

Water Management And Recycling Practices



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ABSTRACT

Pulp and Paper Industry is highly Capital, Energy and Water intensive and Water is a critical resource for long term sustainability of the industry. Sustainability is the Core DNA for all business Operations of ITC. ITC has been carbon positive for 9 years and water positive for 12 Years through its sustained efforts to conserve these precious resources. Paperboards and Specialty Papers Division of ITC contributes to group's sustainability initiatives by setting goals in Energy and Resource Conservation and achieving them with committed focus.

ITC Limited, PSPD, Unit: Kovai is a Recycled Paper based Paperboard plant near Coimbatore. It embarked on Water Conservation activities since 2004. The Unit through its TPM activities focused on principle of 4R (Reduce, Reuse, Recycle and Recharge) and were able to reduce the Specific Water consumption from 28 M³/MT in 2004-05 to 9.8 M³/MT in 2014-15, a 65% reduction. In the last three years the Unit has reduced the Specific Water Consumption by 33%. Total Employees Involvement through TPM has been the main driver for this achievement. This Paper provides information on path taken by the Unit in achieving excellence in Water Stewardship.

Introduction

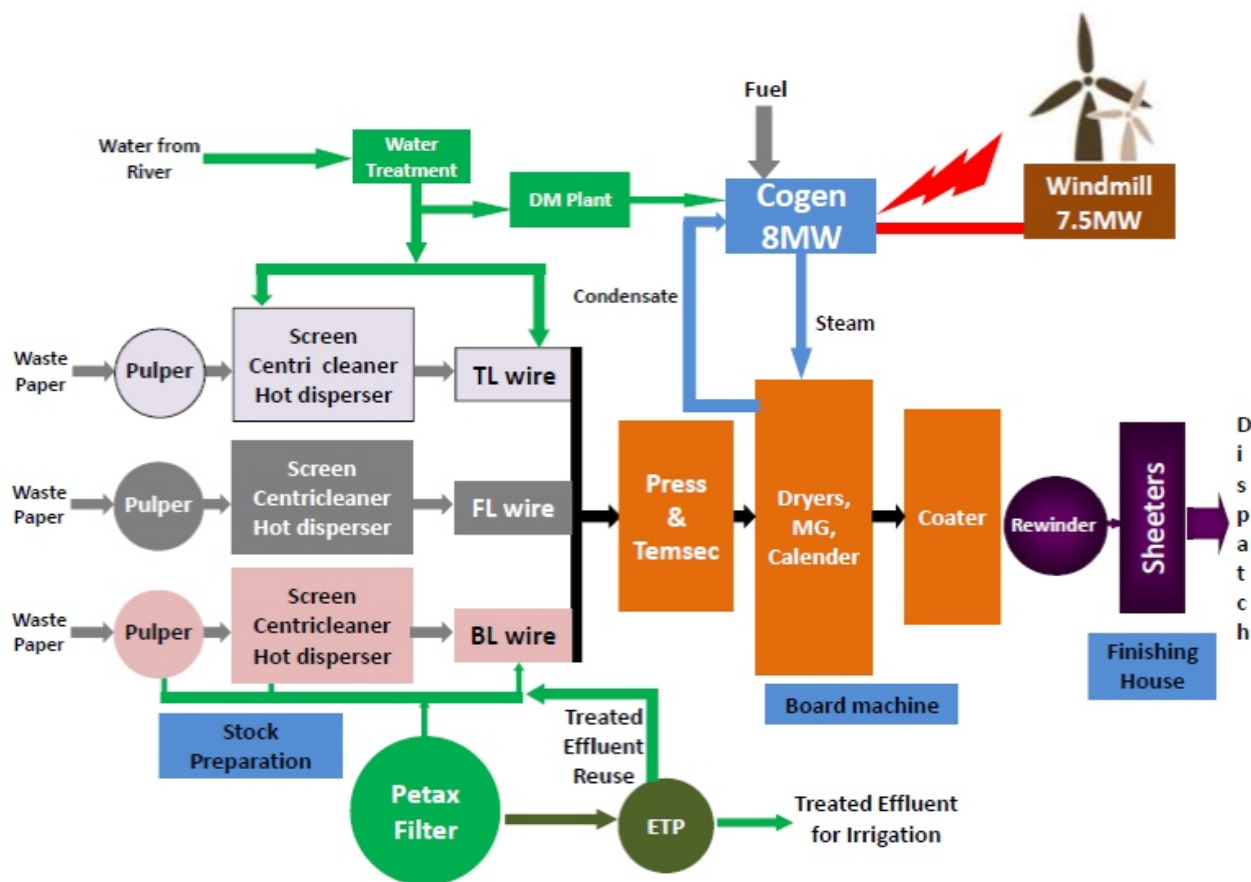
ITC Limited ,PSPD , Unit Kovai is situated in Mettupalayam, in Coimbatore district of Tamilnadu. The Plant with production capacity of 1.0 Lac tonne per annum manufactures Recycled Coated Paperboard. The Water requirement of the Unit is catered from the nearby River. The Unit has its own Power Plant with installed capacity 8 MW. The Unit also has Installed Wind Mill with capacity of 7.5 MW. The Unit has adopted TPM (Lean Manufacturing) as a work culture. Unlike traditional department structure, the unit has Area Effectiveness Teams (AETs) which comprise of cross functional managers from Process and Engineering having the entire responsibilities of their own area. The same structure has been followed at employee level as Process and Asset Care Teams (PACTs)

