

Gujarat Alkalies and Chemicals Limited
Dahej, Dist. Bharuch (Gujarat)

(i) UNIT PROFILE

GUJARAT ALKALIES AND CHEMICALS LIMITED (GACL), DAHEJ UNIT commercial production commenced in August, 1998, with and installed capacity 100000 MTA. As a whole, GACL (RANOLI) installed capacity of 153500 MTA & (DAHEJ) installed capacity of 116500 MTA is largest Caustic Soda manufacturer in INDIA. GACL (Dahej Unit) production capacity utilization is 122.06%.

GACL (DAHEJ) is an integrated complex of Caustic Soda – 300 TPD, Captive Power Plant (Combined Cycle Co-generation Power Plant) having and installed capacity of 90 MW and Phosphoric Acid Plant (Technical Grade) with and installed capacity of 80 TPD. GACL markets it's products all over Gujarat and its exports many products.

GACL has it's own Energy Management Policy in addition to various other policies like quality policy, SHE Policy (Safety, Health & Environment Policy), Policy for Training & Development, Personnel Policy and Information Technology Policy. All these policies are in place which are declared by company Managing Director.

All policies are functioning well with participation of all employees up to their maximum capacity and continuous efforts are on in implementation of all the policies. GACL, Dahej unit is a ISO 9001-2000, ISO14001-1996 and ISO 18001-2000 certified company. **GACL has received the prestigious Green Tech Award Silver Medal for Safety for the year 2004 and for the year 2005 Green Tech Award Silver Medal for Environment for the year 2004 and National Energy Conservation Award – 2004 awarded by Ministry of Power, Government of India.**

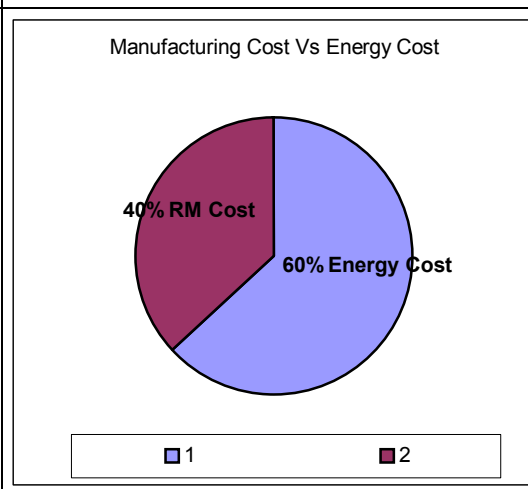
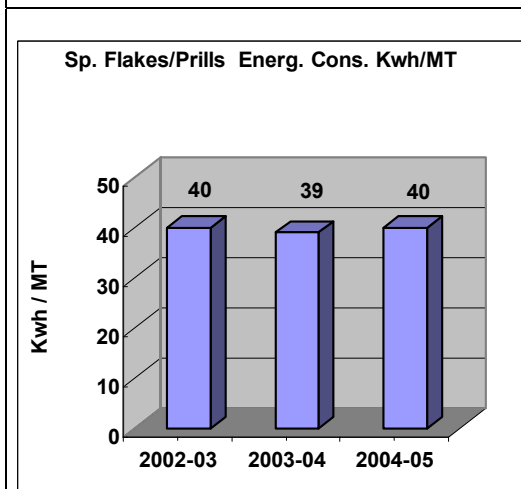
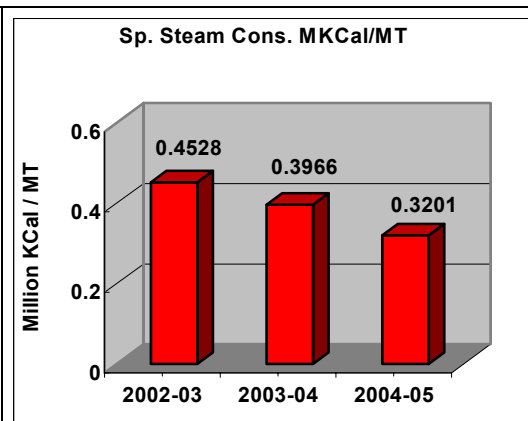
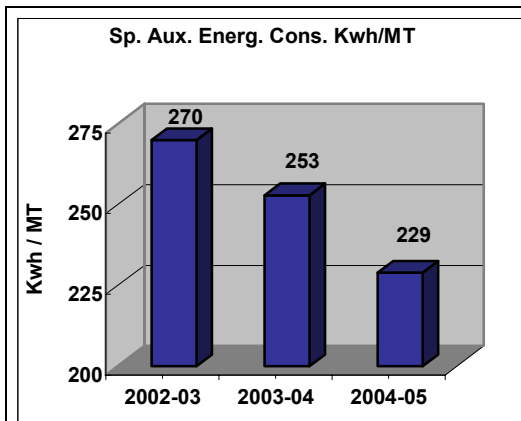
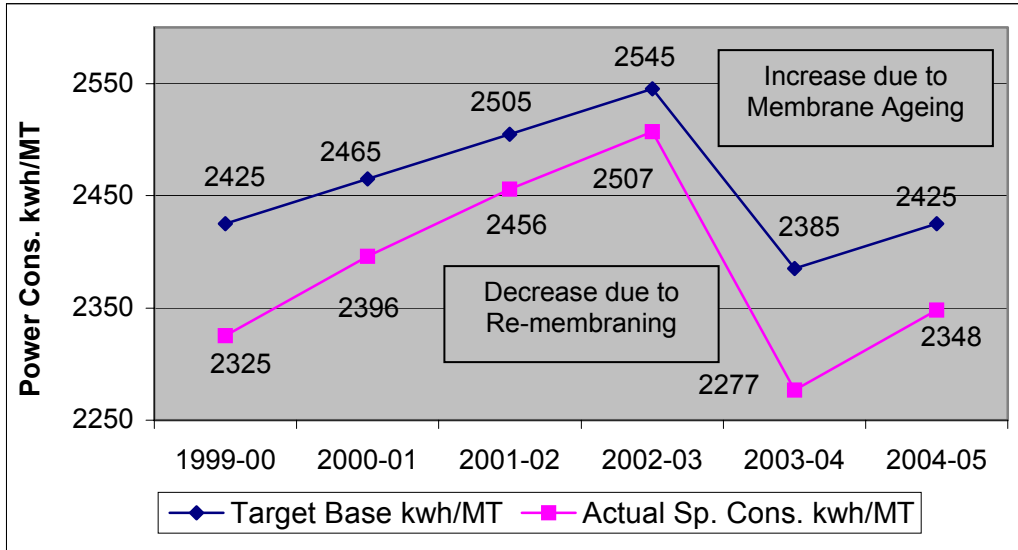
(ii) ENERGY CONSUMPTION

