

WORLDWIDE GREEN GARMENT FACTORIES ANALYSIS								
NAME:	REMI HOLDINGS	ENVOY TEXTILES	PLUMMY FASHION LTD.	VINTAGE DENIM STUDIO	ESQUEL TEXTILES	MAS INTIMATES	BRANDIX-SEEDUVA	MIHILA
ACHIEVEMENT:	Highest score ever achieved by a garment industry till date	First Denim Industry in the World, have achieved USGBC certified LEED platinum category certification.	Highest LEED Scoring Knitwear Factory	first LEED Platinum-rated garment factory	Largest shirt manufacturer in the world; Ranked 2 nd best apparel company in China for its green supply chain	Claims to be the world's first clothing factory powered solely by carbon-neutral sources.	First apparel manufacturing facility in the world to be rated Platinum	First custom built eco-friendly factory in the world
GROUP: YEAR OF ESTABLISHMENT	Bitopi Group 2014	Envoy Group 2005	- 2009	ABA Group	Esquel Group	-	Brandix Group	Hirdaramani Group 2008
TURNOVER		\$75 million	-		US\$1,398 MILLION in 2014			
AREA	2,50,000 sq. ft. 48 Acres		5.1 acres	300,000 sq. ft.		10, 000 sq. m.	1,30,000 sq. ft.	
PRODUCTS	Denim bottoms, trousers, long pants, short pants, formal fine pants etc.(WOVEN ONLY)	Denim bottoms	Knit products - Lingerie	Denim Products				
BUYERS	H&M, Decathlon, Benetton and VF Corporation.	Marks & Spencer, GAP, Wrangler, Tesco and Next	Next, Zara, Aldi, Falabella, Family Dollar, Mango		Marks & Spencer, Ralph Lauren, and Tommy Hilfiger			M&S, Tommy Hilfiger, Levi's, CK, Uniqlo, Addidas, Nike, Pepe jeans
COST OF ESTABLISHMENT	USD 16.7 million				US\$150 million investment we have made over the last 10 years (2005-2014) toward managing our water and energy consumption	USD 2.66 million	USD 3 million	
PRODUCTION CAPACITY	Daily production capacity of 15,000 pieces, produces 8,000 apparel pieces/day; 4,50,000 pcs/month	Produces four million meters of fabrics a month and uses 10 percent of the fabrics for making garments in its factories.	40,000 pcs/day	1.4 million pieces per month	110 MILLION shirts produced in 2014			
WORKERS/WORKFORCE:	1,500 workers	1,500 workers	2000 workers	2376		1300		
LEED CERTIFICATION STATUS:	PLATINUM LEED BD+C New Construction, July 16	Platinum LEED O+M March2016	PLATINUM LEED BD+C New Construction	Platinum LEED New construction	Platinum LEED Certified	Platinum LEED New Construction BD+C	Platinum LEED O+M	Gold certified
LEED POINTS:	97/110	80/110	92/110	90/110	93/69	76/85		
FEATURES:	<div>1. Built with the pre-fabricated steel structure</div> <div>2. System accommodates cutting, sewing, washing, waste management, a child daycare center, a medical center, canteen and office within its premises.</div> <div>3. 10 High Volume and Low Speed (HVLS) fans: -Provides healthy and comfortable working atmosphere -Distributes the cooling air from air cooler</div> <div>4. Water Treatment Plant -Zero Liquid Discharge (ZLD)</div> <div>5. Thermo Oil Heater with thermal efficiency of 85%</div> <div>6. 67 Prismatic skylights to use daylight in the factory - Reduction of mildew or mold buildup</div> <div>7. Incineration boiler- first of this kind of technology in Bangladesh</div> <div>- The 'Jhur'—one kind of wastage of garments is used in operating the boiler</div> <div>- All solid Waste will be burnt in this boiler and produce heat energy.</div> <div>- Long sustainability</div> <div>8. Rooftop Solar Panel</div> <div>- Capacity: 125 kW</div> <div>9. Building Management System</div> <div>- Total factory status & energy consumption monitoring</div> <div>- Ensures proper energy utilization through censoring</div> <div>10. Automated washing & dryer machine</div> <div>- Washing capacity-30,000 pieces /day</div> <div>- Uses thermal oil instead of steam</div> <div>11.Indsie Garden</div> <div>Acts as a focal point of relaxation for workers amidst their busy working day</div> <div>12. Efficient Treatment Plant</div> <div>13. Unique hanger system</div> <div>14. Condensate Recovery System</div> <div>15. Installation of LED Tube</div> <div>16. Lights & energy efficient ceiling fans</div> <div>17. 45 Rain Water Harvesting & Percolation pits</div> <div>18. Installation of CO2 sensor & demand control ventilation</div> <div>19.Garden Roof</div> <div>20. Medical services in the treatment centre for upto 35 workers</div>	<div>1. Sustainable site: Eco-friendly building exterior; 26% landscape, only 15% hardscape area reducing heat difference between inside & outside</div> <div>2. Uses solid waste to compost fertilizer for farming</div> <div>3. Alternative commuting: Zero carbon emission in personnel movement</div> <div>4. Min. skylight emission: energy saving is 15000 cm³/year</div> <div>5. 