Mill Process Flow Diagram

Mill Approach for Water Conservation

The unit started the water conservation practices since its inception. The idea generation is the key mantra for success. The involvement of employees, managers and top management on day to day basis through TPM/Lean manufacturing techniques triggers idea generation in each and every area. Conducting idea generation campaigns, generation and implementation of Kaizens in each PACT (Process and Asset Care Team), Participating in various water seminar/awards, Bench marking with national and international standards, Implementing best technology, Fixing Environmental Management Targets, Appreciating good works, etc., are some of the key initiatives for success in progressing towards continual water reduction.

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Pic.1: Simple Process flow diagram of ITC-Unit:Kovai

Area wise Water consumption is being monitored in AETs as one of the critical KPIs and any deviation is being analyzed and improved upon. The unit has an Energy Management Cell comprising of managers from various functions. There is a separate Water Manager for the unit who is part of Energy Management Cell. The Water Manager leads all studies and implementation of various water conservation projects. The

team reviews all Energy conservation opportunities on weekly basis. The water consumption in the unit is 100% metered at input, process plants and discharge point.

The unit has taken 4-R techniques approach for water conservation. All ideas are grouped under these four categories for analysis and improvement.

Technique	Activities Involved
<i>Reduce</i>	Activity involves reducing water consumption by eliminating waste
<i>Reuse</i>	Activity involves Reusing of Waste Water in other location.
<i>Recycle</i>	Activity involves usage of Waste Water after treatment
<i>Recharge</i>	Activity involves steps taken to recharge the ground Water Table



Reduce



Re-Use



Recycle



Recharge

Water Conservation Approach : 1st R : Reduce

The activities involved under this category are;

- To identify the required sizes of nozzles, showers and pipelines with respect to sizes and required numbers
- To identify the auto control loop required locations with respect to operational parameter requirements
- Optimization of chemical usage

The key initiatives taken under this category are :

S..No	Title of Water Saving project implemented	Year of Implementation	Annual Water Saving m ³	Investment Made Rs. Lakhs
1	Level Control for Top liner back water chest	Jan - 08	15,840	0.38
2	Optimization of back liner wire edge cleaning shower	Jan - 08	15,840	0.15
3	Optimization of 4 number of Press part LP shower	Jan - 08	79,200	Nil
4	Temperature control loop for vacuum seal pit make up fresh water	Feb - 08	95,040	1.75
5	Reducing sealing water in condensate vacuum pump	Jul - 08	23,760	Nil
6	Replacing all LP showers in wire part with new one	Jan - 09	33,000	4
7	Optimizing Top liner back water in system	Jan - 11	21,250	0.22
8	Optimizing RCC tower cleaning water	Dec - 11	12,000	Nil
9	Ordinary water tap replaced with Foam tap	May - 13	4,200	0.28

The key initiatives taken under this category are :