SPECIFIC POWER CONSUMPTION DETAILS	UNIT	2002-03	2003-04	2004-05
Annual Production	MT	141504	142205	154310
Total Energy consumption per annum	KWH (laksh)	3931	3598	3963
Total Thermal Energy Consumption	Million Kcal	64070	56403	49397
Total Manufacturing Cost in Rs. (lakhs)	Rs. Lakhs	20166	19591	18190
Total Energy Cost in Rs. (lakhs)	Rs. Lakhs	11891	11891	10704
Energy Cost as % of Raw-Material cost	%	59	60	59
DC Electrolysis Power Consumption	KWH/MT	2447	2220	2289
AC Power Consumption without Auxiliaries & CCU	KWH/MT	2510	2277	2348
AC Power Consumption with Auxiliaries & without CCU	KWH/MT	2780	2530	2577
Auxiliary Power Consumption only	KWH/MT	270	253	229
Power Consumption for CCU flakes & prills	KWH/MT	40	39	40
Steam Consumption	MKcal/MT	0.4528	0.3966	0.3201

Year	Target based on base figure of 2385 kwh/MT in 1998-99 (Without Auxileries)	Actual kwh/MT	Savings kwh/MT
1999-00	2425	2325	100
2000-01	2465	2396	69
2001-02	2505	2456	49
2002-03	2545	2507	38

