

RECP Experiences in Cleaner Production at Export Garment Factory Co.,LTD Lao PDR



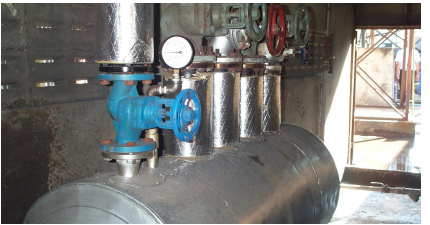
The efficient and environmentally sound use of materials, energy and water - coupled with the minimization of waste and emissions - makes good business sense. Resource Efficient and Cleaner Production (RECP) is a way to achieve this in a holistic and systematic manner. RECP covers the application of preventive management strategies that increase the productive use of natural resources, minimize generation of waste and emissions, and foster safe and responsible production. Benefits are eminent in many enterprises, regardless of sector, location or size, as demonstrated by the experiences of Cleaner Production implementation at Export Garment Factory Co.,LTD Lao PDR.

Achievements at a Glance

RECP implementation in Export Garment Factory Co.,LTD resulted in significant savings in daily operating cost of utilities. Material and energy consumption and its conservation practices in addition to direct savings will also enhance factory image/reputation among clients and other stakeholders particularly those who are concerned global as well as local material/energy security, reducing global energy consumption and the effect direct to clients/consumer. Improvement in energy efficiency measures and increase usage of renewable energy can decrease dependency on energy produced through fossil fuels.

Table1: Results of RECP implementation at a glance

| Parameters | Before CP | After CP | Cost Savings | | Remarks |
|---|------------------------|------------------------|------------------------------|------------|---|
| Fuel | 750kg of FO per Ton | 7 m3/ton of waste wood | 115US \$/ton | Diff. fuel | Reduced air emissions payback in 5 months |
| Electricity | 826kwh/ ton of product | 566kwh/t of product | | 30% | Reduced GHG |
| Water | 162 m3/ton of product | 110 m3/t of product | | 25% | |
| Waste water m3 | 150 m3/ton | 100 m3/ton | | 33% | Reduced WWT costs |
| Green House Gas (GHG) | 3.2 ton/ton | 0.7 ton/ton | 2.5 ton/ton 1,000ton/year | 80% | |
| Based on 350 ton production per year the cost saving will be: | | | | | 40,250USD |

| | | |
|---|--|---|
|  |  |  |
| Old boiler used fuel oil | New boiler used fire wood from waste wood | Insulation of steam distribution pipe |

Overview

Export Garment Factory, located in Dongpalep Village, Chanthabouli District, Vientiane Capital, The factory had a total strength of 900 workers, out of which 700 are female workers. Working hours were divided into two to three shifts depending on orders. The factory operated six days a week. In case of urgent orders the workers were required to work overtimes in order to meet the timeframe of its customer's orders. The export market was to European Union countries like France, Italy, and Germany etc.

The main focused operation units were wet process: washing, dyeing and bleaching.

- Wet process; bleaching and dyeing
- Water consumption
- Fuel consumption (thermal energy)
- Energy consumption (electrical energy)
- Chemical consumption
- Product reprocessing/rejection reduction

A fuel oil based boiler had been substitutes by wood fuel boiler during the project period. The factory uses electricity from grid and water mainly from ground water. Management of the company decided to participate in Cleaner Production demo project in 2005.

Benefits

Table and figure below illustrates the pattern of resource consumption (electrical energy and water after implementation of Low cost RECP measures.

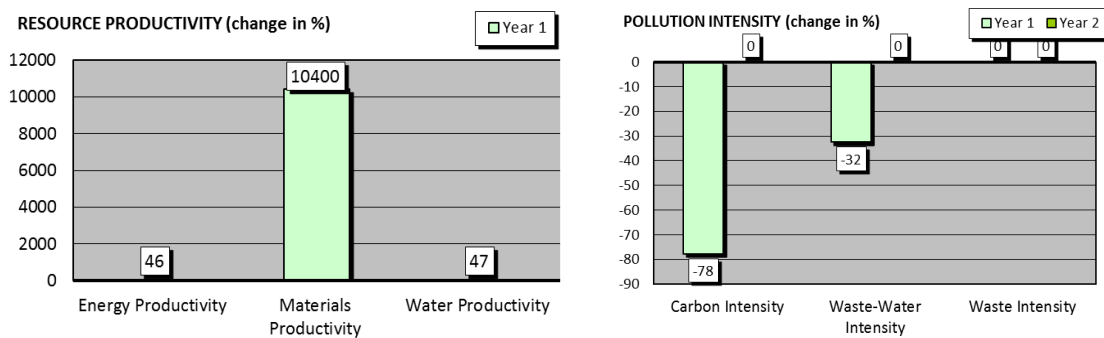
Table 2: Economic benefits

| No. | CP Solution | Before | After | % age | Economic Benefits | |
|-------|--|---------|---------|---------|-------------------|--------|
| | | | | | M Kip | USD |
| 2 | Water Consumption m ³ /annum | 57,000 | 38,500 | - 32% | 15 | 1500 |
| 3 | Electrical Energy KWhr/annum | 289,000 | 198,000 | - 31.5% | 70 | 7000 |
| 4 | Fuel oil for steam Million Kip /annum | 52,500 | 12,500 | -78% | 400 | 40,000 |
| 6 | Reprocessed % | 6% | 3% | - 50% | 18 | 1750 |
| TOTAL | | | | | 503 | 50,250 |

Table 3: Environmental benefits

| No. | Factor | Before | After | % age | Remarks |
|-----|--|------------|-----------|----------|--|
| 1 | Waste water Vol. m ³ /T | 150 | 100 | - 33% | Reduced due to optimisation of cloth :Liquor ratio |
| 2 | Pollution Load -Organic | NQ | NQ | — | No baseline data available but significant reduction reported. |
| 3 | Gaseous Emission - SOx - GHG (T/Annum) | NQ 1120 | NQ 245 | - 80% | Significantly reduced, due to substituted fuel consumption and better combustion |

RECP Profile



Resource

Efficient and Cleaner Production (RECP)

Resource Efficient and Cleaner Production (RECP) entails the continuous application of preventive environmental strategies to processes, products and services to increase efficiency and reduce risks to humans and the environment.