S..No	Title of Water Saving project implemented	Year of Implementation	Annual Water Saving m ³	Investment Made Rs. Lakhs
1	Top liner tray water diverted to top liner silo	Mar - 08	11,880	0.15
2	Reusing main condensate vacuum pump outlet water in process	Mar - 09	23,760	0.1
3	Reducing & reusing water consumption by providing logic control in dilution systems	Oct - 09	12,000	Nil
4	Reusing sump pit water & pulp in process	Dec - 09	39,600	1
5	Reusing main condensate vacuum pump sealing water in process	Jan - 10	12,960	0.2
6	Reusing of Effluent water to ETP Dilution & internal cleaning	Mar - 10	9,600	0.18
7	Reusing Save all and Recovered chests excess water	Dec - 10	39,450	0.35
8	Reusing of hydrant system run check - drain water	Oct - 10	600	Nil
9	Re using sealing water from coater section	Feb - 11	8,400	Nil
10	Re using m/c base wire pit section water into Filler silo tank	Oct - 11	3,30,000	2.5
11	Effluent drain water collected in new SS tank and reused	May - 12	87,500	1
12	Top liner Silo - II overflow collected and reused	Sep - 12	2,62,500	-
13	Chest no -5 overflow to excess water tank	Dec - 12	1,05,000	4
14	Top liner Krima Disperser sealing water reused	Dec - 13	15,750	0.5
15	Back water in place of Fresh Water used for Floor cleaning in board machine	Sep - 13	7,000	-
16	Drum Pulper Liquid cyclone drain water reused	Dec - 13	17,500	1.75

- To identify areas of Water Wastage i.e., Leakages
- To identify the areas where the requirement of water is less and the actual usage is high, especially utility purposes e.g, Toilets, Canteen, Gardening etc.

Water Conservation Approach : 2nd R : Reuse

The activities involved under this category are;

- Identifying potential area of replacing Fresh Water with back Water.

- Identifying locations where fresh water is used for floor cleaning
- Identifying excess water availability for storage and reuse
- Identifying major 'sealing water' source to reuse
- Exploring usage of all 'blow down water' for some processes.

Water Conservation Approach : 3rd R : Recycle

The activities involved under this category are

- Identifying the areas of excess back water availability

S..No	Title of Water Saving project implemented	Year of Implementation	Annual Water Saving m ³	Investment Made Rs. Lakhs
1	New shell and tube heat exchanger installed in place of plate type heat exchanger to improve the condensate recovery	May - 08	33,000	3.2
2	New ETP to treat the Top liner and coating separately	Nov - 08	1,75,000	20
3	Fiber Recovery system	Aug - 2009	43,000	5
4	Reusing fiber recovery tank water by providing logic control	Feb - 12	1,82,500	Nil
5	Mini press installation	Jun - 12	87,500	1
6	Chest 5 & 7 fresh water make up reduction by using clarifier water	Jun - 13	52,500	0.53
7	Filler Line KROFTA Clarifier Capacity Upgrade	May - 14	1,32,000	48
8	ETP Treated water used in PETAX filter Accept in place of Fresh water	Jun - 14	52,500	25
9	Top Wire Shower Fresh water replaced with PETAX water	Mar - 15	35,000	-
10	Fill Less Cooling tower for Vacuum Flume water	Mar - 15	58,800	7.1



Pic.2&3: Rainwater Recharging & Harvesting pits at Unit:Kovai

Sl. No.	Type of Catchment	Area m ³	Run off Coefficient	Annual Rainfall (m)	Harvesting Potential (M ³ /yr)	Actual area for which rain water harvesting system is designed (M ²)	Actual rain water harvested (M ² /yr)
1	Roof Top	44950	0.8	0.336	12082	37350	10040
2	Paved Area	91580	0.5	0.336	15385	0	0
3	Un-Paved Area	1522681	0.2	0.336	102324	0	0
		1659211					10040

which can be treated/processed for further usage in the process.