2003-04	2385	2277	108
2004-05	2425	2348	77

Specific Energy Rectifier AC Power Consumption kwh / MT

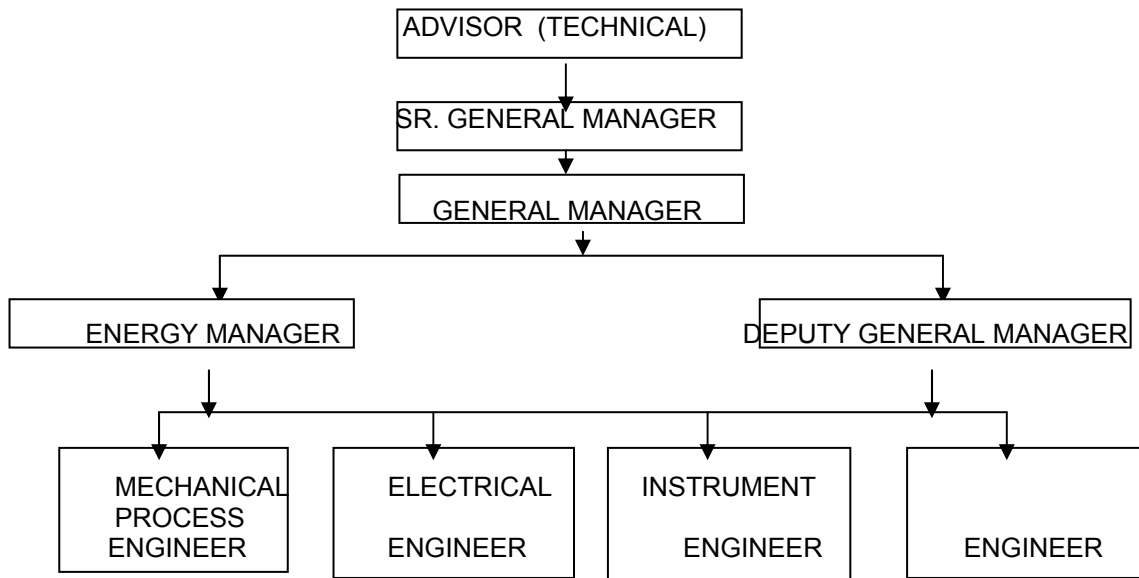


(iii) ENERGY CONSERVATION POLICY & SET UP

SALIENT FEATURES OF ENERGY CONSERVATION CELL:

GACL has its own Energy Conservation Cell at Dahej Complex, headed by General Manager (D) assisted by Energy Manager is supported by at least two Engineers from each department forming a team. This team finds various energy saving potential in their working areas, brings the proposal to Energy Cell for elaborate discussions and brain storming sessions for finalization and implementation. GACL committed to fine tuning operations & maintenance continuously to achieve the goal. Technology up gradation with energy efficient process and equipments. Motivating, Training & encouraging our employees to achieve a target of reducing specific energy consumption by minimizing 1% every year. Promoting the use of renewable natural resources for sustainable development, safeguarding the society and protecting the environment. Setting up a system to continuously monitor the progress.

ENERGY CONSERVATION CELL STRUCTURE



(iv) ENERGY CONSERVATION ACHIEVEMENTS DURING 2004-05.

GACL has implemented many energy saving proposals of small, medium & large. We have Replaced defective Evaporator tube bundles with new tube bundle in CEU to save thermal energy. Retrofitting of luminaries, Preheating of Natural Gas to improve Heat Rate of Power Plant. Maintaining brine temperatures as per the norms, DC power consumption of Cell Power within limits. Many other under efficiency Equipments stopped / replaced to conserve the energy. During 2004-05 with energy conservation measures, we have saved an amount to the tune of **Rs. 327.14 Lakhs.**

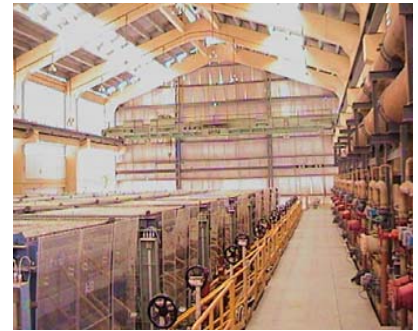
MAJOR ENERGY CONSERVATION PROJECTS IMPLEMENTED DURING THE YEAR 04-05.

A) Energy saved in Cell House.

As per Industries norms, the cell element voltage increases with the aging of membrane and hence power losses increases to the tune of 40 kwh/MT. By maintaining brine temperature and quality of brine and ensuring minimum deposition calcium and magnesium salts and hence less power consumption. The energy saved by above activities is as below:

TARGET

	<u>2004-05</u>
1) Based on base figure of 2385 kwh / MT for the year 2003-04 and industry norms 40 kwh / Ton / year increases due to aging of cell membranes.	2425
2) Specific power consumption kwh / MT.	2348
3) Caustic Production (MT).	154310 118.82
4) Saving in Power (Lakh kwh/year)	1.71
5) Power cost (Rs./kwh)	203.18
6) Amount saved per year (Rs. In Lakh).	



