Material and Energy Savings in Paper Manufacturing

Client
Finch Paper, LLC is a paper manufacturer located in Glens Falls, NY. The company utilizes an ammonium bisulphite process to make offset and digital papers. Finch currently uses 30-50 tons per day of ammonia in its production process. Approximately 49% of the company’s total energy use is generated from waste biomass and other renewable sources.

Opportunity Area
At Finch, waste liquor from sulfite pulping is concentrated in evaporators and then burned in a recovery boiler to generate steam. Ammonia lost in the evaporators is condensed and discharged to the plant’s wastewater treatment facility. Recovery of ammonia from this condensate stream was expected to result in cost savings, as the concentrated ammonia stream could be used as make-up for the aqueous ammonia feed solution.

In the power plant, wood waste is used to fuel a biomass boiler. A wet scrubber is used to treat flue gas exiting the biomass boiler. Given the temperature and flow rate of the water recirculated in the scrubber system, there was a significant opportunity to recover heat from this stream and reuse it in other parts of the power plant operation.

Objectives
The project had two major objectives: (1) to investigate the use of steam stripping to recover ammonia and (2) to identify opportunities to recover heat from the scrubber recirculation loop.

Work Performed
NYSP2I modeled the recovery of ammonia from the condensate stream using a steam stripping column. Alternative separation technologies, such as ion exchange, carbon adsorption and membrane filtration, were also investigated. In collaboration with Emcor Services-Betlem, NYSP2I evaluated options for recovering heat from the scrubber recirculation loop.

Results
- An opportunity was identified to recover heat from the wet scrubber water loop and use it to: 1) heat the plant’s hot water line in the summer and 2) help maintain the warm water loop in the winter. Potential savings of low pressure steam directly translate to natural gas savings of 159,344 therms/year and cost savings of $62,947/year.
- Steam stripping was not economically feasible because the cost of the steam required for the process exceeded the value of the recovered ammonia. It was recommended that a two-stage membrane filtration system be evaluated further to determine whether ammonia could be recovered cost effectively.