Energy Efficiency & Productivity Case Study: Installation of Energy Efficient Servo Motor-based Sewing Machines Hamza Clothing Ltd.

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

The sewing section at Hamza Clothing Ltd. consumes around 25 percent of the garment factory's electricity consumption, with a large portion going to the sewing machines. The performance of a sewing machine is largely affected by the control it affords to operators. With better control of the sewing machine, the quality of the garments produced is enhanced. The operator can speed up the machine or slow it down according to the requirements of the precision of the seam being sewn. Servo motor-based sewing machines are energy efficient devices with higher productivity that can produce high quality garments.

Clutch motor and its downsides

Clutch motor systems consist of three parts: a tri-phase induction motor (which runs on alternating current, or AC), a clutch, and a belt pulley. The motor uses a three-phase AC supply and its efficiency is usually lower than 75 percent. Once full speed is attained, the motor continues to operate, irrespective of whether the pedal is pressed or not. This means that the needle is not moving, but the motor continues to rotate at the rated speed and consumes electricity (usually 450 watts).

In clutch-based sewing motors, the speed of rotation of the shaft (i.e. clutch output) is changeable, but its input, i.e. the rotation speed of the motor, is constant. This leads to high power losses, particularly at lower output speeds

Servo motor-based sewing

The speed of the servo motor can be easily varied between 0 to 3,300 RPM with the help of a switch, making it ideal for beginner sewers. In addition, the servo motor consumes 45 percent less energy (the average power rating of servo motor is 250W) compared with clutch-based motors, and produces low heat and low noise, making it conducive to the work environment. Needle positioning is one of the functions that is available only in a servo motor-based sewing machine. The servo motor only runs when the foot is on the pedal, in contrast to a constantly running clutch motor. This makes servo motors more energy efficient and quieter.

Servo Motor installed at Hamza Clothing Ltd.

Advantages of servo motor sewing machines

- Energy savings
- Low noise
- Light weight
- Easy to change speed
- Safer work environment

Factory Overview

Hamza Clothing Ltd. specializes in manufacturing knit garment products. They partnered with PaCT in 2014 with the aim of achieving resource efficiency through the adoption of best practices in the ready-made garment sector. The factory had 20 clutch motor-based sewing machines installed.

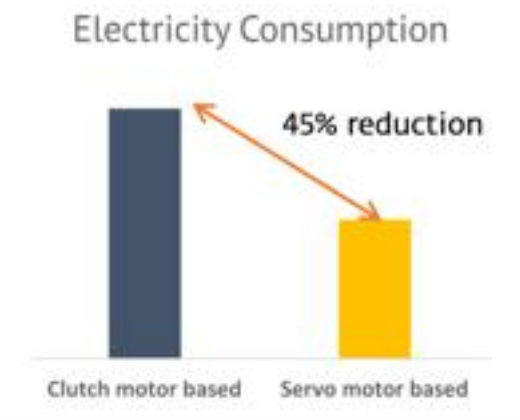
PaCT recommended replacing the clutch-based machines with servo motor-based ones to reduce energy consumption.

Environmental Benefits

$2,980 / Year
Annual Savings

14,196 kWh
Annual Savings

8 tCO2 / Greenhouse Gas Per Year Avoided



Investment & Payback Status

$847
Initial Investment
Pay-Back Period
4 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*

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