12hrs of production without artificial light</div> <div>6. Energy mgmt- system (EMS) - monitoring energy consumption</div> <div>7. Energy saving in air compressor is 1,20,000 cm³/year</div> <div>8. Cool air processing ducting</div> <div>9. Waste heat driver chillers- runs completely on waste heat generated from generator</div> <div>10. Outdoor air delivery diffuser</div>	<div>1. 100% open area</div> <div>2. 100% air cooling factory</div> <div>3. All the essential facilities and amenities are located within 500 meters, including market, school, mosque, and bus stops</div> <div>4. The site also provides secure bicycle parking facilities and encourages the use of non-fossil fuel transport.</div> <div>5. A rainwater management plant prevents rainwater from leaving the site. Rain water is collected in a harvesting tank and re-cycled for toilet flushing and irrigation purposes.</div> <div>6. Installed roofing materials with a high Solar Reflection Index of 79 and Hardscape areas with light colour reflecting paving blocks to reduce heat island effect</div> <div>7. More than 50% land area of the project has been retained as green space which exceeds the requirement of USGBC.</div> <div>8. PFL has installed carbon dioxide sensor to monitor the level of CO₂ in the occupied areas. Depending on the CO2 level feedback from sensors triggers fans to regulate fresh air flow.</div> <div>9. FSC certified wood and low VOC paints have been used to minimize impact on environment.</div> <div>10. More than 20% (By Cost) of local materials has been used for construction to support the local economy and to reduce the environmental impact resulting from transportation.</div> <div>11. More than 20% materials used for construction of this project have been recycled. This has done to reduce the environmental impact resulting from extraction and transport</div> <div>12. PFL has selected machines with very low energy servo motors to reducing power consumption by 50% over conventional factories. State of the art LED lights further reduce the energy demand by 80% over incandescent equivalent. This reduction in waste heat reduces the load on cooling systems and creates an excellent working environment.</div> <div>13. The factory has designed the windows and louvers in a way to use maximum daylight. Moreover, 44 signature series prismatic dome skylights by Sunoptics, USA has been installed for ambient lighting during the day time.</div> <div>14. A 65 KW capacity solar power plant with highly efficient mono crystalline panels is a key component of our green strategy. The facility produces least 110 MWhours energy every year, 13% of total power required.</div> <div>15. PFL has installed efficient water outlet fixtures to reduce the use of water by 60%. Auto sensor urinals, dual flush water closets and faucets with a low flow rate of 1.5 litre/minute have been specified to comply with US-EPA (US Energy Policy Act) and ISO14001.</div> <div>16. Irrigation water demand has been reduced by 80%. Landscaping includes drought resistant locally adapted plant species which do not require regular irrigation. If limited irrigation is required the need is met using recycled non-potable rainwater.</div> <div>17. In PFL no light is directed to the night sky to reduce light pollution. The architects also specified exterior lighting that is automatically controlled to turn off during non business hours. This meets the Full Cutoff IESNA Classification.</div> <div>18. More than 50% of the total site has been kept as open space to restrict the footprint of the factory. A lush green environment enhances the natural beauty of the landscape and creates a stress free experience.</div>	<div>1. Installed a stormwater management system</div> <div>2. Water-efficient landscaping and fixtures</div> <div>4. 100-kilowatt photovoltaic panel</div> <div>4. The facility sends no waste to landfills</div> <div>5. Site design geared to controlling erosion and sedimentation</div> <div>6. Heat island reduction</div> <div>8. Use of non-fossil fuel vehicles</div> <div>8. Monitors and controls to regulate water and energy consumption as well as carbon dioxide emissions and other chemicals and pollutants.</div>	<div>1. US\$33 million installation of reverse-osmosis technology that turns wastewater into clean, drinkable water</div> <div>2. 