Achieving Competitive Advantage Through Environmentally Sustainable Business Practices: The Case of Arvind Envisol

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Introduction

It has been estimated by the Central Pollution Control Board, under the Ministry of Environment & Forests, Government of India, that 501 MLD (million litres per day) of industrial effluent is discharged by water polluting industries through drains of tributaries into River Ganga alone. The mysteriously self-purifying Ganga ranks among the filthiest water bodies in India and the world.

With 18% of world's population and only 4% of fresh water resources, India is poised to have severe water problems, if not managed properly (World Resource Institute). One out of 7 people do not have access to clean water. Worldwide, one out of 5 deaths under the age of 5 is due to a water related disease. Two million tons of sewage and other waste are discharged into world's water, the equivalent of the entire human population on this Earth. The industrial waste forms a major proportion of this. The toxins emerge from a variety of water polluting industries – Sugar, Textiles, Refineries, Food, Dairy and Beverages and others.

With this in mind, Arvind Envisol, a company focussed on extremely effective wastewater management system came into existence in 2011. The company under the helm of Mr. Dinesh Yadav, Director pioneered a patented Polymeric Film Evaporation Technology based Zero Liquid Discharge System. Over the last 6 years, Envisol had garnered tremendous results – both operational and financial. With international expansion already underway, Envisol seemed to be on its way to spearhead India's contributions to global water conservation.

The Textile Industry

India's textile manufacturing dates back some four thousand years and is presently the second largest employment generator after agriculture. The textile industry is not only characterized by its significant contribution to the national economy, but also by the utilization of large volumes of water and a variety of chemicals. There is a long sequence of wet processing and 'waste generating' stages. The large variation in the consumer demands and market trends result in significant fluctuation in waste generation volume and load. Owing to high water usage throughout its operations, 1 kg of textile production requires approximately 200 litres of water (Indian Textile Journal, 2009). The wide variety of chemicals can cause damage, if not properly treated before being discharged into the environment. Wet processing creates the highest volume of wastewater.

The negative environmental impact of the sector has been acknowledged since the first regulatory efforts to preserve and protect the country's natural resources with the Water (Prevention and Control of Pollution) Act, 1974. Industrial growth also spurred the federal government to set up a statutory Pollution Control Board organisation under the Water Act. With textile manufacturing being one of the oldest industrial sectors, wastewater handling was already an issue prior to the enactment of environmental laws. For instance, in the 1930s, treatment of effluent from textile mills in Ahmedabad, Gujarat, was done by allowing wastewater to evaporate and percolate through sandy soils on the banks of the river. These 'solar drying beds' were not maintained properly and eventually became holding ponds from which dry solids were recovered and sold as manure. None theless, it was concluded that the drying beds accomplish a very high degree of purification, or rather stabilisation, at practically no cost by means of biological oxidation. Then, in 1986, the national minimum standards for effluent discharge were laid down in the Environment (Protection) Rules. Relaxed biological oxygen demand (BOD) and chemical oxygen demand (COD) limits applied if the effluents went via the sewer system to a municipal treatment plant. A limit for total dissolved solids (TDS) – useful to monitor salinity – was however, only added after a reform of the regulation of the sector.

In September 2015, Directions were issued by the Central PCB to the effect that all Common Effluent Treatment Plants (CETPs) were to install continuous effluent monitoring systems. In January 2016, the Ministry of Environment amended the Environment Rules for CETPs and replaced previous standards for treated effluents with stricter ones. Finally in October 2016, amended standards for discharge of effluents were enacted, which made the regulations even more stringent.

Moreover, the increased competition for clean water due to declining water tables, reduced sources of clean waters, and increased demands from both industry and residential growth, all have resulted in higher costs for water. Water and effluent disposal costs, in many, account for as much as 5% of the production costs. Moreover, water usage at textile mills can generate millions of gallons of dye wastewater daily. The unnecessary usage of water adds substantially to the cost of finished textile products through increased charges for fresh water and for sewer discharge.

Also, the recent implementation of laws has been stricter, awareness among industry and society has increased, and there has been mounting pressure from customers, the media and NGOs to reduce/reuse water. All these reasons have forced the textile Industry to consider water conservation.

History – Lalbhai Group

Born in 1894, Kasturbhai Lalbhai started the first large scale textile mill under the name of Asoka Mills in 1920 with a capital of Rs.12 Lakh at a time when the largest mills in the region were built with not more than Rs. 5 Lakh. 1930-31 saw the resurgence of second Swadeshi movement coinciding with the great depression. While different entrepreneurs reacted to the situation differently, Kasturbhai saw this as the decade of prosperity and growth and established the flagship Arvind Limited in 1931 with an authorized capital of Rs. 25.25 Lakh. Kasturbhai had also floated mills for families of his three sisters under the name of Aruna Mills in 1928 and Nutan Mills in 1931 and Ahmedabad New Cotton Mills in 1938.

In the early 1980s, Sanjaybhai Lalbhai, son of Kasturbhai Lalbhai led the 'Reno-vision' whereby the company brought denim into the domestic market, thus starting the jeans revolution in India. Today it retails its own brands like Flying Machine, Newport and Excalibur and licensed international brands like Arrow, Tommy Hilfiger, through its nationwide retail network. Arvind also runs three clothing and accessories retail chains, the Arvind Store, Unlimited and Megamart, which stocks company brands. The group is involved in diversified activities from manufacturing to textiles, chemicals, dyes and intermediates, pharmaceuticals, electronics, engineering, real estate and a finance company. (Exhibit 1)

Apart from the field of business, the Lalbhais over generations have contributed to education, social and religious causes. Their contribution to education starting from Gujarat Vernacular Society in late 1800's to the formation of Ahmedabad Education Society, (1936), which governs 11 leading colleges and 6 schools, and 4 other educational programs. Kasturbhai Lalbhai played a key role in establishing the Physical Research Laboratory (1948), ATIRA (1947) and the famed IIM Ahmedabad (1961).

