

MSWE



Converting waste to energy. A City of Cleveland Project.



CITY OF CLEVELAND
Mayor Frank G. Jackson

CITY OF CLEVELAND
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WASTE COLLECTION



ClevelandPublicPower
Count on it

MSWE

Municipal Solid Waste to Energy



rethinkenergy
CLEVELAND



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NOTES:



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MUNICIPAL SOLID WASTE TO ENERGY (MSWE)

A City of Cleveland Project

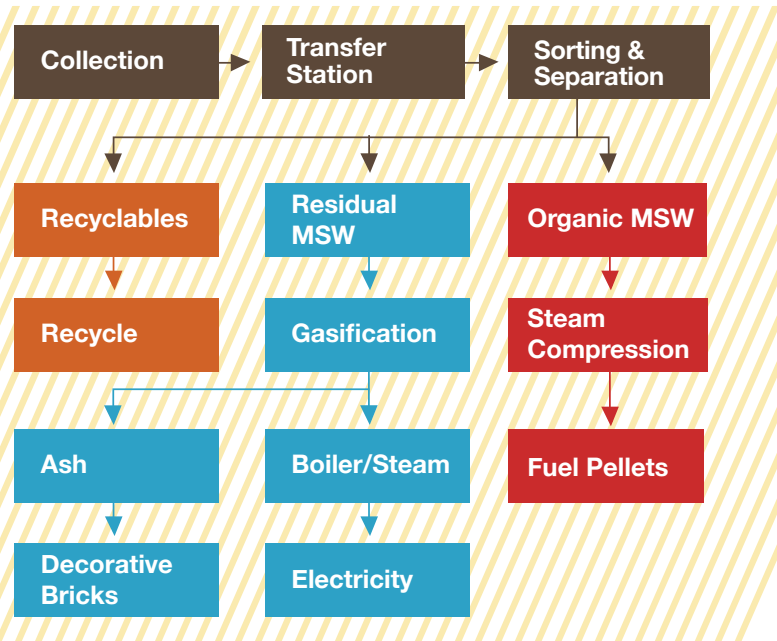
The City of Cleveland's Goal

The City of Cleveland has a clear vision to become a model of sustainability and a leader in the emerging green energy economy. This effort focuses on protecting the environment, providing green power, supporting business growth and creating opportunities for individuals to prosper.¹

Proposed Municipal Solid Waste to Energy Facility

The proposed MSWE facility will process municipal solid waste to generate electricity. The ability to use waste materials as a fuel source to produce energy reduces the use of landfills and all related environmental risks. Establishing this facility will create job opportunities and lead to business growth. It will produce additional marketable by-products such as recyclables, refuse derived fuel (RDF) pellets, and decorative bricks from the ash.

Cleveland's Approach & Facility Design:



Gasification vs. Incineration: What is the Difference?

Gasification of Municipal Solid Waste is through high temperature chemical conversion of solid materials into synthetic gas (composed primarily of H₂ and CO) in a controlled oxygen and heat environment. Gasification breaks down hazardous organic substances such as dioxins and furans in a more efficient manner.

Incineration of Municipal Solid Waste is through combustion of solid materials in oxygen rich environment that produces complex hazardous oxides in the process.

NOTES:

¹ For more info. on the City's of Sustainability goal, visit www.gcbl.org

Environmental Benefits of Producing Energy from Municipal Solid Waste

Currently there are approximately 240 waste collection vehicles which go in and out of a transfer station, for temporary deposition of waste. The proposed facility would be staffed for around the clock operation. MSW will be processed each delivery day, limiting the amount of waste stored in the facility.

THE USE OF MSW MATERIALS AS A FUEL SOURCE SIGNIFICANTLY REDUCES THE NEED FOR LANDFILLS AND ALL RELATED ENVIRONMENTAL RISKS.

The City's proposed facility will reduce waste management tipping fees and large transport vehicles will no longer need to move the waste daily from collection stations to landfills, lowering its carbon footprint. Gasification and related air handling systems eliminate more than 97% of airborne odor and will primarily have water vapor emissions (no black/grey smoke). There will be no increase or high volume noise effects.

GASIFICATION IS CURRENTLY USED ABROAD IN RESIDENTIAL AREAS



ALL ABOUT GASIFICATION

Overview

The MSWE Facility will use a process known as gasification to convert household waste into an energy source. This process will convert solid materials into a gas, similar to natural gas, using a combination of high heat and combustion. The generated gas, called synthetic gas or "Syngas," is primarily made up of carbon monoxide, methane and hydrogen. It is collected from the chamber and consumed as a fuel in a boiler that produces steam for energy generating purposes.

History

Gasification was invented in the 1800's to produce fuel for gas lamps and for cooking. Soon after, the availability of low-cost fuels such as coal, natural gas and oil eliminated the need for gasification. However, the process continued to be used in the production of industrial chemicals and fuels well into the twentieth century.

INTEREST IN GASIFICATION FOR ENERGY PRODUCTION INCREASED OVER THE LAST 30 TO 40 YEARS DUE TO THE MODERN DAY ENERGY CRISES AND A NEED TO CLEANLY DISPOSE OF UNWANTED MATERIALS AND WASTE.

There are currently more than 140 energy producing gasification plants operating worldwide. Nineteen gasification plants are located in the United States, and these are primarily used by chemical manufacturers.

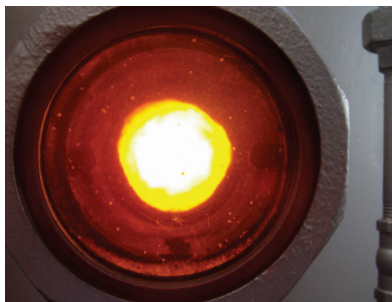
a closer look at the **GASIFICATION PROCESS**



TRANSFER STATION: Municipal Solid Waste (MSW) is collected and sorted.



TOP OF GASIFIER: The MSW is then placed into an air-tight chamber.



IGNITER: Heat is added to the chamber raising the temperature of the MSW and converting it to Syngas. The temperature and amount of air in the chamber are controlled to minimize formation of hazardous emissions.



BOTTOM OF GASIFIER: A small percentage of the material remains in the chamber as ash.



BRICKS: The ash can be used to make decorative bricks.



BOILER: Syngas is used to fire a boiler much like Natural gas is used today.



ELECTRICITY: The Syngas produced in the process is used to generate electricity. That electricity is used in homes, businesses and street lighting.



FUEL PELLETS: The fuel pellets created by the process will be sold to companies interested in using the pellets in place of coal. (Initially these may be used for, the gasification process in our facility).