3% of their annual sales budget funds research and development. This enhances their capabilities in developing eco-solutions.</div> <div>3. Developed patented Esquel Durable Press (EDP) wrinkle-free treatment. Engineered new process introduced at the fabric-finishing stage, using less water and energy while eliminating a more time-consuming process at later stage.</div> <div>4. Installed one of China's textile industry's largest wastewater treatment plants, capable of processing up to 38,000 tons/day</div> <div>5. Quality of treated water ranks well above required standards. Significantly reduces processing odors and completes treatment with a separate process for effluent sludge dewatering and drying, ready for disposal by approved waste operators. Treatments are monitored and tracked in real time to enhance transparency and benchmark activities for future improvements</div> <div>6. In 2011, with supplier collaboration, they developed and installed a reverse-osmosis recycling system capable of processing 5,000 tons of wastewater per day into potable quality that is subsequently reuse in production</div> <div>7. The GHG Protocol and ISO 14064 are used to track and measure emissions.</div> <div>8. Use of Low-sulfur coal, desulfurize waste lye onsite and use electrostatic precipitation to reduce air pollutants</div> <div>9. Rooftop solar panels, natural lighting and LED light sources are common fixtures at all facilities</div> <div>10. 379,856 hours of training undertaken across their global workforce in 2014</div> <div>11. Eco Wash Innovation</div> <div>12. Garment pretreatment and finishing that uses only biological and biodegradable products.</div> <div>13. Upto 3,000 tons of textile waste are now upcycled into blankets, sports shirt collections and staff uniforms for our customers and recycling partners.</div> <div>14. 2,200–3,000 tons of left-over cotton and fabric have been recycled into blankets, sports shirt lines for retailers and fiber content for a project partner's staff uniforms.</div> <div>15. 30,000–40,000 shirts are distributed annually to needy users globally.</div>	<div>1. Only renewable and carbon-neutral energy sources are used.</div> <div>2. Low energy "evaporative cooling" system used in place of air conditioners</div> <div>3. Light usage is minimized by depending amply on daylight to light the premises and individual sewing machines are kitted out with an LED based task light.</div> <div>4. Rain catchment tanks are used to collect water for non-drinking purposes.</div> <div>5. All sewage is treated by on-site anaerobic digestion sewage treatment facility and bio-gas which is a by product of this will be used in the kitchen.</div> <div>6. Green roof with grown vegetation and cool roofs with high solar reflectivity ensure a cooler interior. Amenities such as relax-stations, picnic areas and a holistic centre ensure better comfort the employees.</div> <div>7. Consumption of potable water is half that of comparable factories.</div> <div>8. To reduce the gray energy in the building, the main exterior walls are made of compressed stabilized earth block manufactured 40 kilometers from the site.</div> <div>9. Because operation is very efficient, the payback period for the extra cost of making the building green is only five years.</div> <div>10. Plant's photovoltaic system is largest in Sri Lanka.</div> <div>SITE DESIGN</div> <div>11. Two-story building with a footprint of only 6,780 square meters, or roughly 15% percent of the site.</div> <div>12. Rare, endangered, and medicinal species were planted as well.</div> <div>13. The pond is designed primarily for retention of irrigation water, decorated with islands and a footbridge, and designed for visitors to walk around it.</div> <div>BUILDING PROGRAM</div> <div>14. The production floors are free from columns and other obstacles so that each production team can arrange its machinery to best suit the garments being made.</div> <div>15. The arrangement of electrical receptacles and lighting fixtures provides the same flexibility.</div> <div>16. Each hall has its own service spaces including mechanics' room, meeting areas, and toilets.</div> <div>SUSTAINABLE APPROACH</div> <div>17. Built partially on stilts, with courtyards, amid lush greenery.</div> <div>18. The facility incorporates an anaerobic digestion system for sewage treatment.