Arvind Limited

Arvind Ltd., headquartered in Ahmedabad, is a leading conglomerate with interests in textiles, brands, retail, engineering and advanced materials sectors, amongst others. It ranks among the top fabric suppliers worldwide. Arvind is an end-to-end solutions provider for the entire textile chain. With a market capital of $ 1.3 Billion and 85 years of rich business experience, it manages 15 global apparels brands in India. It features amongst the top 5 organised Denim manufacturers in the world. (Arvind Annual Report 2016-17)

The underlying theme across the broad spectrum of business activities is that of enhancing lifestyles – across diversities and demographics. Arvind's vision is to enable people to experience a better quality of life by providing enriching and inspiring lifestyle solutions. Arvind has a strong focus on Research & Development for process improvement, new product development, cost reduction and sustainability. Arvind has registered 22 global patents for environmental solutions. Arvind vies for continuous product modification and enhance flexibility of the production process.

"Fundamentally Right" is Arvind's bespoke approach to sustainability which focuses on input management rather than tailpipe intercessions. It systematically embeds sustainability across their six key inputs viz. Cotton, Water, Chemicals, Energy, Money and People, thereby ensuring that they produce more value while consuming less resources. Arvind's notion of an inextricable link between the society and the corporation drives its sustainability measures.

Arvind's policies, practices and processes are geared to not only optimise utilisation of these resources, but also nurture their source and thereby ensure that they remain in abundant supply. Focus is on managing, enriching and getting these inputs fundamentally right and thereby making the business sustainably sound.

Arvind Envisol

Arvind Envisol Pvt. Ltd. (Envisol) is a Lalbhai group company operating under the brand umbrella of Arvind Ltd. Established in 2011, Arvind Envisol, a 100 per cent subsidiary Arvind Ltd., is a water recycling solution and technology provider. It is in the field of Mechanical Vapour Recompression based evaporators, crystallizers and special grade of Multi Effect Evaporators. The inspiration to set up the subsidiary came after Arvind set up its Santej plant in Gujarat way back in 1997 in which the company had installed a one-of-its-kind zero liquid discharge (ZLD) plant for effluent treatment of 10 MLD capacity, which was then the largest in Asia.

Arvind Envisol began by consulting for setting up liquid effluent treatment and recycling plants. Going forward, it covered the entire gamut, from designing to commissioning of plants. Realising that it was an overcrowded market, Arvind decided to be a technology-driven company and created differentiation by providing cost-effective solutions to the industry, which could only have been with niche technologies.

The group has diversified business interests in Textile, Chemicals, Telecommunication, Real Estate, Heavy Engineering, Water & Wastewater Treatment and Engineering Consultancy for Power sector. With revenues in excess of ₹6,000 Cr. Arvind Envisol has witnessed a strong pull from Indian and international market and has grown at a CAGR of 70% over the last three years

Envisol focusses on providing solutions based on operating cost, life cycle economy, efficiency and reliability. It aims to be the premier technology provider to save or recycle water. Its mission is to build long term relationships with its customers and provide exceptional customer services by pursuing business through innovation and advanced technology. Its formidable client list includes names like PepsiCo, Coca-Cola, IndianOil, Jindal Steel & Power, JSW, Titan, Zydus, Raymond, and TVS, among others.

Santej Plant – A Zero Liquid Discharge since 1998

Rated as the most energy efficient textile unit in India by the Ministry of Textiles, the Santej unit is equipped with a Wastewater Treatment Plant, which recycles up to 98% of the effluent (Arvind Envisol Sustainaibility Report 2014-16). Thus, the net withdrawal of the water from bore wells is limited to evaporation and consumption losses. Once it was realized that the quantum of water conserved could no longer be enhanced, the focus shifted to conserve the amount of energy used to conserve water. The plant has introduced a slew of technologies and process that make water conservation more energy-efficient. At Santej, during 2015-16, although the production volumes increased during the reported period, but the total freshwater consumption did not cross FY 2013-14 levels (Exhibit 7). The plant was able to produce more using less water. It recorded a CAGR of 9% in the use of recycled water between FY2014-16

Zero Liquid Discharge

Zero Liquid Discharge (ZLD) is a wastewater treatment process that is developed to completely eliminate all liquid discharge from the system. The goal of ZLD system is to reduce the volume of wastewater that requires further treatment, economically process it and produce a clean stream suitable for reuse. Companies have begun to explore ZLD because of ever-tightening wastewater disposal regulations, company mandated green initiatives, public perception of industrial impact on the environment, or concern over the quality and quantity of the water supply.

ZLD involves installation of facilities and systems that involves taking in of industrial effluent, permeate recycling and conversion of solute (dissolved organic and in-organic compounds/salts) into residue in the solid form by adopting method of concentration and thermal evaporation. ZLD is recognized and certified based on two broad parameters that is, water consumption versus waste water re-used or recycled (permeate) and corresponding solids recovered (percent total dissolved / suspended solids in effluents).

ZLD essentially refers to an approach underlain by the reduce – reuse – recycle principle. It is not possible to attain complete recovery of the influent water as some is inevitably evaporated in the process, but the ZLD method maximises the treatment and recycling of wastewater and minimises the demand for freshwater to that of make-up water. The benchmark in India is held to be a loss of as little as 3% of the water; between 85 and 95% efficiency seems to be the norm (Sustainability Outlook, 2015).

ZLD Working

The first step of the ZLD process involves pre-treatment such as pH adjustment, antifoam and/or antiscalent, necessary to keep control of the feed water, minimise energy consumption and fouling of the RO membranes. A sand filter is used to trap suspended solids. The secondary treatment involves passing the waste water through membrane filters including reverse osmosis (RO) in several stages to remove dissolved solids including dye fixation salt. The RO membranes are mostly combined with micro, ultra and/or nano pore size filters. So far it has much in common with desalination. The permeate (clean water) is recycled back to the process and the concentrated filter-reject, also known as brine, undergoes 'reject management' by way of evaporation and crystallisation. The resulting condensate water is recycled. The wet sludge (slurry) may go through a filter press and/or different evaporation methods.

The ZLD method leaves a solid waste by-product – dry sludge, often referred to as mixed waste salts – that contains high levels of hazardous chemicals and heavy metals. The dry sludge is either used as fuel in cement kilns or middlemen are contracted to handle all the sludge as per the Hazardous Waste Rules of 2008. However, this by-product remains a major challenge. It is often dumped to cut costs, littering the landscape and causing secondary impacts on soil and groundwater. The weak link, as so often, is the law enforcement.

