

Cleaner Production Case Study

Thermal Efficiency

This series provides examples of PaCT's advisory work with clients to implement Cleaner Production solutions in the Bangladesh textile wet processing sector.

Heat Misuse: Causes, Costs and Cures

Most thermal energy wastage stems from lack of awareness amongst workers and managers, and inadequate upkeep of plants, machinery and auxiliary systems. Lack of monitoring interferes with the estimation of the cost of different energy forms (i.e., steam and condensate) and potential savings.

Process Heat — An Invisible Resource

Inefficient use of thermal energy is common among the Bangladesh textile factories. Unlike electricity, heat is gradually lost to the environment. Cost reduction is possible by preventing loss of heat, and recovering and re-using it.

Low and No-Cost Solutions

Cost-saving improvements in thermal efficiency are possible in almost every washing-dyeing-finishing textile factory.

By implementing low and no-cost solutions, it is possible to reduce energy bills by 5-25% and to lower CO₂ emissions.



Cleaner Production (CP) is an integrated strategy to maximize profits by making more efficient use of inputs (such as energy, water, raw materials), while maintaining or increasing production and minimizing waste and pollution at source.



The Bangladesh PaCT: Partnership for Cleaner Textile is a holistic program that supports textile wet processing factories in adopting cleaner production, and that engages with brands, government, communities, financial institutions, and other stakeholders to bring about systemic, positive environmental change for the Bangladesh textile wet processing sector, its workers, and surrounding communities, and to contribute to the sector's long-term competitiveness.

Spot The Hot

Combustion Efficiency: Irregular monitoring of boiler-burner combustion is a common scenario in textile factories. However, through thorough monitoring and tuning it is possible to maintain boiler efficiency between 83 and 84%. This in turn reduces fuel consumption.

Heat Recovery: A Hot Water module (HWM) captures heat from generator jacket-cooling water. This thermal energy is then recycled, and as a result, less gas (or diesel) is required to generate steam, and cooling tower costs go down.

Boiler Economizer: Stack economizers are simply heat exchangers, with flue gas on one side and feed water on the other. The use of flue gas heat (usually at 232-343°C) improves boiler efficiency by 4-5%.

Boiler Blow-down: Excessive boiler blow-down wastes heat and energy, blowing money away. A heat exchanger with an automatic Total Dissolved Solids (TDS) controlled surface blow-down saves heat and water.

Condensate Recovery: Condensate is valuable: this "soft" water does not require treatment, and is preheated, usually above 90°C. Reusing it saves boiler feed water treatment and preheating costs.

Heat in Process Wastewater: When process wastewater is discharged into drains and ETP, it is like pouring money down the drain, because this wastewater contains precious heat. A heat exchanger can recycle this heat back into the process. A Hot Water Module (HWM) enables hot, relatively clean water from the later wash cycles to be reused in the process.

Radiant Heat Loss: Poor insulation of steam pipes and accessories is common, but the escaping steam is like money floating out of the factory. With efficient insulation, the factory can reduce its heat loss by 5-10% in heat loss, with a payback period of six months or less.

See how HAMS Garments Ltd. managed to reduce resource consumption

Client Spotlight: Hams Garments Ltd.

Hams Garments Ltd. (HGL) has washing, dyeing and finishing (WDF) units, with an average production of 13 tons of finished fabric per day.

Challenge

Identifying thermal efficiency improvements within the factory required analysis by skilled CP engineers.

Start with a Resource Efficiency Assessment

Working closely with the HAMS CP team, PaCT experts measured resource inputs across all production processes. By comparing Hams resource use to international efficiency benchmarks, the team identified areas of potential improvement.

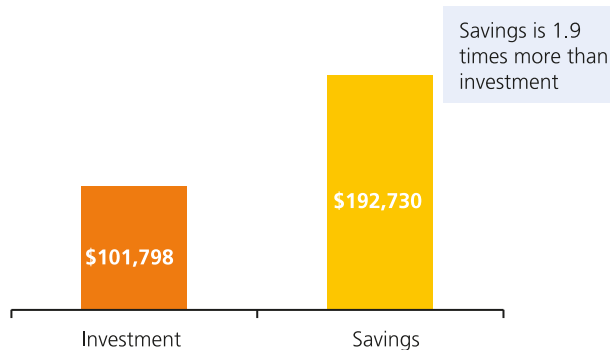
Next, Find the 'Low Hanging Fruit'

Several opportunities to reduce waste heat and conserve energy were encountered by PaCT experts. Hams' existing steam use was reasonably efficient by local standards, but not by international standards.

Saving Resources, Seeing Results

33 no-cost, low cost projects were recommended by PaCT experts. Hams implemented 18 of these measures, investing a total of about US \$100,000. These changes saved the company US \$192,730 per year. The payback period was about 6 months.

Hams' investment in thermal efficiency versus savings from CP measures



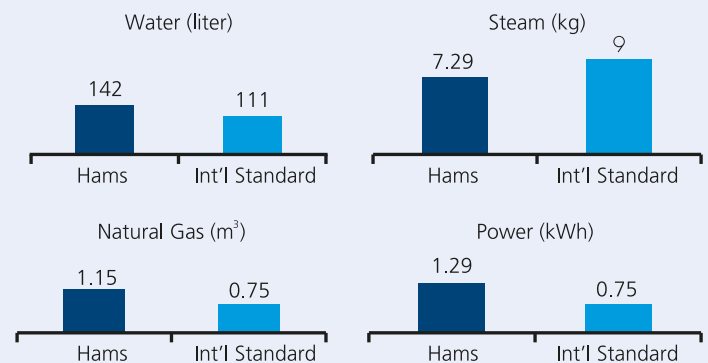
A Mindset for Success

Commitment is an important per-requisite for the successful implementation of a cleaner production program. This commitment was reflected in HGL's interest in making investments in low cost projects.

IFC Recommendations

- Begin regular boiler combustion monitoring and implement regular tuning of boiler burner
- Insulate bare feed tank and recycle all condensates from process machines to feed tank
- Install Waste Heat Recovery Boiler (WHRB) to generate steam using heat wasted to environment as gas-generator exhaust, containing up to 30% original heat
- Install Hot Water module (HWM) to replace generator jacket cooling tower – recycle heat back into processes
- Insulate all steam pipes and accessories, and implement regular checking of pipe insulation
- Repair leaks and malfunctioning steam traps, and implement regular checking and immediate repair of leakages and steam traps

Hams' resource use per kg finished fabric versus international best standards



Client Results

- Reduced gas bill by an average of about US \$1,300/month by increasing boiler efficiency
- Raised boiler feed-water temperature from 50°C to 80°C, by insulating tank and returning all condensates
- Avoided the use of live steam to preheat feed-water
- WHRB provides up to 700 kg steam per hour
- Prevented additional operating cost of generator cooling tower
- Payback period of only 6 months

Chairman
HAMS Garments Ltd.

"Recommendations set by PaCT experts helped us immensely to be better thermal efficient, compared to our past days' efficiency level. 'HAMS Garments Ltd.' is quite happy with PaCT to be able to make a positive turnaround in terms of power and cost savings."

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