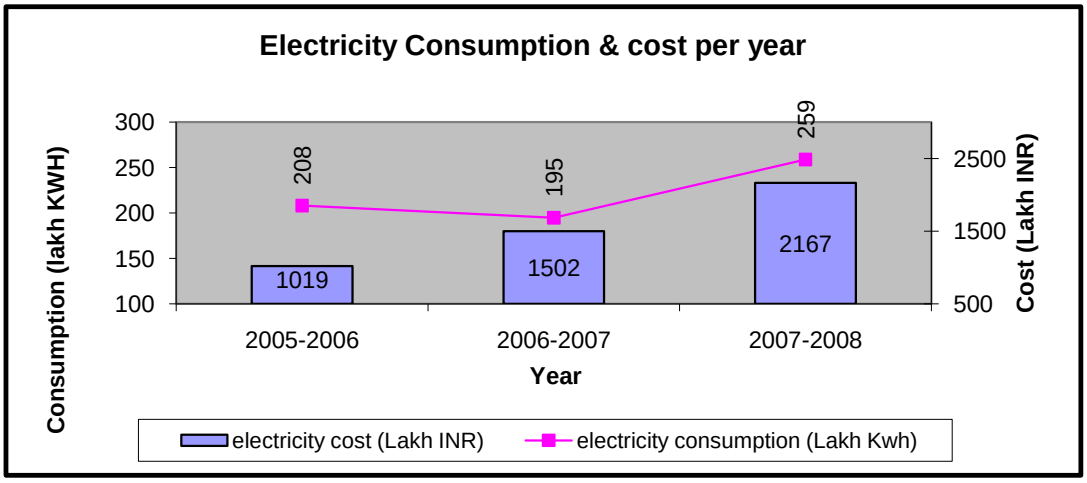
(i) Unit Profile

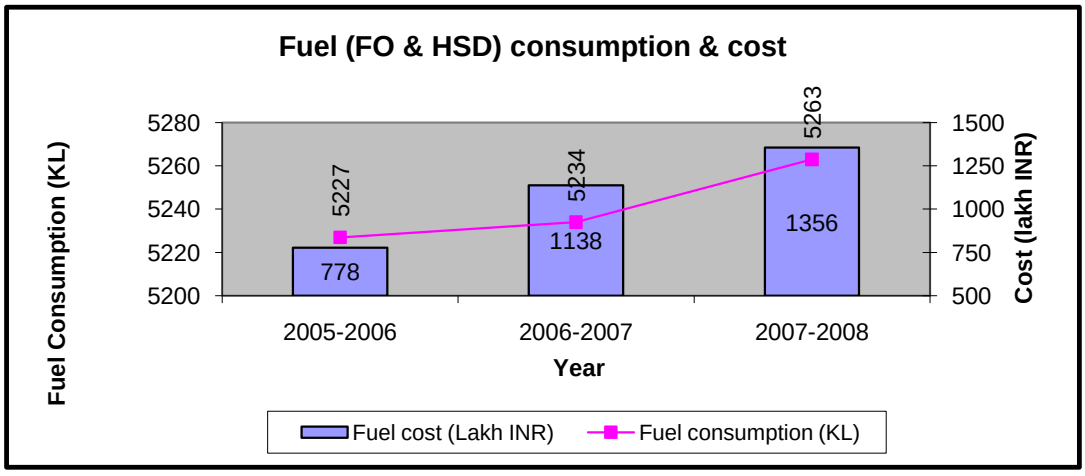
The Santa Monica Works of Syngenta India Ltd in Goa is spread over 200 acres of land with lush green and verdant flora and fauna. The site also has a 12-acre man made lake which is home to several aquatic and amphibian species. Way back, the site started operations in 1971 as Hindustan Ciba Geigy Limited, manufacturing active ingredients for Crop Protection and Pharmaceutical formulations. Today it has grown to be one of the strategic manufacturing sites in Global supply chain. Currently, active ingredients such as Profenofos, Thiamethoxam and Pretilachlor are manufactured at Santa Monica Works. As concerns to chemical industry like Syngenta, energy usage is in the form of electricity & steam as the major inputs which ultimately get transformed into an end product. Thus energy directly dictates the cost of per ton of the product. Thus a need for Energy conservation was felt across the SMW, Goa .The first stages of the plan was to include the expansion of energy-saving programs across various disciplines. The ultimate goal was to reduce the no of KW units consumed per year.