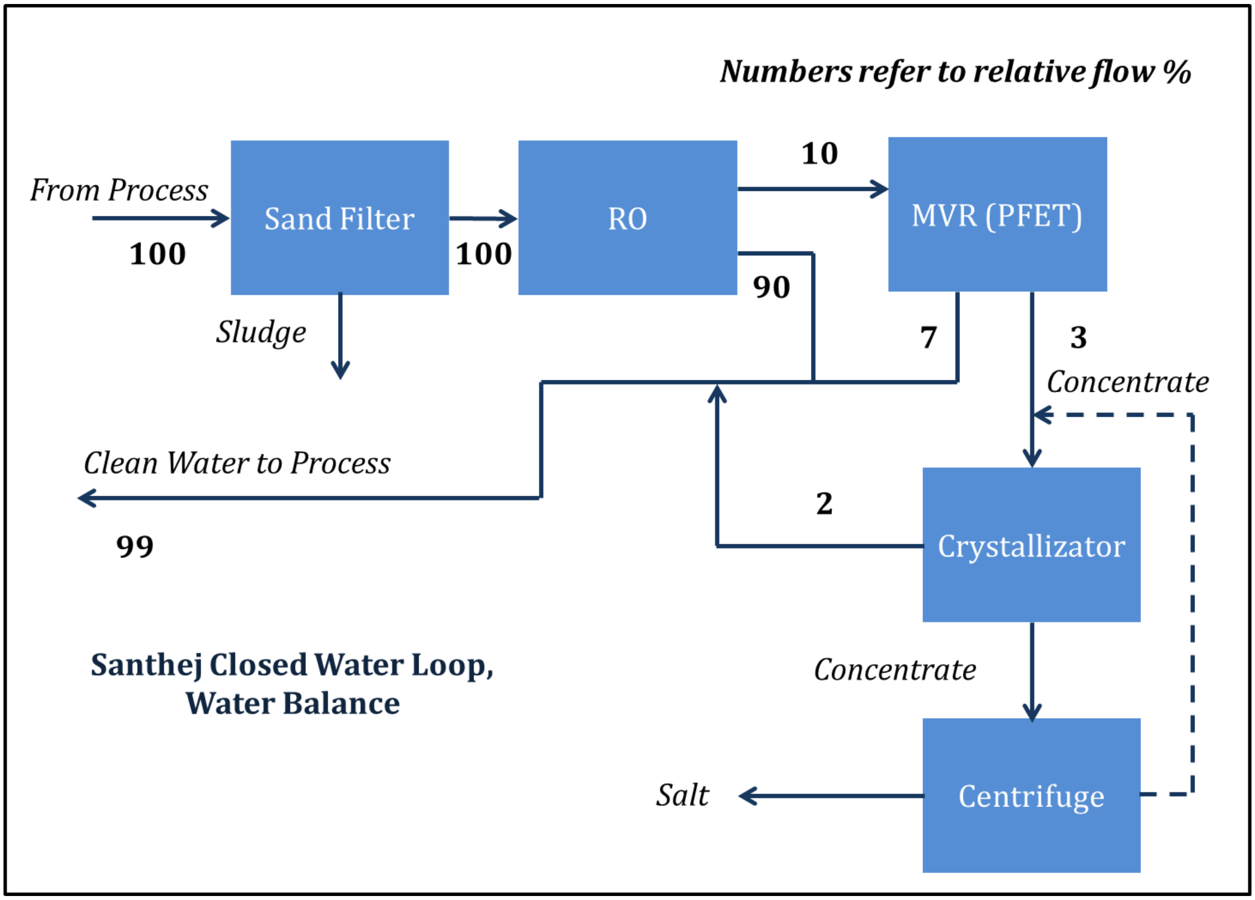


Figure 1: Santhej Closed Water Loop, Water Balance

There are several ways of optimising the end-result for ZLD. The components must always be tailor-made to local conditions, based on a compositional analysis including the volume and quality of influent water and its fluctuation over time, and air humidity. The crystalliser process can use a forced circulation centrifuge, from which recovery of sodium sulphate salt (Glauber's salt, Na_2SO_4) is done for recycling in the dyeing process. Crystallisation, for the final solid – liquid separation, can take place in multiple stages.

At the heart of ZLD lies a simple process of evaporation. Evaporation is the most efficient technology that works on almost all effluents. From a technological point of view evaporation is an ideal method for purification of industrial effluents, process waters and landfill leachates for the following reasons: (1) All non-volatile substances can be separated completely (Exhibit 13), (2) Water recovered from the effluent stream is of high quality, (3) Evaporated water (distillate) can, as such, in most cases be reused in process or discharged into the nature, (4) Harmful solids can be concentrated to a manageable amount for appropriate disposal, (5) Valuable solids can be recovered and reused.

However, the main challenge with evaporation is that it is an energy intensive process. The crucial evaporation stage can employ either of the following techniques: spraying, falling film, multiple effect evaporation (MEE), mechanical vapour recompression (MVR), and/or solar evaporation pans on the ground. Efficiency and power consumption differ between those methods and they are often used in combination. MEE was considered as best practice at large units with Individual Effluent Treatment Plants (IETPs). However, it consumes a lot of energy.

ZLD involves high capital expenditures as well as running costs. The latter, in particular, is high because the RO reject management is extremely energy-intensive, membranes have to be replaced regularly, and technically skilled staff commands higher salaries. A tertiary treatment system with only RO can recover up to 80% of its liquid waste streams. Adding various evaporators and crystallizing steps that are necessary to capture the last 20% and deal with the concentrate was earlier estimated to double costs. In new factories with modern optimization and full recovery of water, heat, salts, and chemicals, the additional cost need not be markedly higher. However, interest rates, government subsidies, influent material prices and energy costs contribute to determining economic feasibility.

Salient Features of Santhej Plant

Setup in 1997, Santej Plant is a 17 MLD (million litres per day) plant. Its Zero Liquid Discharge system is based on a patented Polymeric Film Evaporation Technology (PFET), which Arvind acquired from a Finland-based company Chemitech in 2012. They also acquired manufacturing operations and a branch office in Chennai. In addition to buying the Indian operations, Arvind also owns over 22 patents. The PFET technology developed over 12 years has one of the lowest operating costs in the world and has now been adopted by more than 60 plants.