</div> <div>PASSIVE COOLING</div> <div>19. Cooling is achieved at the plant primarily by passive design and secondarily by active systems. Passive design measures include the orientation and massing of building volumes, controlled fenestration and ventilation, shading of the building and its surroundings, and thermal mass and solar reflectivity of the facades and roofs.</div> <div>20. Thermal roof load, the largest contributor to heat gain and indoor discomfort in the tropics, is controlled by a combination of green roofs, photovoltaic roofs, and cool roofs.</div> <div>21. Green roofs cover 1,757 square meters of the building.</div> <div>22. They are installed on concrete decks over shortspan spaces in the administrative wing.</div> <div>23. The cool roof is a lightweight metal roof assembled over the longspan production halls. Another passive means of keeping the building cool is to cool the microclimate, or reduce the ambient heat around the building. The heat-island effect around the building is controlled by shading, by covering parking areas, by using lighter, reflective paving around the building instead of dark, heat-absorbent paving, and by shading the courtyards between the building volumes.</div> <div>PRODUCTION MODEL</div> <div>24. Just-in-time manufacturing processes</div> <div>25. The production spaces are designed for inventory-free operation, meaning that the day's raw materials are delivered in the morning and the finished and packed garments leave the floor in the evening. The internal layout is designed to minimize transportation.</div> <div>26. The plant is wireless-network enabled, and nearly all computer users have laptops and mobile phones linked to the company phone system, giving staff the mobility to work anywhere in the facility. Managers are encouraged to work with their teams in small groups on the production floor</div> <div>EMPLOYEE WELL-BEING</div> <div>27. Attractive environment, pleasant outdoor views, thermal comfort, fresh air, and illumination, including natural lighting and task lighting. Large windows are a key part of the design, bringing the green outdoors into all working spaces. Also in the interest of worker convenience, MAS operates chartered buses between the plant and nearby villages. The plant also provides free meals, medical care, and on-site banking. MAS developed "Women Go Beyond" a program to educate and empower women, who comprise 85 percent of the plant's workforce. The facility is OHSAS 18001 certified.</div> <div>INDOOR THERMAL COMFORT</div> <div>28. Production spaces and offices are ventilated and cooled by evaporative cooling units. These units draw in fresh air, filter it, and add moisture to lower the dry-bulb temperature. The air is distributed through a balanced system of ducts and fed into the spaces, which remain under positive static pressure. Indoor air is not recirculated, but extracted by suitably sized exhaust fans to ensure effective moisture and heat removal. The air-exchange rate is about 40 air changes per hour.</div> <div>CONSTRUCTION MATERIALS</div> <div>29. The machine-molded blocks are made of local soil, sand, and locally manufactured cement. The walls require no plaster finish; they are simply sealed with varnish on the interior and exterior.</div> <div>30. Roofing is zinc-aluminum imported from Australia. Windows use imported plate glass and aluminum frames. The building is framed in locally made concrete and steel manufactured from imported billets. Gray energy could have been reduced by reducing structural spans, dividing glazing units into smaller sizes, and using wooden windows instead of aluminum. Floor finishes include polished concrete tile, rendered and cut concrete, tile, and wood. Bamboo is used for window blinds and various forms of sunscreen. Partitions are gypsum board and tabletops MDF. The design team says that no viable greener alternatives are available in Sri Lanka. Topsoil was segregated during excavation and reused later. Stabilizing plants, silt traps, and storm water-collection ponds were used to prevent soil erosion during construction.</div> <div>ENERGY EFFICIENCY</div> <div>31. Aides are illuminated with natural and ambient light, and work areas are illuminated with task lighting – high-efficiency TS tubes and LED lamps mounted on the sewing machines – focusing the correct amount of light at needlepoint.</div> <div>32. Sewing machines with direct-drive servo motors were chosen for energy efficiency.