
**SAVING ENERGY IN INDUSTRY:
INTEGRATED ENERGY MANAGEMENT**

***Reducing Energy Cost through Integrated Energy Management
-The Ghana Textile Printing Company Ltd.***



Summary

Energy waste has been identified as one of the primary causes of the high cost of industrial production in Ghana. It has however been proven that energy efficiency can go a long way to reduce the cost of production which in turn can enhance the competitiveness of Ghanaian industries on both local and international markets.

The Ghana Textile Printing Company, a private textile manufacturing concern in Ghana has taken various measures to reduce the cost of energy and consequently the cost of production. The measures, which were implemented over two years included:

- a) Improvement in Boiler Efficiency;
- b) Continuous Monitoring of Energy Consumption and comparison with production levels;
- c) Employee education to switch off lights and equipment when they are not in use;
- d) Installation of steam traps and scale prevention devices;
- e) Power Factor Correction; and
- f) Installation of skylights to enable the use of natural light

nd “high cost” measures to improve boiler efficiency, water and electricity utilisation during 1999. These measures included:

Improvement in Boiler Efficiency

Low cost measures

These measures included regular control of boiler air/fuel ratio, adoption of a boiler maintenance schedule, repair of faulty insulation on steam and condensate lines and elimination of leaks on steam lines, valves and process equipment.

High cost measures

Steam traps were installed to remove condensate from steam. An electronic device “Scale Blaster” that continuously “de-scales” the boiler and at the same time prevents scale formation in the boiler tubes was also installed. This electronic device sends electromagnetic waves at a frequency of 24,000 times per second through the feed water pipe, instead of the scale forming ions attracting each other to form scales, they are repelled by the electromagnetic waves. This action prevents scale formation and also removes scales, which have been formed already in the tubes of the boiler.



Implementation Cost

GTP spent €70million during 1999 to purchase and install the “Scale Blaster” and to undertake all the other fuel saving measures mentioned.

Savings achieved

Before the measures were implemented in 1998, GTP consumed on the average 429.54kg of fuel per 1,000 yards of textile produced. With the implementation of the above measures, fuel consumption reduced to 407.5 kg in 1999. This is equal to 5.13% or 310,000kg (279,000litres) saving in fuel consumption. At an average cost of €522.00 per litre of RFO, the savings amounted to €145.6million. In addition to this, GTP saved €3million a month in terms of scale prevention chemicals, which it would have used to treat the feedwater. This brought the total savings in 1999 to €181.6million. The payback period for this investment is about 4 months.

Water Saving Measures

Low Cost Measures

Leaks in water lines, valves, storage tanks and process equipment were eliminated, while wastewater was recycled for use.

High Cost Measures

A new 1,200m³ concrete reservoir and interconnecting pipelines to enable the recycling of water was built. GTP spent €100million to implement these water efficiency projects.

Savings achieved

Before the implementation of these measures in 1998, the average water consumption rate was 74.4m³ per 1,000 yards of textile produced. With these measures in place, the rate reduced to 57.21m³ in 1999. This is equivalent to 23.12% or 234,50002m³ savings in water consumption. Cost savings of €304million was realized in 1999, giving a payback period of 4 months.

Electricity Saving Measures

No Cost Measures

Workers were educated to switch off equipment when they are not in use and reduce artificial lighting where natural light could be used to supplement indoor lighting.

Low Cost Measures

Skylights were installed to increase the use of natural light while some rewiring was done to permit turning off of lights in little used areas.

High Cost Measures

The company installed Capacitor Banks to improve plant power factor. Subsequently the Power factor at the factory improved to 0.92 after the installation in 1998. The company currently has a maximum demand of 1,160 kVA.

Variable speed drives were also installed on some on some motors, pumps and compressors whilst burnt out motors were replaced with high efficiency ones.

Savings achieved

Before these measures were implemented in 1998, the average electricity consumption was 294.71kWh per 1,000 yards of textile produced, but this reduced to 275.55 kWh when the energy efficiency measures were implemented. The reduction represents a saving of 6.5% equivalent to 207,000 kWh or €35.19million in 1999¹.

Summary of Energy Efficiency Measures

Measure	Energy savings	Cost Savings, #million
Electrical Energy Saving Measures	207,000kWh	35.19
Water Saving Measures	234,500m ³	304
Fuel & Chemical Saving Measures	310,000kg	181.6
TOTAL		520.79

Conclusion

The integrated energy management approach with the active support of management has helped GTP to achieve tremendous improvement in energy utilisation with a corresponding reduction in production cost. This has resulted in a total cost saving of €520.79million in 1999.

The experience of GTP has confirmed that energy can be managed in the same way other production inputs such as raw materials are managed. Energy Management should be treated as a continuous process. With the creation of awareness and acceptance of the concept, it is expected that GTP will continue to record cost savings in subsequent years.



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