Energy source of the system is the latent heat released when the vapour evaporated from wastewater is condensed. This vapour is used as the heating medium after it is compressed and temperature is increased using a high speed centrifugal fan as the vapour recompressor. Also, unlike MEE, PFET, is based on mechanical vapour re-compression technique, and is one of the world's most economical, sustainable, highly effective and fully automated evaporation technology. (Exhibit 9)

In most of the conventional plants, heat exchangers are made out of high-end metals, which are highly costly for zero discharge applications and are also prone to scaling and corrosion. The scaling needs to be removed physically, which ends up damaging the heat exchanger tubes over the long term and which in turn also increases the life cycle cost. The power and steam consumption too is very high in the case of metal-built heat exchangers.

The basic design of the heat exchanger in the technology acquired by Arvind Envisol is completely different as it is made out of polymeric film, which is essentially a plastic material. Hence, its capital cost, the replacement cost as well as the life cycle cost is very low and it is also very easy to handle. In addition, it operates at a very low ΔT of $2.5^{o}C$ due to which the efficiency of the system is very high. While conventional systems would need almost 280 kg of steam for evaporating one kg of water, this technology would need just 10 kg of steam – a straight reduction of operating cost by more than 330 Rs/m^3.

Envisol PFET saves upto 80% energy for ZLD system as compared to any other prevailing technologies (Exhibit 10). Low energy consumption is due to lower differential pressure and temperature required in their technology. It takes care of the solids in wastewater that are to be removed or recovered before release, which in turn ensures that the cleaned waste water is completely harmless. The chemical free process inside the heat exchanger, with the reduced number of stages in the process, makes the treatment system more conducive to the environment as well. Combination of PFET system with crystallizer unit results in complete separation of liquid, i.e, pure water and solids, i.e, crystals. PFET allows convenient retrofitting in existing schemes in order to derive maximum advantage over MEE. It lowers the capex of boilers as PFET system requires a much lesser capacity boiler. It is less prone to scale and corrosion in comparison to metals as in case of MEE. Also, cleaning process is easier.

Envisol PFET is proven in the manufacturing process. Utilization of their evaporation technology can significantly reduce cost of production. Envisol PFET also has in-process applications in industries such as Milk, Fruit Juices, Volatile Fatty Acid, Metals - Zinc, Nickel and Silver, etc.

The Way Forward

With the growing environmental concerns with every passing day, Mr. Dinesh Yadav, Director, Arvind Envisol was sure that any technology for liquid and solid waste or even air pollution would gain significance. However, the need of the hour was to offer robust and cost-effective technologies. No good technologies were available for sustainable disposal of solid waste generated in towns and cities, which made the segment very exciting in terms of future prospects. The market for zero discharge too had not been fully unlocked yet. This also left a lot of room for growth. With pollution pressures growing, the market was surely going to expand in the future and Envisol should be prepared to capture it.

Envisol is now also vying for spreading its branches across the globe with its strong foundation in India. It aims to create a global impact with its breakthrough ZLD technology. Envisol has been expanding its presence in the African market. The Ethiopian Government has roped in the company to set up zero liquid discharge (ZLD) plants across the country. It has a growing international presence with key installations in South Africa, Saudi Arabia, Singapore, Japan, Spain, Sweden, Hungary, Finland, France and the Netherlands. In Ethiopia, Envisol bagged the first international order on the African continent in 2015 for ZLD solution in textiles. The company has set up a ZLD water treatment plant at Hawassa Industrial Park, with a capacity of treating 11 million wastewater per day.

"We believe that if this economic progress is to continue, we need to ensure that the environmental impact of this Industrialisation is reduced or minimised. I am happy that Arvind Envisol, one of the world's most innovative water management companies, is partnering with us not only to set up ZLD plants in our mega industrial parks but also working with Ethiopian Universities to develop curriculum on environmental sustainability and technology transfer," said Dr. Arkebe Oqubay, the Special Advisor to the Prime Minister of Ethiopia

Exhibit 1: Lalbhai Group of Textile Companies

- The Arvind Limited, Denim, Ahmedabad
- The Arvind Limited, Santej Shirting,Knits,Khakhis,Denims
- The Arvind Ltd , Voils, Ahmedabad
- Arvind Brands Limited
- Arvind Intex Ahmedabad
- Asoka Cotsyn Ahmedabad
- Asoka Spintex Ahmedabad
- Anmol Spintex At Santej Complex
- Achal Spinning At Santej Complex
- Anveshan Textiles At Santej Complex
- Ankalesh Textiles
- Abeer Spinning , Weavings Santej Complex
- Arvind Ltd – Advance Materials, Santej Complex
- Arvind-Pd Composites Pvt Ltd. Vadsar
- Arvind-Og Non-Woven Pvt. Ltd, Dholka
- Arvind Ltd-Composites
- Arvind Ltd-Andrew India