(ii) Energy Consumption

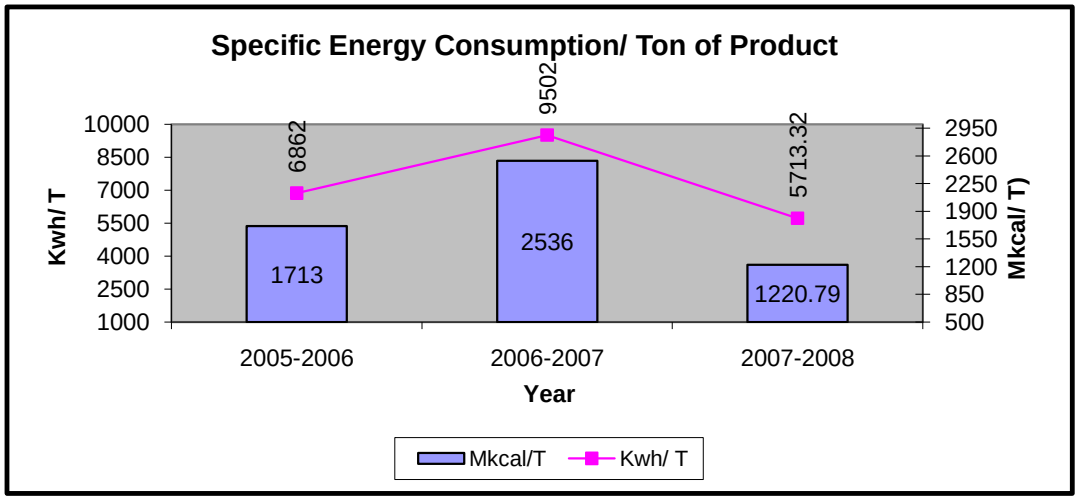
Energy Consumption and cost per year	2005-2006	2006-2007	2007-2008
electricity consumption (Lakh Kwh)	208	195	259
electricity cost (Lakh INR)	1019	1502	2167



Fuel Consumption and cost per year	2005-2006	2006-2007	2007-2008
Fuel consumption (KL)	5227	5234	5263
Fuel cost (Lakh INR)	778	1138	1356



Specific energy consumption/ ton of product	2005-2006	2006-2007	2007-2008
Kwh/ T	6862	9502	5713.32
Mkcal/T	1713	2536	1220.79



(iii) Energy Conservation Commitment, Policy and Organizational Set up

Energy Conservation Policy

- Conserve energy resources
- Preserve the environment
- We will comply with the local regulations and follow all new developments that could influence the supply of energy, considering these developments while planning of all future expansions at Santa Monica Works.
- We will optimize conversion of the primary delivered energy such as fuel and electric power into usable secondary energy forms such as thermal and mechanical energy.
- We will ensure efficient use of secondary energy for our production processes and infrastructure operations.

