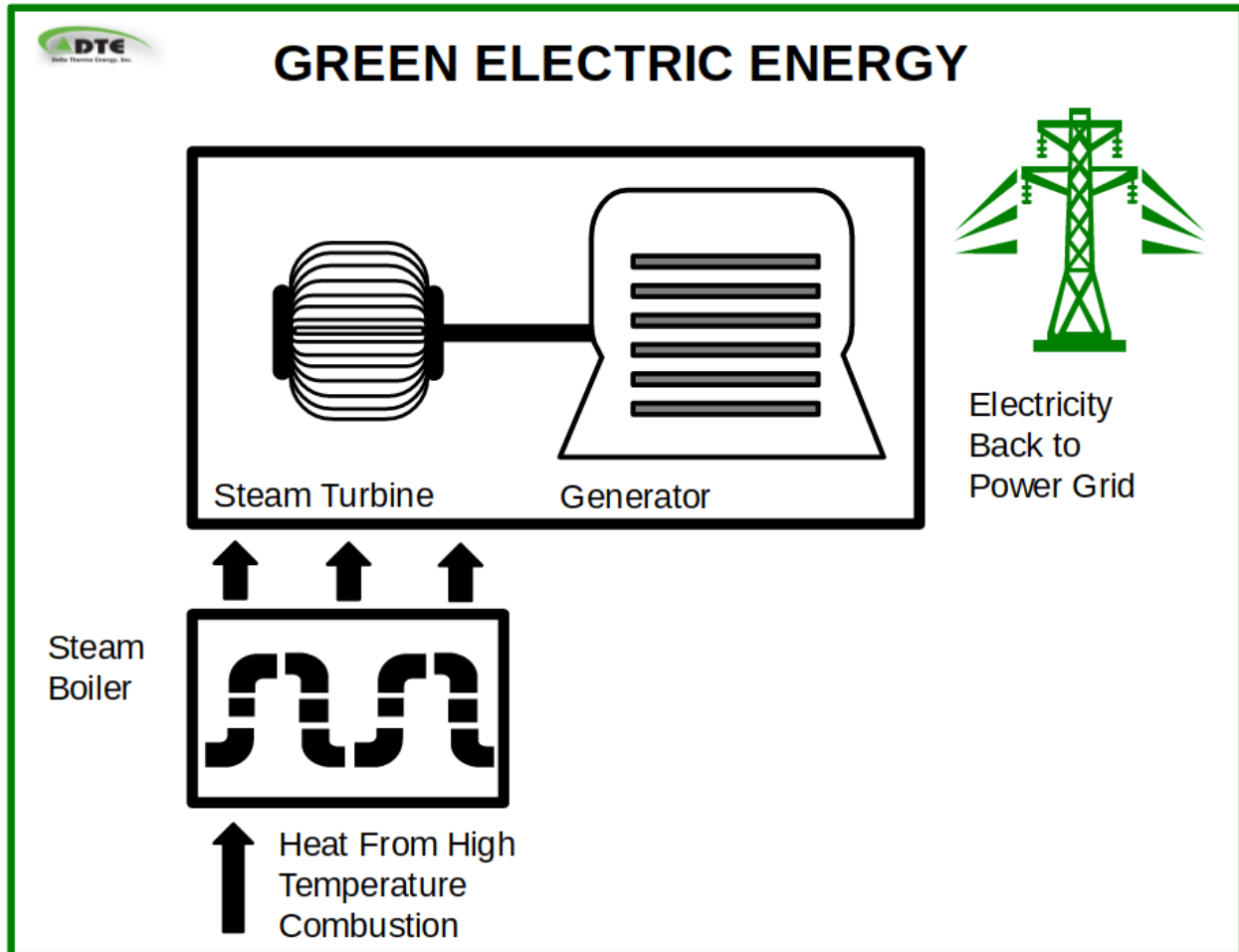


All of our facilities utilize a sophisticated air quality control system (AQCS).

The AQCS includes the following major components:

- Twin Cyclone for initial particulate removal;
- Selective Catalytic Reduction (SCR) with urea injection to reduce NO_x and VOC;
- Fabric filter baghouse to control particulate matter (PM) and metals;
- Wet Scrubber with sodium hydroxide to control SO₂, HCl, HF; and,
- Carbon Adsorption system to control mercury (Hg) and VOC.

Green Electric Energy Production



The combustion of EPF produces high temperatures which are used to power a high pressure boiler for the production of steam.