Exhibit 2: Water Stress by Country: 2040

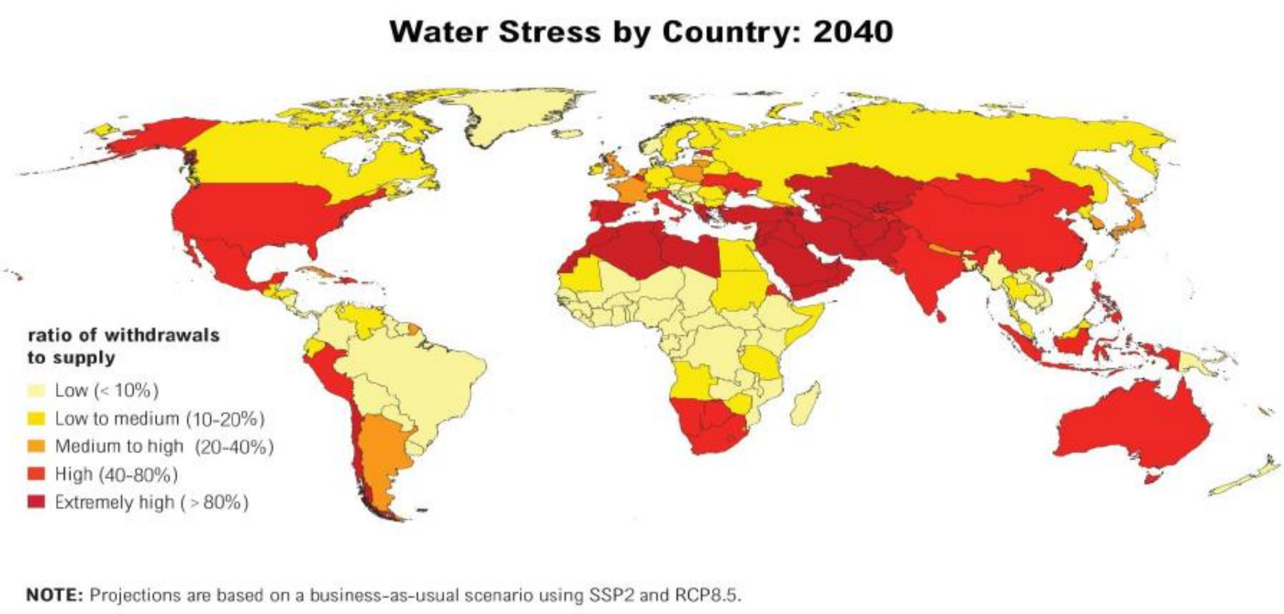


Exhibit 3: Location of Santhej Plant

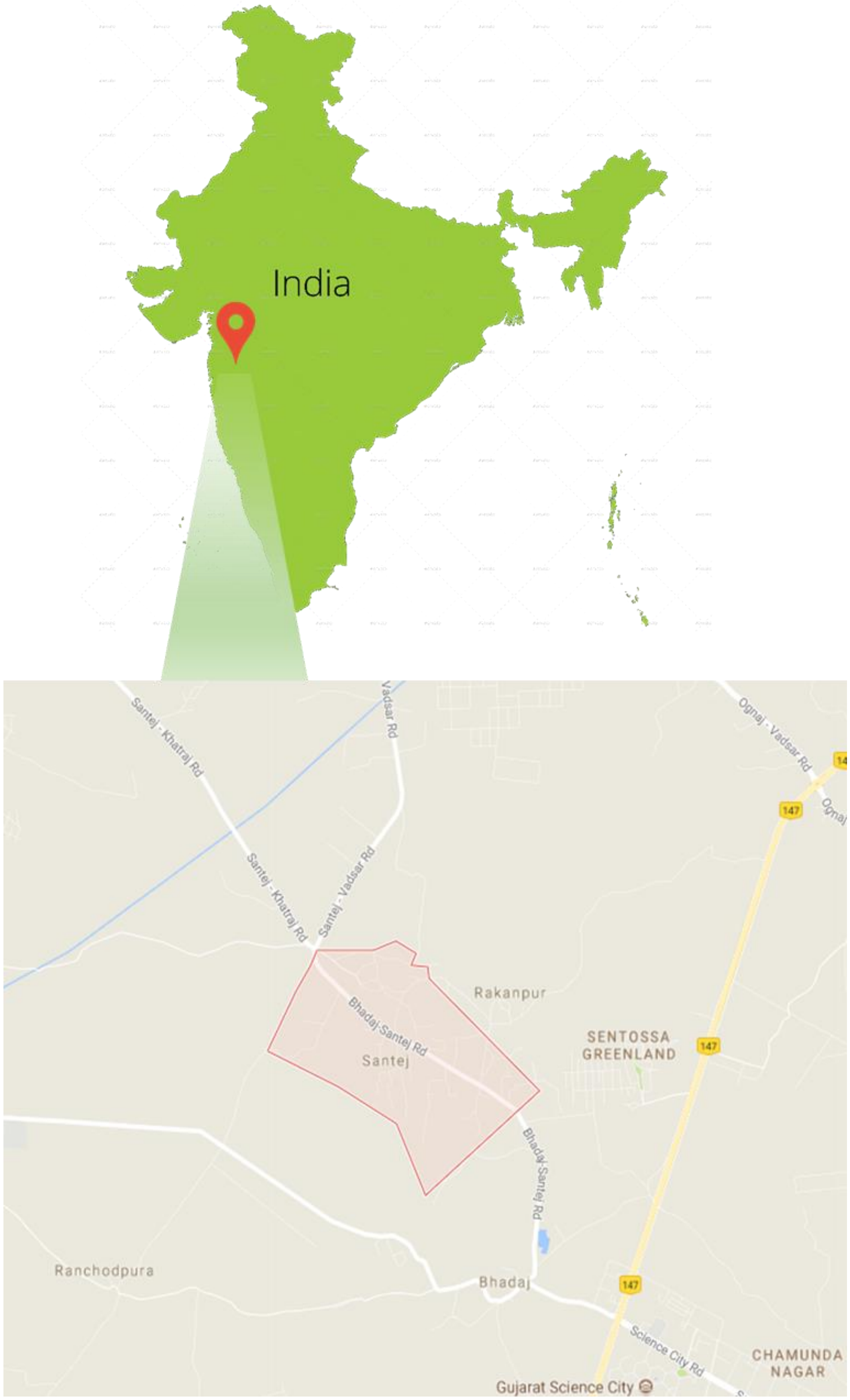


Exhibit 4: 17 MLD ZLD Plant at Arvind Limited, Santej

Exhibit 5: Basic Schematic of ZLD Technology using Thermal Evaporation

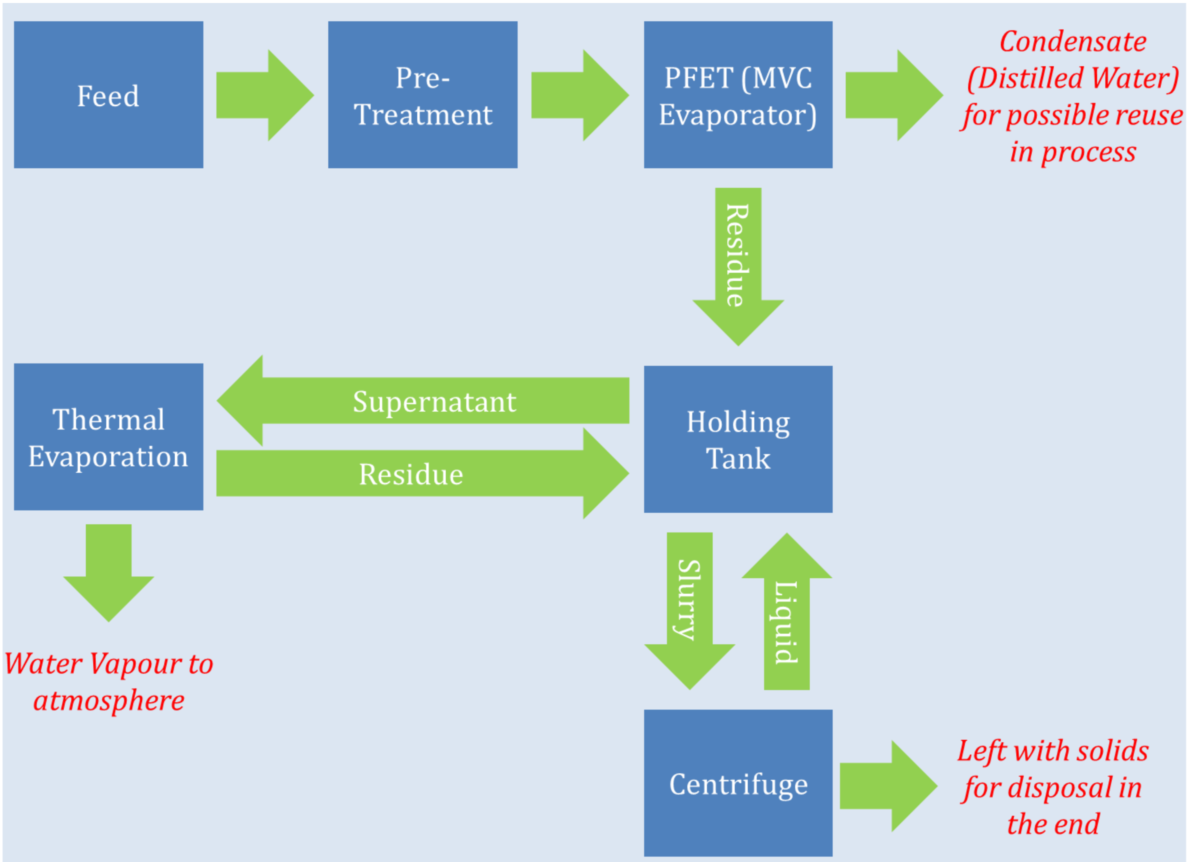


Exhibit 6: Dissolved Substances removed by various Technologies

3 = high separation 2 = moderate 1 = low separation

Note! pH may change rating considerably

	Pollutant to remove															
Dissolved substances	Cations (e.g. heavy metals)	Monovalent ions	Multivalent ions	Complexed ions	Anions	Monovalent (e.g. chloride)	Multivalent (e.g. SO_4^{2-})	Ammonium	Organic compounds	Carbohydrates	Proteins	Alcohols	Solvents (e.g. hydrocarbons)	Pigments	Pesticides	COD in general
Technology																
Adsorption (e.g. activated carbon)		1	1	1		1	1	1				1	3	3	3	1
Ion exchange		3	3			3	3	2								
Chemical precipitation		1	2	3			2				2					1
Membrane technologies																
Ultrafiltration (UF)											2				1	1
Nanofiltration (NF)			2	3			2			2	3			2	3	2
Reverse osmosis (RO)		3	3	3		3	3	1		3	3	1		3	3	3
Electrodialysis		3	3	3		3	3	3								
Evaporation		3	3	3		3	3	2		3	3			3	3	3
Distillation								3				3	3			
Flotation		1	1	2			2				2			1		1
Air/steam stripping								3				2	3		2	
Electrical methods																
Electrolyse		3	3	3												
Electro coagulation		1	3	3			2				2			2		2
Biological treatment		1	1	2		1	1	2		3	3	3	1	2	1	2

Exhibit 7: Water Treated & Consumed for Woven & Knits Process at Santhej Plant

Units (in '000 m^3)	FY 13-14	FY 14-15	FY 15-16
Total Water Treated & Reused in Process	4,654	5,036	5,550
Total Freshwater Consumption	1,541	1,465	1,537

