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Boiler Performance When Switching from Coal to Gas Firing

Converting coal fired boilers to natural gas firing improves boiler efficiency and reduces stack emissions.

Consider the following comparison table:

	<u>Coal</u>	<u>Gas</u>
1. Heat Losses from:		
1.1 Bottom Ash Carbon	-3.00%	0
1.2 Fly Ash Carbon	-2.00%	0
2. Stack Gas Enthalpy at 340F for:		
2.1 15% excess oxygen	-17.88%	
2.2 3% excess oxygen		-10.75%
3. Radiation from Boiler Skin	-1.00%	-1.00%
4. Total Boiler Heat Losses	-23.88%	-11.75%
5. Boiler Efficiency	76.12%	88.25%
6. Fuel Efficiency Gain: $(88.25-76.12)/76.12 = 0.159$		<u>+15.9%</u>
7. NOx emissions, lb/mmBtu	0.500	0.100
8. SOX emissions, lb/mmBtu	2.000(1%S)	0
9. Particulate, lb/mmBtu	0.5	0
10. Opacity (Smoke), %	20+	0

Reduction in the stack gas enthalpy losses due to the reduction in the excess air of the gas firing is substantial (7.125%). This analysis shows that gains in boiler efficiency of 5% are achieved from the elimination of the carbon losses in the bottom and fly ashes from coal combustion. These reductions are available without any modifications to the boiler other than conversion to natural gas firing with the Kenneth L. Maloney, PhD, Inc. **Stoker Gas Matrix Burner(SGMB)or Low Pressure Jet Burner (LPJB)**. Stack Gas temperatures may also be reduced when firing gas since all of the heat transfer surfaces are cleaner.

Co-Firing with natural gas will achieve results in between those of pure coal and pure gas conditions.

NOx emissions are reduced by 80% on gas.

SOx emissions are reduced to 0 ppmv on gas.

Opacity as well as **Particulate emissions** are eliminated.

Contact **KLMCo** for more information.