Anexure-B

(iv) Energy Conservation Achievements during the year 2007-2008

1	VFD For Cooling water HP Supply Pumps (project no 1), Cooling water pump 8479 (Project no 7), MW Booster pump (project no 9),Chilled water supply pump (project no 11)
	The requirement of cooling water varies based on the process requirements, but the pumps will be operated at full load through out the day since the motors are induction motors and runs in constant speed which leads to energy losses. A VFD was installed with a pressure sensor in the circulation line and this controlled the speed of the pump based on the requirements & maintaining a constant head. When the consumption in the plant is less, it reduces the speed of the pump and save energy.
2	VFD & FRP fan for cooling tower Pos no 78136
	The cooling towers in utility block use to run 24 hrs a day irrespective of cooling water temperature. As the utility plant equipments are designed to operate at 30 deg. C, lot of energy was wasted by operating the cooling towers at lower temperature. A temperature sensor was provided in the cooling water line & set the operating band at 27 to 30 deg.C and this controlled the speed of the towers. When the temperature is less it reduces the speed of the cooling tower and save energy. Also Aluminium fans replaced with energy efficient FRP fans.
3	Engg Stores lighting
	In Engg stores, multiple lights are controlled by a single switch. This results in operating a gang of lights for want of light in a particular area. During day time also the same situation leads to energy loss. So non critical lights were identified and separate switches provided to switch only when required.
4	MEG compressor running time reduction by reducing the load and unload temperature range.
	Operating parameters of MEG Brine chilling system was analysed through Data Acquisition and revised the compressor loading, unloading & tripping temperature settings. This has reduced the compressor running hrs from ave. 8 hrs from 14 to 15 hrs per day. Also cooling water flow to condenser stopped manually during compressor trip.
5	Timer for Agro. Change room heaters
	In Agro plant Change Room, Geysers were operating for 24 hrs. The operation of the same was controlled by installing cyclic timers which resulted in considerable amount of electrical energy.
6	Timer for fans and lights in the Engg change room for use in shifts where lights are left on
	In Engg Change Room, fans and lights were operating for 24 hrs for use in regular shifts. The operation of the same was controlled by installing cyclic timers to operate during shift change hours, which resulted in considerable amount of electrical energy
7	VFD for Cooling water pump 8479
8	WHRB Export steam
	Hot flue gases generated during the process of burning chemical waste from the AI plants in Thermal Oxider plant was vented after scrubbing quenching processes. Huge amount was heat energy was being wasted in this process. To recover this heat, a waste heat boiler was installed in flue gas path to generate steam from the heat energy of the flue gas
9	VFD for MW Booster pump
10	VFD for G 134 Boiler Combustion Air Blower
	The steam boiler designed to produce 16 TPH F&T 100 deg C was being operated at 8 TPH due to low steam requirement from plants. Combustion air required for combustion was controlled by throttling the dampers through PLC controlled servomotors fitted at forced draft fan duct. Lot of energy was wasted due to this throttling process. Considering the low load operation of boiler VFD is incorporated for FD fan which will regulate the speed of the motor and fine air adjustment will be controlled through dampers. This saved considerable amount of energy
11	VFD for Chilled water supply pump
12	FRP fan for Cooling Tower pos no 18007
	The earlier aluminium fans of Paharpur make cooling towers have been replaced with energy efficient FRP fans. These FRP fans consumes around 30% lesser than the conventional aluminium fan with 10% increase in air flow
13	VFD for 2 nos ETP aeration blower
	The blowers provided for aeration process in ecology are operating at full speed. Actual air required for this process was varying depending on the process requirements. The same is controlled by installing a VFD and run as per the required frequency, which saved considerable amount of energy

(v) Energy Conservation Plans and Targets

S.no.	Opportunity	Investment Required - Rs. Lacs	Saving potential per annum - Rs. Lacs	Pay Back - Months	Remarks
1	Utilization of WHRB steam up to 92%	5	50	1	
2	Cooling water circulation rate reduction by 10% to 15 % .(Nov-08 on words)	1	15	1	
3	CW KPI reduction from 0.39 to 0.27 kwh/m3(15th Dec-08 on words)	51	37	12	
4	Bifurcation of Cunhi Column cooling water circulation system with independent pump and reducing the whole site circulation system Pressure.		15		
5	Segregation of -32 deg & -27 brine. Hence reduction in KPI by 0.5 KWH/TR.(Nov-08 on words)	15	15		
6	Supply pump specific power consumption reduction from 0.34 to 0.26 kwh /m3.(Jan-09 on words)	42	40	11	
7	Operation of chiller between 9 to 11 deg C. Reduction in KPI by 0.05kwh/TR(In progress)	0	18		
8	Nitrogen generation using Screw compressors	0	2		
9	Variable Frequency Drives for one of the Water chillers.	6	6	12	
10	Variable Frequency for One of the Brine chillers.	6	10	8	
11	Transformer relocation near T&P for major loads.	0	40	0	
12	Water system Bifurcation with necessary VFDs and low head pumps by categorizing the pressure and flow requirements.	32	25	16	
	Total	**158**	**273**	**7.625**	