</div> <div>WATER MANAGEMENT</div> <div>33. Rainwater that falls on the cool roofs is collected and used for flushing toilets. The storage tanks and toilets are gravity fed, eliminating the need for pumps. When the tanks run dry during a drought, water is sourced from the park's system. When the tanks become full after prolonged rain, the overflow is piped underground into the pond.</div> <div>34. The plant's two primary energy sources, photovoltaic and hydroelectric power, are renewable and carbon neutral.</div> <div>35. Three electric bikes are used at the plant.</div> <div>36. The plant is equipped with a vacuum-tube system for solar water heating. Water is preheated in the tubes and then heated in conventional boilers. The water is used for brewing tea for all employees twice a day. Methane gas from the sewage treatment plant is collected for firing stoves and ovens in the kitchen.</div> <div>GREEN MANUFACTURING</div> <div>37. The plant strives toward zero waste in landfills. Empty thread cones are recycled, as are paper, plastics, glass, and metal. MAS is collaborating with Marks & Spencer to develop a fabric-defibering system for fabric waste. Fabric scraps currently go to local craftspeople. The company seeks to reduce transport-related CO2 emissions by offering financial incentives for employees who commute by bicycle or bus.</div>	<div>1. New screw-type chiller unit provide energy efficient air conditioning for the entire factory.</div> <div>2. Square ducts were converted to round ducts to reduce distribution loss in air conditioning.</div> <div>3. Sophisticated new LED used as task lights provide light to the sewing machines.</div> <div>4. Direct rainwater is recycled for all use except for drinking.</div> <div>5. A tertiary filtration system and a disinfection process allows the used water to be recycled again for toilet flushing and gardening</div> <div>6.The factory has a solid waste disposal system by recycling or reusing the solid waste it use</div> <div>7. Canteen waste is being composd and contributes to biogas generation.</div> <div>8.An advanced intelligent building management system controls relative humidity and carbon dioxide</div> <div>9. Heat-blocking paving to prevent heat flow into the factory and minimize the use of air-conditioning, an intelligent control centre that monitors all aspects of output, natural lighting wherever possible, highly-efficient LED lighting where required, rainwater harvesting, larger outdoor garden areas (which use 100% organic fertilizers), indoor green patches inside plants, and the electric-powered vehicles for some of the factory's tasks that require transportation.</div>	<div>1. The factory focuses on three key areas - energy consumption, water consumption and waste generation</div> <div>2. The scraps of materials leftover from production are shipped to China, where they are shredded and pulped to be spun and woven in to new products; or sold for car insulation or upholstery.</div> <div>3. Some of the scraps are also "upcycled" which simply means that rather than reformatting and transforming them into something else, the fabric is used in the creation of new garments. In Italian designer Orsola de Castro's opinion, these scraps can be converted into haute couture, thereby saving the resources used for transportation and the energy used for reconstruction.</div> <div>4. Joint venture with Vidullanka on a Hydro Power project in the Kegalle district which contributes close to 4GWh to the national grid annually.</div> <div>5. Seguwantivu and Vidatamunai wind farms and power plants are estimated to contribute approximately 52 GWh to the national grid.</div> <div>6. First apparel factory in Asia to be certified CarbonNeutral® because they wanted to compensate for the environmental impacts created, rather than simply claim energy reduction or waste recycling as our sustainability efforts. The factory's complete carbon footprint has been independently assessed and verified through their sustainability partner – The Carbon Consulting Company (CCC), and by purchasing sufficient carbon credits to compensate for this impact through The CarbonNeutral Company of the UK, they have ensured that they have made complete amends for the greenhouse gas pollution we generate through their operations.</div>
