



# combined heat & power in refuse disposal

## Baltimore Refuse Energy Co 60 MW CHP Application

### Project Profile

#### Quick Facts

##### Location:

Baltimore, MD

##### System Capacity:

510,000 lbs steam/hr

@ 850 psig / 825 F

60 MW peak electrical capacity

##### Major Components:

3 mass-burn waterwall boilers

Von Roll Reciprocating Grate System

60 MW Steam Turbine

##### Annual Energy Cost Savings:

\$29M revenue annually

##### System Performance:

3 lines of 750 tons per day, continuous operation

90% Waste Volume Reduction

##### Installed System Cost

\$254M financed with revenue bonds and private equity

##### Began Operation

Commissioned 1985

#### Reasons for Installing CHP

Combined Heat and Power fit naturally into the process for this waste-to-energy plant. Converting the chemical energy of the refuse to electrical energy for export meant that heat recovery via high pressure steam was a necessity. By designing their plant with flexibility in mind, BRESCO is able to moderate the amount of electricity or steam they export, according to market conditions.



#### Project Overview

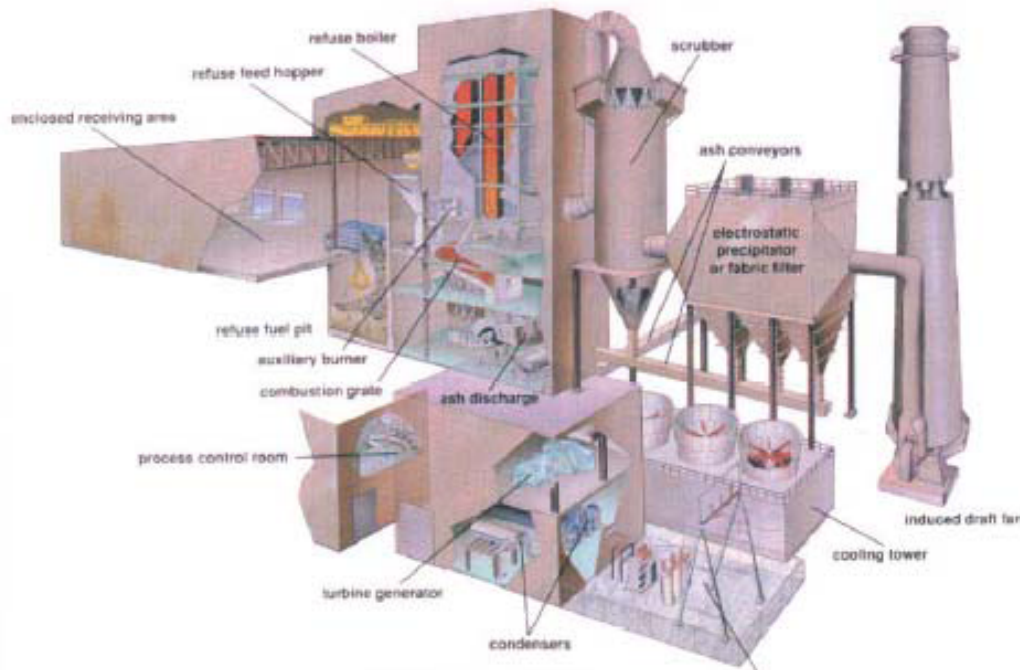
Since 1985, The Baltimore Refuse Energy Systems Company (BRESCO) has been disposing of up to 2,250 tons per day of municipal solid waste from Baltimore City, Baltimore County and other areas in Maryland. The incoming trash is received into an enclosed pit, then transferred via clamshell crane (three to four tons of waste at a time) into one of three boiler processing units. A reciprocating grate moves the trash through the refuse boiler, where heat is recovered as high-pressure steam. The combustion gases are passed through a spray dryer 'scrubber' and electrostatic precipitator filters prior to being expelled to the atmosphere. Subsequent to processing, ferrous metals are also reclaimed from the residue.

BRESCO can generate in excess of 500,000 pounds of steam per hour, or 60,000 kW at full capacity. Typically, a portion of the steam (determined by the market price from Baltimore Gas & Electric Company) is used to generate electricity and the rest is used for district heating and cooling, and supplied to buildings in downtown Baltimore under a contract with Veolia Energy Baltimore Corporation.

The BRESCO waste-to-energy facility successfully reduces the volume of incoming waste by approximately 90%. BRESCO also recovers ferrous and non-ferrous metals from the ash residue. These metals are shipped off-site to be recycled. The ash residue is approximately 28%, by weight, of the incoming waste. The ash is being used by the City of Baltimore for daily cover at its Quarantine Road landfill.

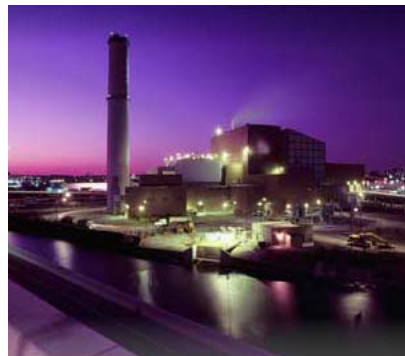
## System Construction

The BRESCO plant is divided into three identical processing units. Each processing unit is made up of a furnace, a boiler and an air pollution control system. The reciprocating motion of the grates inside the furnace moves the waste through the unit, insuring complete combustion. The primary combustion air is drawn from the refuse pit area, sustaining a negative pressure in the unit. The negative pressure prevents garbage odors and dust from escaping into the environment. Surrounding the grate systems are large utility-type boilers, which recover and "recycle" thermal energy released during the combustion of the waste. This recycled energy is recovered in the form of high-pressure steam. The facility has the ability to run natural gas as a secondary fuel to supplement refuse shortages, or to generate additional electricity as needed.



## Financing Specifics:

- BRESCO was financed with a combination of public revenue bonds and private equity
- **\$63.1M** private equity was raised to supplement the public bonds. **An additional \$40.1M in bonds were sold for additional air pollution controls in 1998.**
- The facility is operated by Wheelabrator, now owned by Waste Management Inc.
- Under current management, MSW is provided to BRESCO under contract by the city and county of Baltimore, and steam and electricity are sold to BGE and Veolia Energy Baltimore Corporation, respectively. This provides a steady source of revenue for BRESCO.



## U.S. DOE Mid-Atlantic Clean Energy Application Center

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***“Our technology allows us to operate a facility in downtown Baltimore without negative noise and air impact to the community”***

**Steven Tomczewski,  
Former BRESCO  
General Manager**