B) Thermal Energy Saving by Replacement of Heat Exchanger tube bundles with new ones.

Two no. of Heat Exchangers EV-11 and EV-13 tube bundles were developed leakages in CEU. These tube bundles were replaced with new tube bundles, which saved quite good amount of thermal (Steam) energy. The saving of thermal energy is as below:

1) Before replacement of the tube bundles specific thermal energy consumption was Mkcal/MT.	- 0.3966
2) After replacement of the tube bundles specific thermal energy consumption was Mkcal/MT.	- 0.3201
3) Annual production	- 154310 MT.
4) Thermal energy saving	- 11805 Mkcal
5) Amount saved (Rs. Lakh).	- 94.00



C) Improvement in Heat Rate of Power Plant.

Preheating of Natural Gas from 5degC to 40degC, to improve the net heat rate gain in power plant (GTG- 2 nos. and STG – 1 nos.). Natural Gas is fed 5 Lakh SM3/ day at 5degC to both GTGs. Natural Gas Temperature raised to 40deg C through IP saturated steam heat exchanger at 1.2bar pressure (steam consumption was 0.5T/Hr.)

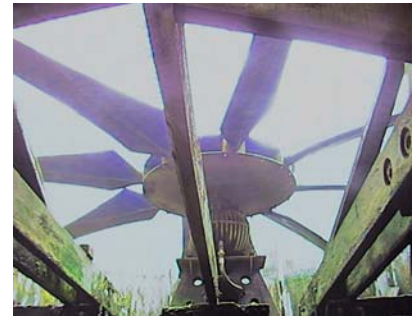
1) Thermal energy saved by preheating the N.Gas	210 Mkcal/Yr. 313 Mkcal/year 523 Mkcal/year
2) Thermal energy saved through mini STG turbine	59520 SM3/year
3) Total Heat saved	
4) Natural Gas saved (1 SM3 = 8787 Kcal)	4.17



5) Amount saved (Rs. In Lakh)

D) Auxiliary consumption reduced by replacing FRP Fan in place of Metallic Fan in Cooling Tower 3 nos. The power saving details are as below.

1) With metallic blades power cos.(kwh lakhs)	9.59	
2) With FRP blades power cons.(kwh lakhs)	5.96	
3) Power saved (kwh lakhs)	3.63	
4) Investment made (Rs. Lakhs)		1.50
5) Amount saved (Rs. Lakhs) @Rs. 1.71	6.20	



E) Switching off of 2.2 MVA idle charged transformer power saved.

Switching off of 2.2 MVA Transformer, which was in ideal charged condition. This transformer put off through out the year except charging the transformer 2 days in a month for keeping in healthy condition.

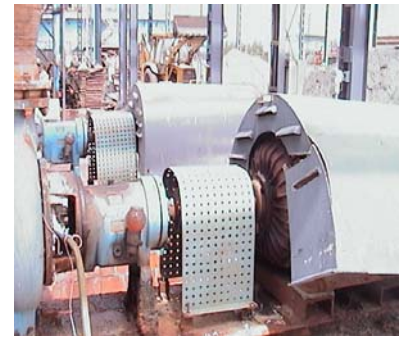
Before Switch off of transformer	5.05
Power consumption (kwh lakhs)	
After Switch off of transformer	0.46
Power consumption (kwh lakhs)	4.59
Power saved (kwh lakhs)	Nil
Investment made (Rs. Lakhs)	7.85
Amount saved (Rs. Lakhs) @Rs. 1.71	



F) One no. 45 kw pump Switched off instead of running two nos. by incorporating bigger size impeller :

Instead of running 2 nos. of 45 kw pure brine pumps only 1 nos. 55 kw with bigger size impeller to meet the process requirement.

Before implementation of above measure	5.84
Power consumption. (kwh lakhs)	
After implementation of above measure	4.77
Power consumption. (kwh lakhs)	
Power saved (kwh lakhs)	1.07
Investment made (Rs. Lakhs)	0.20
Amount saved (Rs. Lakhs) @Rs. 1.71	1.83



G) One 18.5 kw ETP pump replaced with 9.3 kw pump to save the power and meet the same process requirement:

One nos. 18.5 kw ETP pump, Suction starving which having lower size suction pipe and hence delivery was not proper. This pump replaced with 9.3 kw Rating Pump.