	<div>1. Rainwater harvesting has a capacity worth of 100,000 liters of water, & can save up to 37% of energy.</div> <div>2. ETP treated water is reused in washing, gardening, and toilet flush.</div> <div>3. 4 auto loaded washing machines can wash 25,000 to 30,000 pieces of apparel daily and only two operators run the Turkish machines.</div> <div>4. There are gardens inside the factory especially in the sewing floors which acts as a focal point of relaxation for workers amidst their day surrounded by needles and sewing machines.</div> <div>5. 125 kW solar panels on the rooftops that meet 5% of the total electricity requirements of the factory and there is also a garden on a roof</div> <div>6. HVLS fans keeps the inside temperature of the factory at least 7°C lower than the outside temperature</div> <div>7. WTP recycles 60% of its waste water back to its process.</div> <div>8. Thermo Oil Heater reduces Fuel (Gas & Diesel) Consumption, Batch Time & Increases the Capacity of Dryers</div> <div>9. Prismatic skylights reduces the need of installing 240 LED lights that save 19kw of electricity</div> <div>10. Automated washing & dryer machine reduces pressure on gas by 50% and the process results less operator engagement</div>	<div>1. Rain water harvesting – saves 100 million liter/year</div> <div>ETP processes save 45000 cm³/year</div> <div>Fire mgmt.: uses only ETP processed water</div> <div>2. Water saving 91,153 m³/year</div> <div>3. Electricity savings, 315,904 KWh/year</div> <div>4. Natural Gas saving 476,52m³/year</div> <div>5. CNG saving 3,022 m³/year</div> <div>6. Diesel saving 127,903 liter/year</div> <div>7. Reduced 2,323,152 m³/year of Natural Gas as well as reduced 42,436 tons of CO2 & saving operating cost.</div> <div>8. 5.51% reduced of production energy by replacing 1844 T8 Led lights and purchased 9 VFD has been installed.</div> <div>9. 17,087% ETP treated water reused for factory works.</div> <div>10. 28.17% process recovering and reuse of water related with production.</div> <div>11. 100% ETP water DoE report complies with local law.</div> <div>WATER CONSUMPTION (m³/year)</div> <div>Before: 1,102,699-----After: 1,099,516</div> <div>ELECTRICITY (KWH/year)</div> <div>Before: 41,980,886-----After: 39,665,340</div> <div>GAS (m³/year)</div> <div>Before: 28,759,114-----After: 21,499,764</div> <div>DIESEL (Liter/year)</div> <div>Before: 563,041-----After: 440,726</div> <div>STEAM (Tons/year)</div> <div>Before: 107,941-----After: 104,241</div> <div>WASTEWATER AVOIDED (m³/year)</div> <div>Before: 1,102,699-----After: 1,078,922</div> <div>GHG AVOIDED (tons/year)</div> <div>Before: 65,585-----After: 52,312</div>	<div>1. 40% reduction in energy usage</div> <div>2. 41% reduction in water use</div> <div>3. 35% reduction in carbon footprint</div> <div>4. Work on the first floor is carried out in sunlight, saving 70kw of electricity.</div> <div>5. LED bulbs are programmed to be switched on automatically under light deficiency or gloomy sky.</div> <div>6. Rainwater harvest system ensures that 6 million liters of water can be preserved.</div> <div>7. Facility produces at least 110 MWh energy every year, which is 13% of the total power required.</div>	<div>1. 100% water treatment & reuse</div> <div>2. 47% water saving, overall</div> <div>3. 46% power saving</div> <div>4. 118 million gallons of water saved every year</div> <div>5. 1 pair of denim saves 7 gallons of water</div> <div>6. 44% improvement on baseline building performance rating</div> <div>7. 9% onsite renewable energy</div>	<div>1. 45% reduced energy consumption per garment</div> <div>2. Reduced water consumption by 64%</div> <div>3. Lot of customers come not for being the cheapest, but because of green manufacturing practices & they are good to their people.</div> <div>4. 15.4 tons of CO² emission was reduced from June 2016 to January 2017 by launchin self developed mobile app "Esquel car pool"</div> <div>5. Reduced their global energy consumption/unit of production by 26% between 2010 & 2014</div> <div>6. 26% Reduction in water use/unit of production from 2010 & 2014</div> <div>7. Average productivity rose by 7% during 2014 due to continuous improvement in technology & people skills</div> <div>8. Progressive applications of energy-efficient technologies and the upgrading of machinery and equipment have significantly increased their global garment production by more than 22%.</div> <div>9. Reduced energy consumption by 43% from 2005 to 2014, while garment production increased by 75% over the same 10 years.