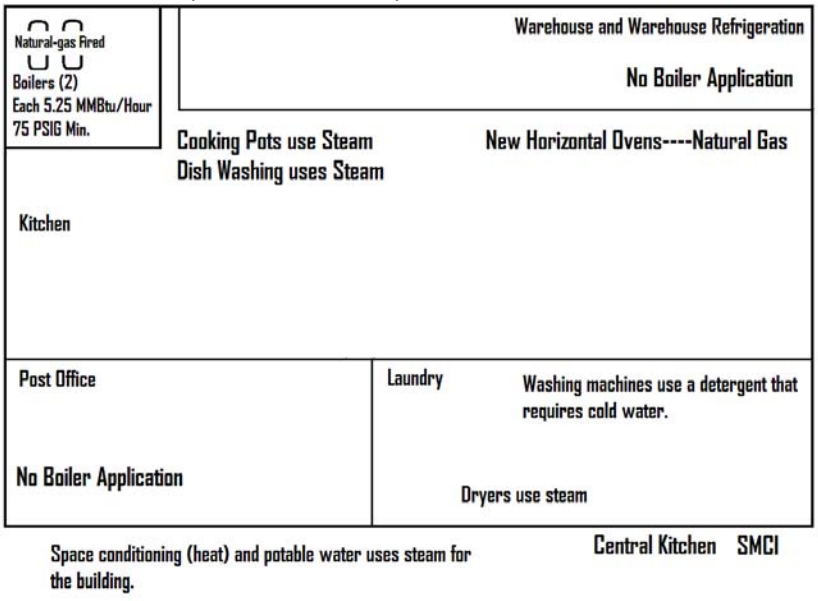
South Mississippi Correctional Institution (Leakesville, MS)
Clean Heat and Power System

Project Profile

Project Overview:

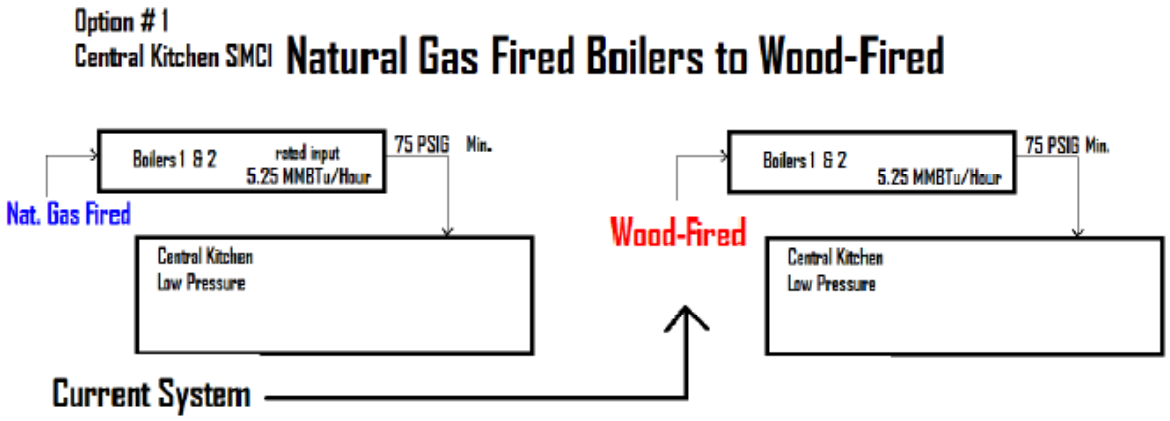
Representatives of the Southeast CHP Regional Application Center (Southeast RAC) as well as representatives from the Mississippi State University Industrial Assessment Center (IAC) met with representatives from the South Mississippi Correctional Institution to discuss the possibility of a Clean Heat and Power (also known as Combined Heat and Power, CHP) applications. As part of the Southeast RAC technical assistance and outreach program, the Southeast RAC agreed to assist the MSU IAC in determining the feasibility of CHP applications.

A layout of the facility examined is as follows:



MSU IAC and Southeast RAC members made the following recommendations:

Replace one of the existing natural gas boilers with a wood-fired boiler and keep the remaining natural gas boiler to supplement the wood-fired boiler.



The system was modeled in U.S. Department of Energy (DOE) Steam System Assessment Tool (SSAT). The model is built using information provided by the staff at SMCI. The system model recommendation makes certain key assumptions. The first assumption is a direct replacement of the current natural gas boiler with a wood fired boiler system. The model also assumes a current average natural gas price of $8.09/MMBtu and an average wood price of $27.00/ton. The heating value of green wood is taken to be 5,251 Btu/lb. The results of the model are shown in the table below.

	Current Option	Recommended Option
Fuel Cost ($/yr)	$334,000	$106,000
Fuel Consumption	4712.8 s.cu.ft./hr	0.4 ton/hr
Fuel Cost ($/MMBtu)	8.09	2.57

The implementation of this recommendation includes the cost of the boiler and installation. The type and cost of a material handling system will be dependent upon fuel supply form and storage location. The implementation cost as determined by MSU IAC members is as follows (obtained from *2001 Means Mechanical Data*, plus 30% adjustment for inflation):

Item	Cost
1 - 5.4 MMBtu/hr solid fuel boiler with controls	$34,320
Labor	$5,330
Total	**$39,650**

This implementation cost results in an overall simple payback of 0.2 years and it was therefore recommended that the Southern Mississippi Correctional Institution replace one of the existing natural gas boilers with a wood-fired boiler and use the additional natural gas boiler for supplemental purposes only.