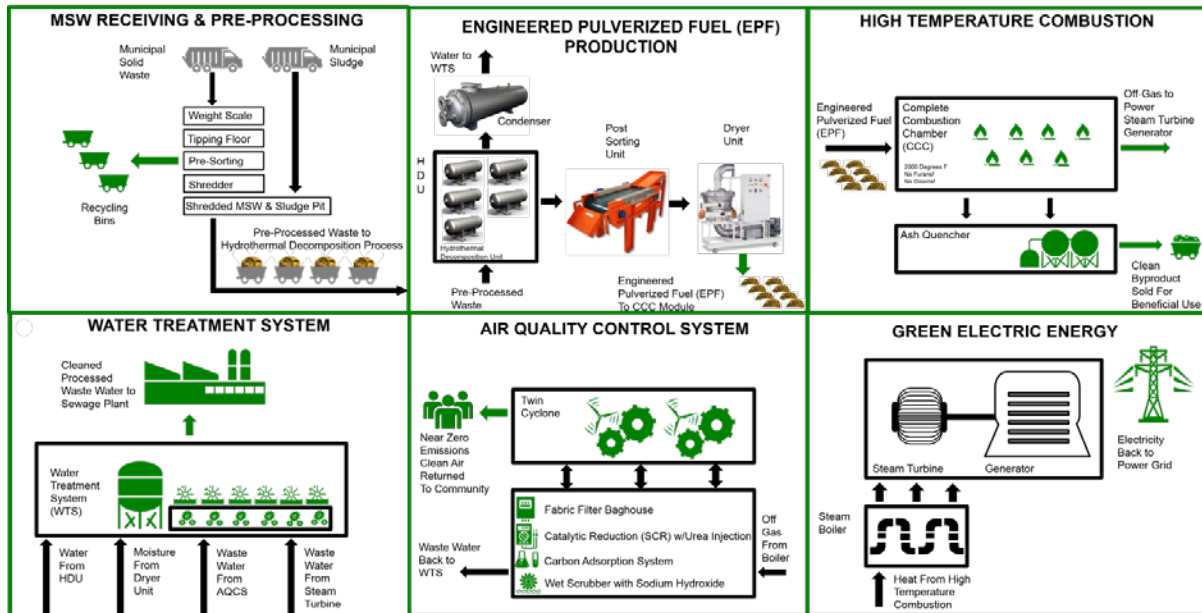
The resultant steam in turn powers a Steam Turbine / Generator Set which generates **CLEAN GREEN ELECTRIC ENERGY** which flows back to the community.

Waste water from the Steam Turbine and the Boiler, in turn, flows back to the Water Treatment System. The off gas from these processes flow to the Air Quality Control System.

DTE Green Waste to Fuel™ Process Summary

DTE GREEN WASTE TO FUEL™ TO ENERGY

- PROTECT OUR ENVIRONMENT
- SUSTAINABLE GREEN ENERGY



In summary, our proprietary 6-step process changes everything about the waste processing industry.

It is important to emphasize, DTE Green Waste to Fuel is not legacy in Waste to Energy. Incinerators burn trash - we do not. We process it into a clean fuel first. This clean fuel burns at very high temperatures without the production of the dangerous and toxic compounds such as furans and dioxins typical of incinerator stack emission.

Please note in our Near Zero Emissions white paper that our projected emission levels are significantly lower than the most modern Waste to Fuel incinerator.

Summary of Benefits

The benefits of a partnership between Delta Thermo Energy and your community are considerable. We provide benefits in multiple areas that positively impact your community today and far into the future.

Our new technology can help protect the planet we all share. Delta Thermo Energy's DTE Green Waste to Fuel processes produce Near Zero Emissions and virtually no landfill impact. Everything we process produces primarily water vapor and gases normally found in the atmosphere prior to industrialization. Our facilities do not require huge smokestacks to disperse airborne pollutants, nor do they produce many tons of hazardous waste for landfills.

Sustainable green energy for your community is now in sight. Sustainable green energy is the creation of usable energy such that it meets the needs of the present generation without compromising the ability of future generations. Sustainable green energy must be renewable, produced on an efficient basis, and not harm or pollute the environment. Nothing could be more ideal than to process waste cleanly, without pollution, and then to leave a byproduct as useful as energy for the community. DTE Hydrothermal Decomposition technology brings together innovative and unique technology from around the world to enable the world's first truly sustainable Waste to Fuel process.

Company

Delta Thermo Energy is a leader in delivering the world's first sustainable DTE Green Waste to Fuel process for industry and community. Uniquely, our internationally patented and U.S. patent pending DTE Hydrothermal Decomposition technology enables our systems to convert municipal solid waste into a clean-burning fuel that produces Near Zero Emissions. Our modern systems reduce costs and pollution within existing waste processing plants, protect the environment and help to return clean energy to the community. Our markets include industrial manufacturers and small to mid-sized communities across the world.

Contact us to learn more about how we can help. Learn how to integrate DTE Green Waste to Fuel systems with your existing incineration processes. Find out how we can provide a complete DTE Green Waste to Fuel to Energy facility. Contact us now via 1.215.809.1130 or email us via info@deltathermo.com.

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