</div> <div>10. In Sri Lanka, their biomass boiler consumes cotton fabric waste as renewable fuel and has reduced carbon footprint there by half since its adoption in 2014.</div> <div>11. During 2014, recycled water replaced 10% of the total water consumed at the main complex in Guangdong Province</div> <div>12. In Malaysia, they replaced underground water pipes, improved washroom facilities and implemented other solutions, achieving more than 50% savings in 2014.</div> <div>13. ECO-WASH INNOVATION- Zerowastewater discharge, Approximately 960 ltrs of water saved per load,US\$3.50 saved per load</div>	<div>1. Energy cost reduce by 40%</div> <div>2. Evaporative cooling system saves 65% of the energy consumed.</div> <div>3. 10% of the plant's power provide by solar panels.</div> <div>4. 50 % reduction in water consumption</div> <div>5. 95% waste recycling</div> <div>6. Reduced absenteeism</div> <div>7. Energy required for operation is 25 percent lower than that of comparable factories.</div> <div>8. About 400 trees were planted, doubling the number on the site.</div> <div>9. Shading of the building and grounds keeps the building an estimated 1 to 2°C cooler</div> <div>10. Green areas are designed to absorb up to 25 millimeters of rain before runoff begins.</div> <div>11. Erosion is controlled by porous surfaces, dense planting, and, where necessary on steep slopes, stabilized soil.</div> <div>12. Runoff is channeled to the retention pond, which serves as the primary irrigation source for plants on the site.</div> <div>13. The building is energy efficient and the indoor climate is comfortable, a challenging combination in the tropics.</div> <div>14. Main building volumes, the production spaces, are aligned on an east-west axis, the north and south facades being the largest. This orientation makes it easier to block direct solar radiation.</div> <div>15. The massing of the building volumes and the positioning and sizing of windows permit daylight to enter as natural illumination without causing substantial heat gain.</div> <div>16. Covered with turf and plants, the high thermal mass of this roof absorbs heat without transmitting it into the building.</div> <div>17. The white metal, with a solar reflectivity index of 79, reflects nearly eighty percent of the solar energy that reaches the roof.</div> <div>18. JIT system reduce storage space required for raw materials and finished goods at the plant, leaving more area for production.</div> <div>19. Year round, the indoor dry-bulb temperature is up to 3°C cooler than the outdoors, and the indoor relative humidity about ten percent higher than the outdoors.</div> <div>20. The plant provides 1,300 permanent fulltime jobs, revitalizing the local rural economy</div> <div>21. Using passive design to reduce heat loads and efficient evaporative cooling equipment, an indoor temperature of 27° to 29.5°C (compared with 25° to 26°C in an average factory) is maintained, while consuming only 25 percent of the cooling energy of an average factory.</div> <div>22. Energy consumption for lighting was reduced by using well-designed systems with efficient lamps.</div> <div>23. An added benefit of foregoing artificial lighting is reduced heat gain within the building.</div> <div>24. Lighting system requires about half the normal number of light fixtures.</div> <div>25. Dual-flush toilets and low-flow plumbing fixtures minimize water consumption.</div> <div>26. The plant's two primary energy sources, photovoltaic and hydroelectric power, are renewable and carbon neutral. The rooftop photovoltaic system with output of 25.6 kilowatts covers 10% of the plant's power needs. A small hydroelectric power plant connected to the public grid provides the other 90% of the factory's power.</div>	<div>1. Energy cost reduction by 50%</div> <div>2. 60% reduction in water consumption</div> <div>3. 95% waste recycling</div> <div>4. Reduced absenteeism with improvement health standard to 2%</div> <div>5. Reduced Carbon Dioxide (CO₂) emissions to the atmosphere by 80%, Sulfur Dioxide (SO₂) emissions by 71% and Nitrogen Oxides (NO) by 92%</div> <div>6. Achieved an energy saving of 46%</div> <div>7. Reduced potable water use by 70% and documented that almost all of the site-generated solid waste is recycled.</div>	<div>1. 48% reduction in its carbon footprint</div> <div>2. 70% less water consumption</div> <div>3. Zero waste to landfills</div> <div>4. 'Most Sustainable Factory – 2014'</div>