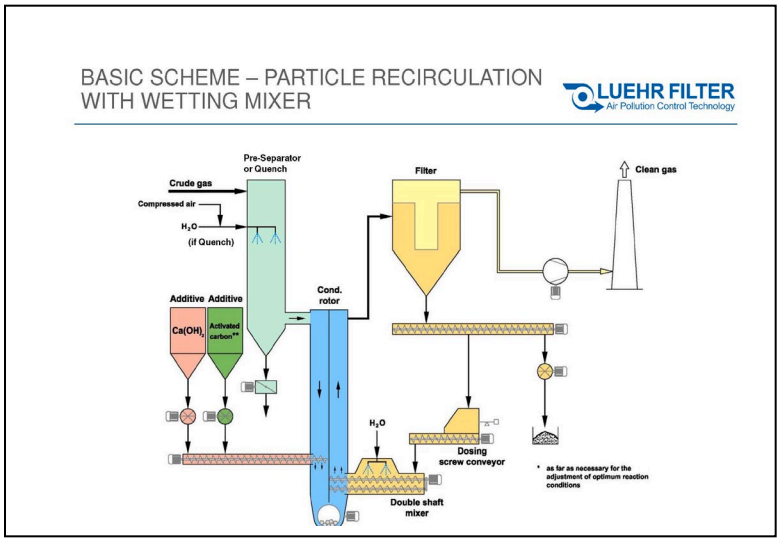
Waste-to-Energy Circulating Dry Scrubber Overview

A scrubber is an air quality control technology that can mitigate various exhaust emissions and help control temperature. At our Camden, NJ facility, each Municipal Waste Combustion unit ("MWC") is followed by a scrubber to help reduce acid gases (primarily SO_2 and HCl). Our proposed upgrade of the air quality control systems at Camden includes the conversion of the existing spray dryer scrubber on each MWC to a circulating dry scrubber ("CDS") system and replacement of the electrostatic precipitator ("ESP") on each MWC with a fabric filter baghouse.



The existing spray dryer scrubber system is designed to control flue gas temperature and acid gases at the same time by evaporating a lime slurry (a water mixture containing calcium hydroxide). As the gas is cooled, the acidic compounds in the gas react with the alkaline reagent to form solid salts.

In contrast, the proposed CDS system will split the two functions of cooling flue gas and mitigating emissions. Separating the functions allows for fine tuning of each process. For optimum acid gas neutralization reactions to occur, the flue gas temperature must be maintained at a specific setpoint. At Camden, we will convert the existing spray dryers into evaporative coolers that will use only water rather than a lime slurry. In these evaporative coolers, we can set the flue gas temperature by adjusting the water injection rate. Additionally, to reduce the use of freshwater, we will utilize wastewater from our processes, only relying on City water as required.

With the temperature regulated, more options become available for emissions mitigation. As shown in the diagram, flue gas from the evaporator will initially go through the CDS reactor where hydrated lime and powdered activated carbon will be injected to neutralize acid gases and reduce mercury and dioxin emissions, respectively. Additionally, a portion of the fly ash residue collected in the baghouse will be recirculated into the CDS reactor driving further emissions reductions. The recirculation of residue from the baghouse into the reactor provides the opportunity for reuse of any unreacted lime and activated carbon contained in the recirculated material to reduce the levels of contaminants in the flue gas. Additionally, the ductwork and the CDS reactor will function as a transport reactor where there will be a large amount of entrained residue that provides a large amount of surface area for further adsorbing gas phase mercury and dioxins/furans contained in the flue gas.

CDS technology is defined as Best Available Techniques by the European Union and is working very well at Covanta's Durham-York, Ontario, Canada and Dublin, Ireland facilities. The technology improves contact between acid gases, mercury and organic substances with lime and activated carbon to increase the residence time for the reagents to react with the contaminants in the system. The advantages of the technology improve control efficiencies, optimizes reagent usage, and reduces ash disposal volumes.