MULTI-POLLUTANT CATALYTIC REDUCTION (MPCR)

Babcock Power Environmental
ENVIRONMENTAL
a Babcock Power Inc. company

Babcock Power Environmental provides fully integrated environmental solutions for utility and biomass power plants, waste-to-energy facilities, and large industrial applications. With more than forty years of experience in planning, designing, fabricating, constructing and commissioning environmental control systems, Babcock Power Environmental has developed into one of the market leaders in the field of environmental air pollution control technology. These technologies address emission guarantees, and are competitive from both a capital and operational cost perspective with delivery of these solutions on schedule with high quality.

TAIL-END SCR TECHNOLOGY THAT UTILIZES BABCOCK POWER ENVIRONMENTAL SCR EXPERIENCE AND REQUIRES NO AUXILIARY HEAT

Babcock Power Environmental is the leading supplier of SCR systems in the US, and has supplied more than 100 operating SCR systems representing over 50,000 MW of power generation in the US market. Our extensive SCR experience and knowledge has led to the development of our proprietary Multi-Pollutant Catalytic Reactor (MPCR) technology especially designed for low temperature biomass applications. Babcock Power Environmental has supplied biomass SCR facilities with successful operation over the past twelve years. These systems have continuously proven that this technology is the superior solution for cost-effective NOx and CO/VOC reduction.

Babcock Power Environmental worked with Gemma Power Systems, LLC, and East Texas Electric Cooperative (ETEC) to supply the Riley Stoker boiler and air quality control system including an MPCR with a split air heater on a 50 MW biomass project for chipped forest waste in Woodville, TX. The Hilton Lively Renewable Power Project was a finalist and received honorable mention for 2015 Project of the Year Award by Renewable Energy World and Power Engineering. The performance levels surpassed specifications and the plant is one of the largest, most-efficient and sustainable plants of its type.

ETEC's Hilton Lively Renewable Power Biomass Project in Woodville, TX

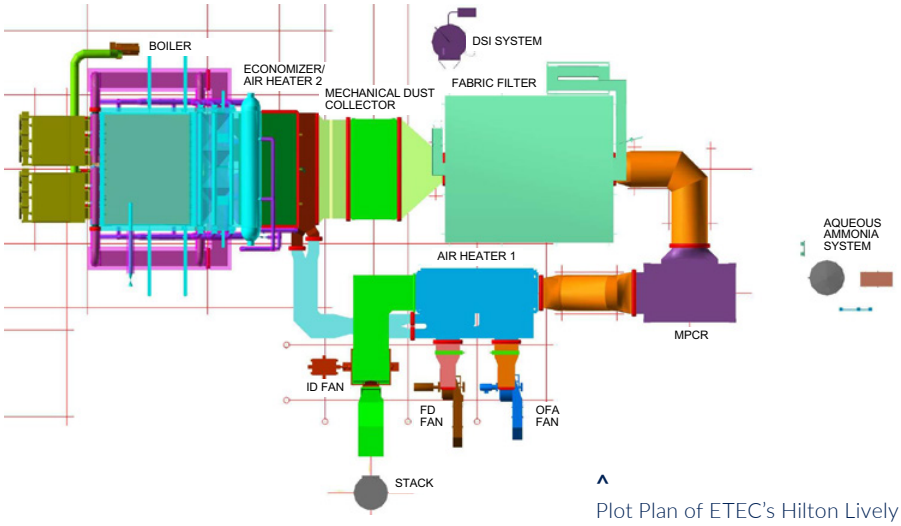
MPCR FEATURES/BENEFITS

- Tail-end SCR with no auxiliary heat source
- Compact design
- High NOx removal efficiency
- Optional CO/VOC reduction catalyst
- Split air heater design eliminating the requirement to reheat flue gas reducing plant O&M
- Ability to maintain flue gas emissions during reduced load and startup/ shutdown conditions
- Modular approach to minimize installation time and cost
- Direct ammonia injection reducing plant O&M

OVERVIEW

Catalyst requires a minimum inlet flue gas temperature to operate efficiently for the removal NOx and CO/VOC flue gas pollutants. Traditional tail-end SCR technologies for biomass systems requires a larger footprint and the flue gas has to be re-heated because the SCR is located downstream of the airheater. Only a percentage of the heat (70-75%) is recovered across a gas-gas heat exchanger adding O&M costs. In addition, flue gas leakage across a rotary gas-gas heat exchanger is common reducing the overall NOx removal that can be achieved with a traditional biomass SCR.

Babcock Power Environmental eliminates to the requirement to reheat the flue gas by designing a split airheater to control flue gas temperature to the MPCR at design flue gas conditions and reduced load conditions when flue gas temperature from the economizer outlet is also reduced. Combustion air can be bypassed around the air heater in a controlled manner to maintain flue gas temperature to the MPCR at a specific control point. This design reduces the overall capital and O&M costs of the project.



Plot Plan of ETEC's Hilton Lively Renewable Power Biomass Project

AMMONIA INJECTION

Babcock Power Environmental also includes a proprietary ammonia injection system to reduce O&M costs. The goal of the ammonia control system in a MPCR installation is to accurately inject a correct stoichiometric amount of ammonia into the flue gas upstream of the catalyst, to achieve the desired NOx removal without exceeding the ammonia slip specification. A dual fluid nozzle uses the combination of fluid pressure drop and compressed air (atomizing air) to mechanically atomize the aqueous ammonia directly into the flue gas stream. This technology avoids the use of an ammonia vaporizer, which is very expensive to operate. The droplets thus produced turn to vapor in the flue gas stream by absorbing heat from the flue gas. The dual fluid nozzle technology is capable of producing droplets in the range of 40 microns, which is much smaller than can be achieved with conventional spray nozzles.

SAFETY³ PEOPLE. POWER. PROJECTS.
We're giving safety the third degree.
Babcock Power Inc. and its subsidiaries place the safety, health and security of our people at the core of our company values. Our team is our most valuable resource, generating solutions everyday to deliver safe, clean, reliable energy globally. With a keen focus on safety, Babcock Power Inc. conducts business in a manner that protects our people, our customers and the environment. From innovation to generation, we are proud of our award-winning safety record and are committed to operating with integrity and excellence.

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