Exhibit 8: Schematic of ZLD Plant

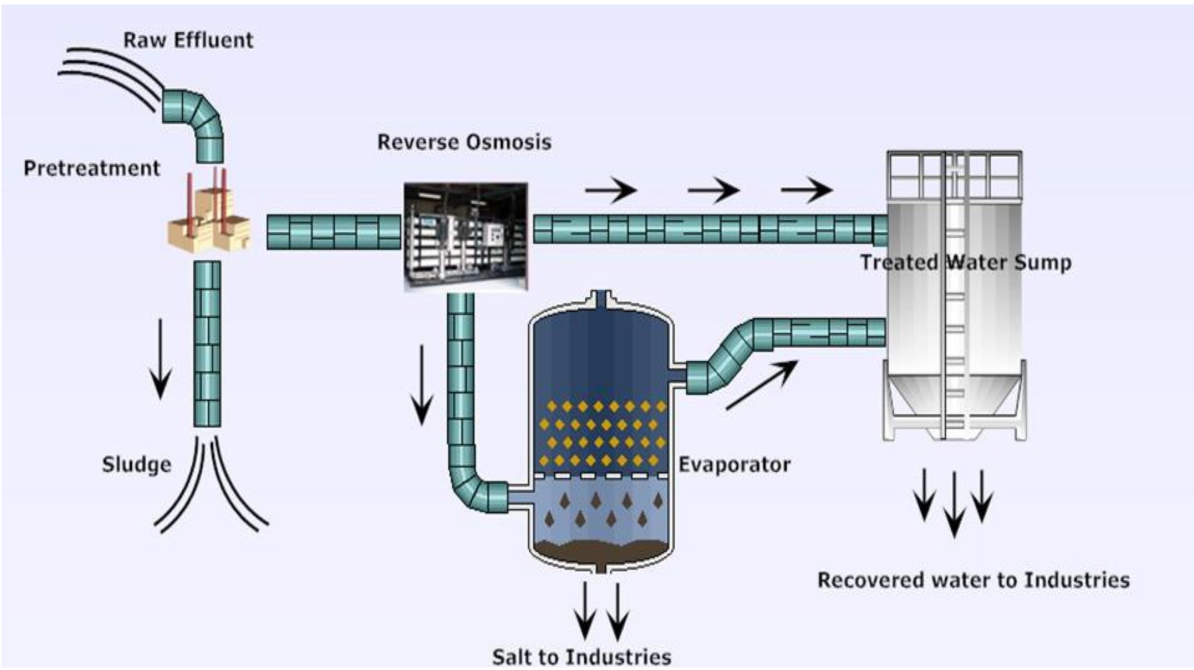


Exhibit 9: Working Principle of MVR Evaporator

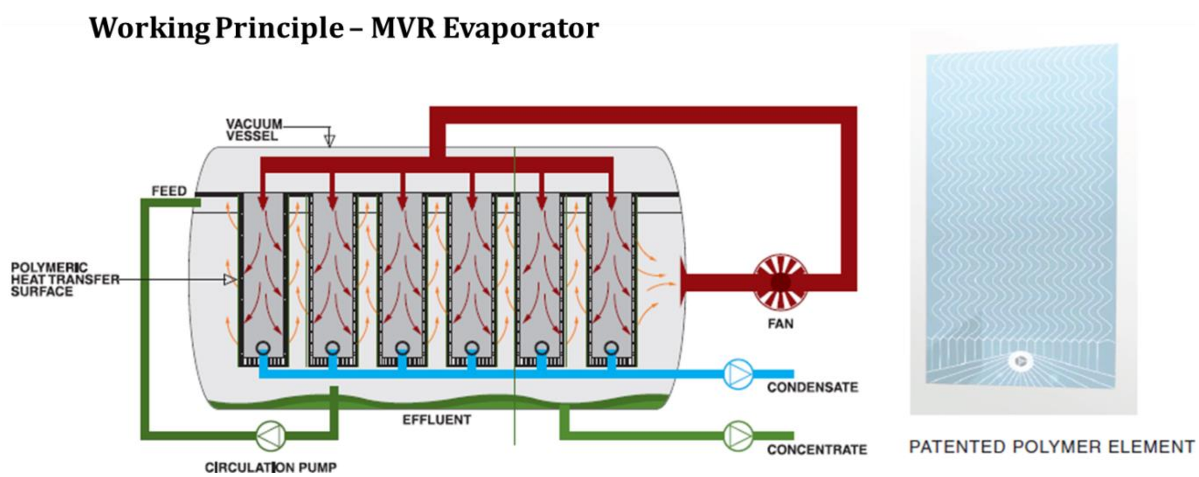
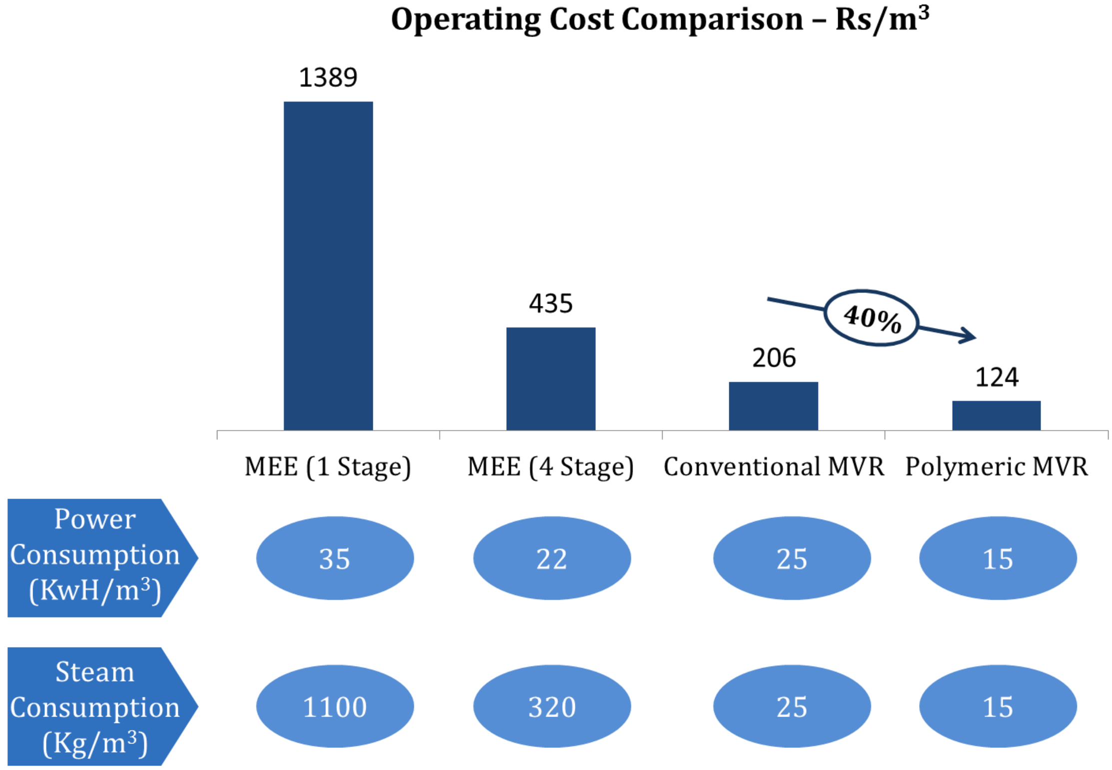


Exhibit 10: Operating cost comparison for various evaporating techniques



Source: Company Presentation

Exhibit 11: Benefits of Polymeric Heat Exchanger over Conventional Heat Exchanger