With 18.5 kw motor power consumed (kwh lakhs)
 With 9.30 kw motor power consumed (kwh lakhs)
 Power saved (kwh lakhs)
 Investment made (Rs. Lakhs)
Amount saved (Rs. Lakhs) @Rs. 1.71

1.30
 0.51
 0.79
 Nil
1.35



H) Out of three running pumps one pump was stopped to cater the flow requirement with two pumps only in CCP :

There are three pumps namely clarified water pump to PA Plant. Clarified water pump to CSPlant and C.T. makeup pump were running continuously. By piping interconnections clarified water pump and C.T. make up pump both together catering the flow to all the three location and the PAPlant pump totally stopped. The saving is as below:

When three pump in operation the power was (kw) 64.80
 After modification only two pumps are in
 Operation the power was (kw) 42.40
 Total energy saving per year (kwh Lakhs) 1.94
 Energy cost (Rs. / kwh) 1.71
 Investment made (Rs. Lakhs) 1.00
Total amount saved for the year (Rs. In Lakh) 3.32



I) By maintaining the power factor above 0.95 lag amount saved:

By maintaining the power factor of the complete electrical system of the complex more than 0.95 lag. Rebate in the form of revenue obtained from Gujarat Electricity Board. For complete year of 2004-05 is

Investment made (Rs. Lakhs) Nil
 Rs. In lakh 4.91



J) By stoppage of drinking water pump energy is saved:

Previously 2.2 kw pump was catering the drinking water pump in CCP plant. At present the same is met by inter connecting pipeline to existing over head tank.

With this the power saved is (kwh/year) 0.19
 Investment made (Rs. Lakhs) 0.20
Amount saved per year (Rs. Lakhs) @Rs. 1.71 0.33



Other projects implemented during 2003-04.

1) Timers installed for control of lighting. 2) Stoppage of idle running of motors. 3) Electronic chokes in place of conventional chokes. 4) Thermal insulations provided wherever damaged. 5) L.T. capacitors installed to improve the Power Factor. 6) Switching off lights, fans, ACs, by individuals whenever offices are not occupied. 7) Lighting transformers installed to maintain the normal voltage level of 230V. We have implemented the 5s' system (short, set in order, shine, standardize & sustain) for good & clean environment. Kaizens system has been implemented for improvement.

National campaign on Energy Conservation 2005:

As committed in the manifesto of Energizing India, we have organized energy campaign in surrounding schools of the villages at Dahej and Bharuch district of Gujarat. Some of the photos depicting the same is enclosed in annexure. Rest of the program as committed in the manifesto will be complied in true spirit. A book was printed containing domestic appliances on energy conservation and distributed the same in nearby schools and the villagers who attended the program. In the year 2004, our company celebrated Energy Conservation Week in December 2004 and organized energy slogan competition for all our employees.

(v) ENERGY CONSERVATION PLANS & TARGETS

Energy Saving Measure	Amt.saved (Rs.Lakhs)	Investement (Rs. Lakhs)	Project*
Vent out Hydrogen will be utilized instead of Natural Gas in New CCU (100 MT per day Caustic Flakes)	60.24	16.00	2005-2006
Vent out Hydrogen will be utilized instead of Natural Gas in Old CCU (200 MT per day Caustic Flakes)	121.21	18.00	2005-2006
Cooling Tower Performance improvement in CCP	12.82	10.00	2005-2006
Rectifier Electrical A.C. replacement by spare chiller cooling coil	1.71	2.00	2005-2006
In place of existing 10 nos. of air compressors, two nos. of screw compressors installation to cater total air requirement	34.20	120.00	2005-2006
Replacement of 250watt HPMV lamps with 150watt HPSV lamps	1.37	0.60	2005-2006
Replacement of lower size motor of 30 kw in place of existing 37 kw motor (3 nos.)	1.15	1.20	2005-2006

* Project commencement and completion year.

RGY CONSERVATION CAMPAIGN BY GACL



◀ **ENERGY CONSERVATION CAMPAIGN FOR SCHOOL CHILDREN AT VILL. JOLWA.**

**ENERGY CONSERVATION CAMPAIGN AT ►
AT GAEL COLONY – BHARUCH (GUJ.)**



**◀ ENERGY CONSERVATION CAMPAIGN
FOR SCHOOL CHILDREN AT VILL.
DAHEJ.**

**ENERGY CONSERVATION CAMPAIGN AT SVM
BHARUCH FOR ENGG. STUDENTS.**