RECP addresses three sustainability dimensions individually and synergistically:

- *Production efficiency*
 - > Through improved productive use of natural resources by enterprises

- *Environmental management*
 - > Through minimization of the impact on nature by enterprises

- *Human development*
 - > Through reduction of risks to people and communities from enterprises and supporting their development



Success Areas

The results were achieved through the implementation of the following measures:

Till the compilation of this report, the company has implemented 11 options with low/medium financial investment needed below. After implementing the listed low cost options, the company reported energy and water saving by 50%.

1. Substitution of fuel oil fired boiler with wood fired (waste wood) fired boiler
2. Fuel substitution from FO to waste wood.
3. Water consumption optimisation by optimising cloth to liquor ratio
4. Improved insulation of steam pipes etc.
5. Reduce cloth:liquor ratio in washing M/C upto 50%.
6. Use comparatively clean water eg. wash water for floor cleaning and other miscellaneous purposes.
7. Repair of leakage, leading to reduced losses and better house keeping
8. Reuse of softening chemical: in subsequent softening bath for washing particularly for white and lighter colour garments
9. Water quality control for process water consumption
10. Installation of electricity meter at usage point to monitor usage of specific equipment
11. Arrangement of electrical switch for control of lighting energy.

The impact of RECP implementation on operational costs was reported to be very significant and based resource costing as per year 2014, total financial benefits of RECP is presented below.

| Principle options implemented | Benefit | | | |
|--|------------------|----------------------|--|--|
| | Economic | | Resource use | Pollution generated |
| | Investment [USD] | Cost Saving [USD/yr] | Reductions in energy use, water use and/or materials use (per annum) | Reductions in waste water, air emissions and/or waste generation (per annum) |
| Option1: Substitution of fuel oil fired boiler with wood fired (waste wood) fired boiler | 35,000 | FO reduction | Reduction of Fuel oil | Reduction of GHG emission generated by burning of fuel oil |
| Option2: Fuel substitution from FO to waste wood. | 15,000 | 100,000 | Reduction of Fuel oil | Reduction of GHG emission generated by burning of fuel oil |
| Option3: Water consumption optimisation by optimising cloth to liquor ratio | No cost | | Reduction of water | Reduction of waste water |
| Option4: Improved insulation of steam pipes etc. | 1,000 | 1,000 | Reduction of steam loss, reduction of fuel | Reduction of GHG caused by burning of fuel |
| Option5: Reduce cloth:liquor ratio in washing M/C upto 50%. | No cost | | Reduction of water | Reduction of waste water |
| Option6: Use comparatively clean water eg. wash water for floor cleaning and other miscellaneous purposes | No cost | 300 | Reduction of fresh water | Reduction of waste water |
| Option7: Repair of leakage, leading to reduced losses and better house keeping | 500 | 500 | Reduction of water | Reduction of waste water |
| Option8: Reuse of softening chemical: in subsequent softening bath for washing particularly for white and lighter colour | No cost | 500 | Reduction of chemical softener | Reduction of water pollution load |



RECP Experiences



| | | | | |
|--|---------------|----------------|--|--|
| garments | | | | |
| Option9: Water quality control for process water consumption | No cost | NQ | | |
| Option10: Installation of electricity meter at usage point to ,monitor usage of specific equipment | 500 | NQ | | |
| Option11: Arrangement of electrical switch for control of lighting energy. | 200 | 200 | | |
| Total | 52,200 | 102,500 | | |

The payback period is $52,200/102,500=0.5= 6\text{months}$.

Approach taken

The CP methodology used was to analyze the data collected by the CP team. The baseline data collected before CP implementation (data of 2005) was compared with those of 2006. All the data of electricity and water was collected base on the monthly bill and daily measuring. Therefore, the electricity and water were main resource consumption.

The specific greenhouse gas reduction is the result of the specific electricity consumption reduction estimated for Lao PDR with the factory 0.60 kg/Khw and 3.228 tons per ton of fuel oil and 0.184 ton per ton of fire wood (Carbon trust Conversion factor). The total GHG before CP is the total sum of carbon equivalence generated by electricity and fuel oil. The total GHG after CP is the sum of the carbon equivalence generated by electricity and fire wood. The reduction of raw material and the raw material productivity means the reduction of fuel oil replaced by waste fire wood by substitution of FO boiler with fire wood boiler. That's why the raw material productivity is so high of 100 fold. The reduction of water is the consequence of reduce cloth:liquor ratio and minimize unnecessary steps in wet process.

ABOUT RECP EXPERIENCES

Through the joint Resource Efficient and Cleaner Production (RECP) Programme, the United Nations Industrial Development Organization (UNIDO) and the Cleaner Production Center Lao PDR (CPC-L) has cooperated to improve the resource productivity and environmental performance to hotel sector. The Programme had been implemented in 2005 under the Project of Promotion of industrial Cleaner Production in Lao PDR (phase1 of Cleaner Production programme in Lao PDR).

There is also reports on case study which is publicized at website of Cleaner Production Centre Lao PDR at laocpc.org.