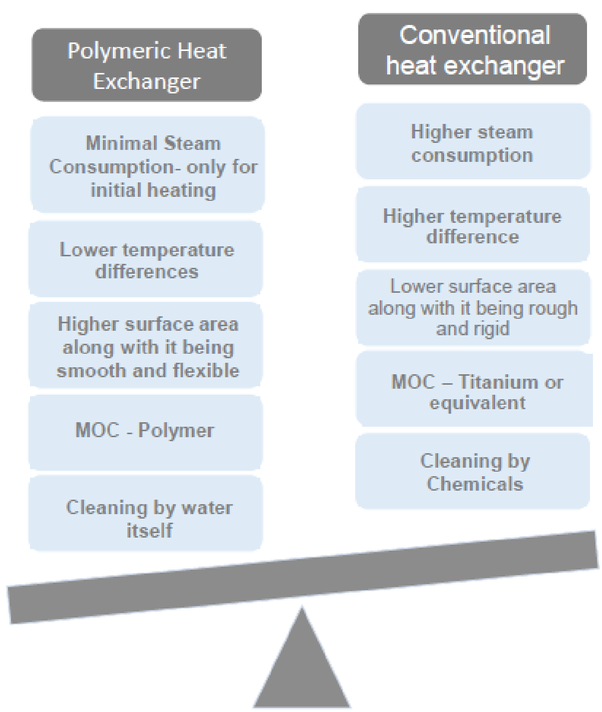


Exhibit 12: Summary of the wastes generated during textiles manufacturing

Process	Source	Pollutants
Energy production	▪ Emissions from boiler	▪ Particulates, nitrous oxides, sulphur dioxide
Coating, drying and curing	▪ Emission from high temperature ovens	▪ Volatile organic components
Cotton handling activities	▪ Emissions from preparation, carding, combing, fabrics manufacturing	▪ Particulates
Sizing	▪ Emission from using sizing compound	▪ Nitrogen oxides, sulphur oxide, carbon monoxide
Bleaching	▪ Emissions from using Chlorine compound	▪ Chlorine, chlorine dioxide
Dyeing	▪ Disperse dyeing using carriers Sulphur dyeing Aniline dyeing	▪ Carriers
Printing	▪ Emission	▪ Hydrocarbons, ammonia
Finishing	▪ Resin finishing heat setting of synthetic fabrics	▪ Formaldehyde carriers
Chemical Storage	▪ Emissions from storage tanks for commodity and chemicals	▪ Volatile organic components
Wastewater Treatment	▪ Emissions from treatment tanks and vessels	▪ Volatile organic components, toxic emissions

Exhibit 13: Filtration Spectrum of Separation Methods

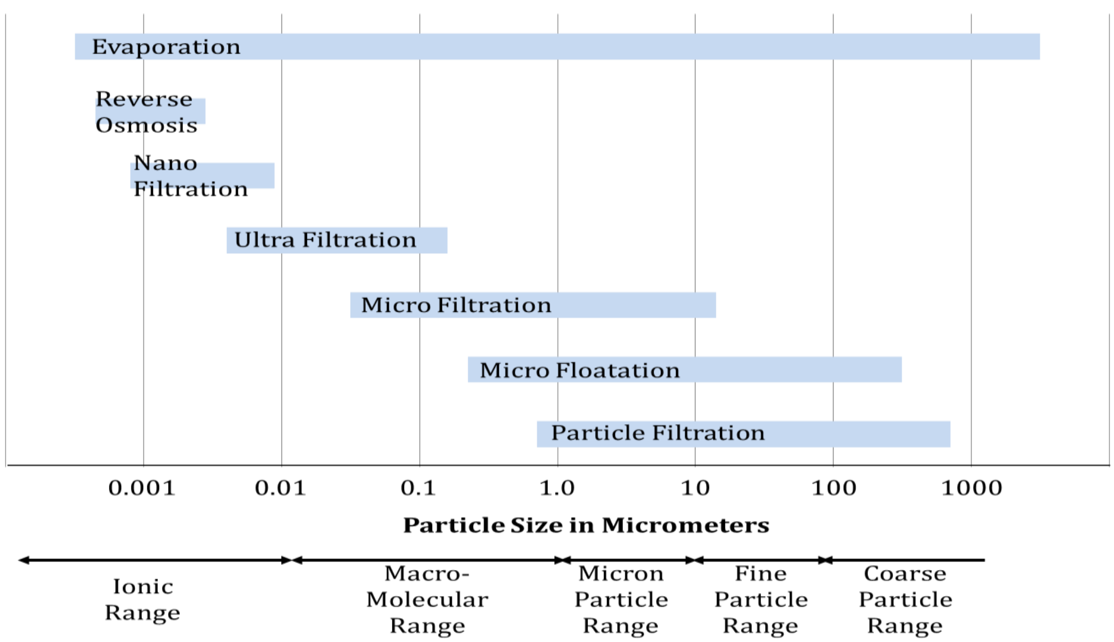


Exhibit 14: Various Sustainability Initiatives at Santhej Plant (Arvind Mills Sustainability Report)

Action	Conservation
Replacement of 8,796 nos. 36-watt TFL with 18-watt LED lamps	**3 mn** kWh/Annum
Replacement of 1,096 nos. 250-watt, MV Lamp fittings with 120-watt LED	**1.4 mn** kWh/Annum
Installation of VFDs at various locations and processes	**VFD with Pressure Transducer** At three Auto Coner machines: **2.59 lac** kWh/Annum conserved **VFD without Pressure Transducer** At Pressure Dryer of Dyeing Machine: **0.5 mn** units/year conserved
Replacement of the existing pumps with new, energy-efficient pumps	**48.8** kWh/Day
Installation of additional pumps with better ratings at the shirting pump house	**7.65 lac** kWh/Annum
Introduction of dynamic rinsing process (VIVO & miDori®) in the yarn dyeing section	Power savings of **0.07** kWh/kg of fabric rinsed Steam savings of **0.5** kg/kg of fabric rinsed
Implemented Karl Mayer dyeing and sizing technology in the indigo dyeing machines such that two warp sheets are dyed & sized in one passage	Power savings of 30% **30%** and steam savings of **20%**

Action	Conservation
Elimination of two cooling tower pumps by installing a HR PHE in the Gas engine	**3.78 lac** kWh/Annum
Installation of two energy-efficient compressors in the loom shed	**8.1 mn** kWh/Annum
Replacement of existing pump sets with energy-efficient pump sets in the Central ETP	6 nos. 30 kW pump sets replaced by 2 nos. 55kW pump sets - resulting in energy savings of **2.51 lac** kWh/Annum 6 nos. 110 kW pump sets replaced by 3 nos. 160 kW pump sets - resulting in energy savings of **1.4 mn** kWh/Annum
Installation of O_2 sensor and insulation improvement in steam boilers	Annual coal savings of **2,594** tonne
Installation of Economizer in 20 TPH boiler	**1,689** tons of coal saved equivalent to **9.83 lac** Kcal
Temperature optimisation of approximately 10°C at the Thermopack machine	Gas consumption reduced by **9.2%**

SANTEJ UNIT RECEIVED TOP HONOURS AT THE NATIONAL ENERGY CONSERVATION AWARD FOR CONSERVATION EXCELLENCE IN THE TEXTILE SECTOR - SECOND YEAR IN A ROW.

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