- Upgrading water treatment facilities to enable recycling of waste water
- Exploring the usage of ETP treated water in process operation
- Exploring Best Available Technology (BAT) for maximum recycling of waste water

Water Conservation Approach : 4th R : Recharge

In addition to the above water conservation practices, the unit has taken 4th R approach to recharge the rainwater to the ground to increase the water table. Though the recharge is not directly reducing water usage, it is the key factor to save water for near future and for the benefit of the society in large. The implementation is done under two category;

- Internal / Inside mill
- External /Surrounding mill

a) Activities inside mill



Potential rainwater harvesting areas have been identified under this project. 83% of roof top rain water are re-charged to the ground . The potential of this saving is about 10,040 M³/Annum. In addition paved and unpaved area also covered.

b) Activities outside mill

The surrounding areas are selected based on survey by experts and various type of water conservation infrastructures have been developed. The unit involves itself in Ground Water augmentation beyond the fence through

1. Farm ponds
2. Percolation ponds

S.No	Recharge Infrastructure	Numbers	Benefit villages	Benefit area (Acres)
1	Farm Ponds	45	18	12
2	Percolation Ponds	9	6	161
3	Check Dams	7	5	194

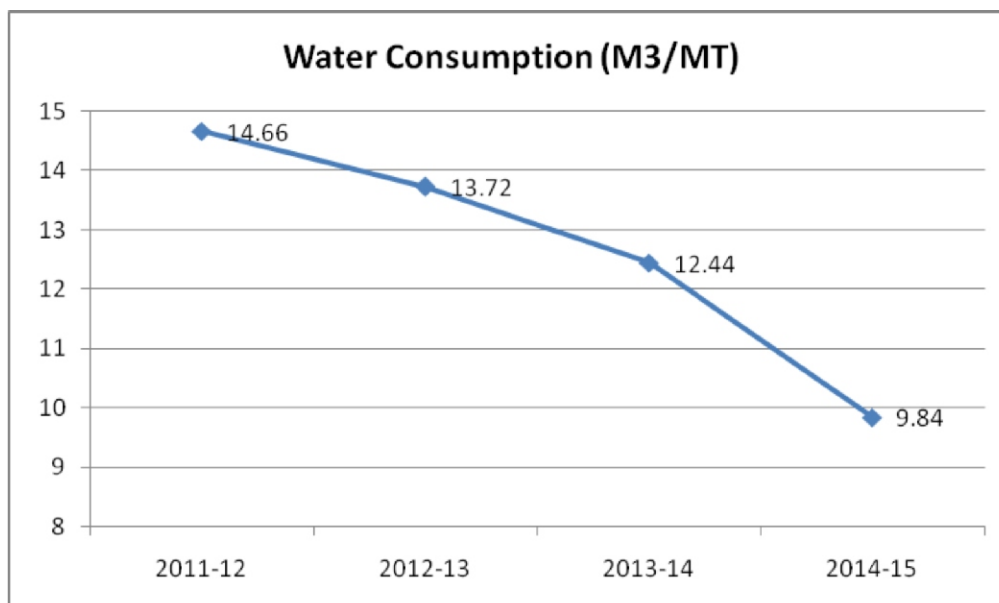


Pic. 4&5: Check Dam & Percolation ponds near ITC-Unit:Kovai



Pic.6 &7: Lean Family Garden & Water Day gathering at ITC-Unit:Kovai

3. Check Dams
4. Contour bunding
5. Drip irrigation



Water development Activities

The unit is also focusing on activities such as tree plantation (Greenbelt development), Vendor involvement in water conservation, Awareness program on water conservation conducted to local community through Water day, World Environment day, Energy Conservation day, Ozone day, Development of Lean Garden Employee's Family Garden etc., The Effectiveness of these activities are much more and will benefit the society in the long term.

Results

The systematic approach to reduce water consumption per tonne of board made the unit to achieve 33% reduction in last three years and about 65% since inception of this unit. Innovation, timely up-gradation of new technology, employees involvement under TPM on continuous basis and top management commitment are the key factor to achieve the excellence in water Management.

Conclusion

The unit has achieved the above results through continuous focus and through Total Employee Involvement (TEI). The efforts taken by the unit on various Energy and Water conservation practices has resulted in making the unit to become the first paper mill in India to receive the CII Green

Co-Platinum rating the highest rating in the country for meeting the world class standards in sustainability.

Reference

1. Energy Management Cell review - Internal
2. Water Audit review reports - Internal
3. Internal Kaizen Management reports