

This series showcases success stories of PaCT (Partnership for Cleaner Textile) partner factories in the Bangladeshi textile sector that have implemented cleaner production projects.

Boilers often operate at higher than optimum air levels, making it critical to periodically monitor the composition of boiler flue gas and tune boilers to maintain excess air at the optimum level. The correct ratio of excess air can be found by analyzing the carbon dioxide or oxygen concentration in the flue gas. If the excess air concentration is low, unwanted combustibles such as soot, smoke, and carbon monoxide are released into the atmosphere. A high concentration results in heat loss as the flue gas flow becomes higher, it lowers the boiler's efficiency. Tuning the boiler to achieve the optimum ratio of excess air can reduce energy usage by 2 to 3 percent.

Improving Boiler Efficiency

PaCT analyzed boiler flue gas in seven random factories and found that the oxygen levels were higher than the standard boiler manufacturer recommended level. The percentage of excess air was found to be between 55 and 60 percent across all the factories, which is nearly three times more than the recommended level. Boiler burner tuning was the best solution to resolve this issue. PaCT recommended that the factories tune their boiler burners twice a year. After making a combined initial investment of \$2,000, six out of the seven factories collectively saved around \$85,000 in the first year — an almost immediate payback period.



Image of a Flue gas analyzer

Boiler tuning to curb resource consumption

By properly tuning boiler burners, the optimum boiler combustion efficiency was achieved, reducing greenhouse gas (GHG) emissions and conserving natural gas.

The following reductions were achieved by boiler tuning (seven factories combined):

- Natural gas consumption by 2.32 percent
- GHG emissions by 2.1 percent

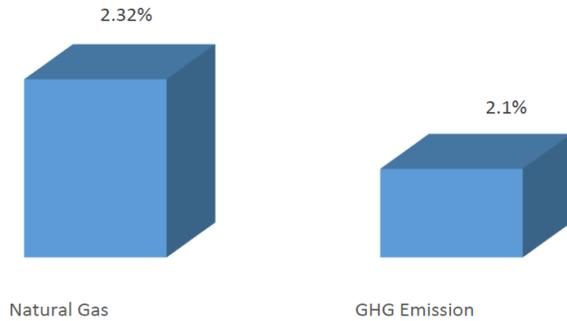
Items	Report before burner adjustments	Report after burner adjustments	Optimum values for optimum boiler efficiency
Excess Air	9.8%	13.3%	(10-20)%
Oxygen (O ₂)	1.9%	1.2%	0.9%-2.1%
CO ₂	14.12%	11.12%	11.7%-11%
CO	54 ppm	0 ppm	Tends to zero
NO _x	81 ppm	81 ppm	Up to 64 ppm
Fuel gas temp (C)	192.9	155.4	150-182
Gross Combustion Efficiency	77.8%	86.3%	87%
Net combustion efficiency	83.2%	89.2%	Around 90%

Sample burner test report



“Before the PaCT Program, we were not aware about such resource savings that can be achieved just by tuning the boiler. We appreciate PaCT II team’s effort to work for energy savings and prevent environmental pollution.”
 – Factory Management

Reduction in resource consumption and GHG emissions



Environmental Benefits



**2,100 tCO₂e/year
GHG Avoided**



**973,380 m³/year
Natural Gas Saving**

Economic Benefits

Factory Name	No. of boiler tuned	Investment (\$)	Annual Savings (\$)	Payback Period
A	1	833	18,690	Immediate
B	3	*	11,547	-
C	1	60	2,381	Immediate
D	2	298	41,667	Immediate
E	1	179	7,143	Immediate
F	2	*	1,190	Immediate
G	1	595	2,381	3 months

IFC led Advisory Partnership for Cleaner Textile (PaCT)

is a holistic program that support the entire textile value chain – spinning, weaving, wet processing and garment factories in adopting Cleaner Production (CP) practices and engages with brands, technology suppliers, industrial associations, financial institutions, government to bring about systemic and positive environmental change for the Bangladesh textile sector and contribute to the sector’s long-term competitiveness and environmental sustainability.

WHAT PaCT DOES:

- Chemical Management Assessments
- Basic Cleaner Production Assessment
- In-Depth Cleaner Production Assessment
- Water & Energy Management
- Rooftop Solar PV Pre-feasibility Study
- Rooftop Solar Calculation
- Online Resource Monitoring

DEVELOPMENT PARTNERS



IMPLEMENTING PARTNER



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BRAND PARTNERS



IMPLEMENTER

