

CHEMFAB ALKALIS LIMITED
Kalapet (Puducherry)

Unit Profile

Chemfab alkalis Limited (CCAL) was the first membrane chloralkali plant in India. Chemfab was successful in operating this new technology under Indian conditions. This technology eliminates mercury and consumes less energy and is also safe compared to the conventional mercury cell technology.

As a part of the corporate philosophy, CCAL has been continuously trying out environment-friendly technologies both for the conservation of the environment and energy. Various programs on energy conservation are in the offing and new technologies which are energy efficient has been introduced in the past two years.

Energy Conservation Measures Implemented

1 Revamping of Plant-I With State-Of-The-Art Bipolar Bitac Electrolyser :
 The age old monopolar electrolyser was replaced with the new Bipolar BiTAC electrolyser from Chlorine Engineers, Japan. The old monopolar electrolyser was replaced due to higher power consumption owing to its aging and old technology.



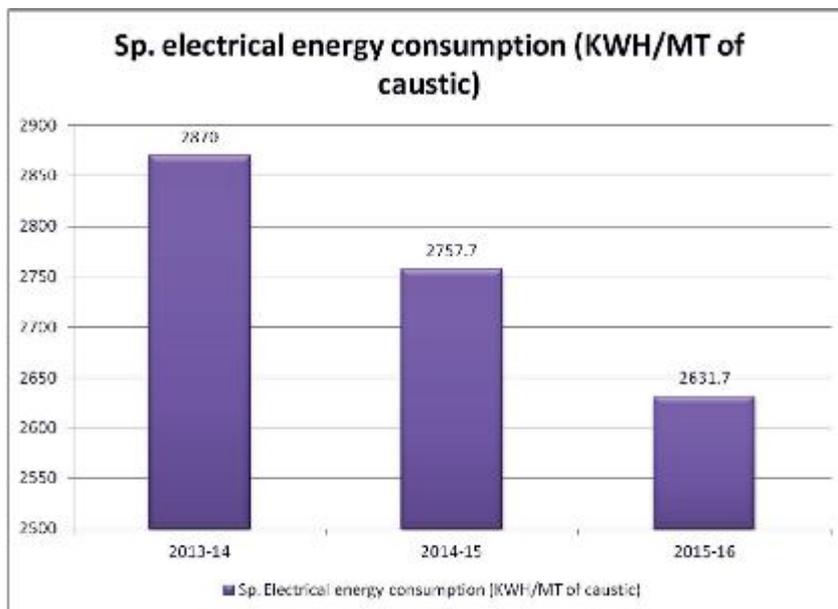
The specific power consumption with the new technology has reduced by over 8 % and contributed immensely to the energy conservation initiatives of the company.



The salient features of the n-Bitac electrolyser are :

- Low power consumption, due to unique electrolyser design, uniform distribution of the electrolyte and efficient gas-liquid separation.
- High current density operation, hence lesser footprint and capital cost.
- Easy monitoring of the electrolyser performance & trouble shooting through individual element gas sampling ports.
- Higher endurance of the electrolyser elements.

Total Investment (Rs.in Cr)	37.03
Year of Implementation	2015
First year cost savings (Rs.)	140,05,742
First year electrical energy savings (kWh)	2746224

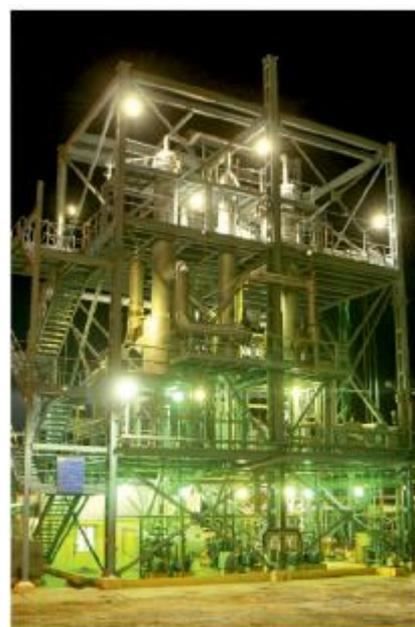


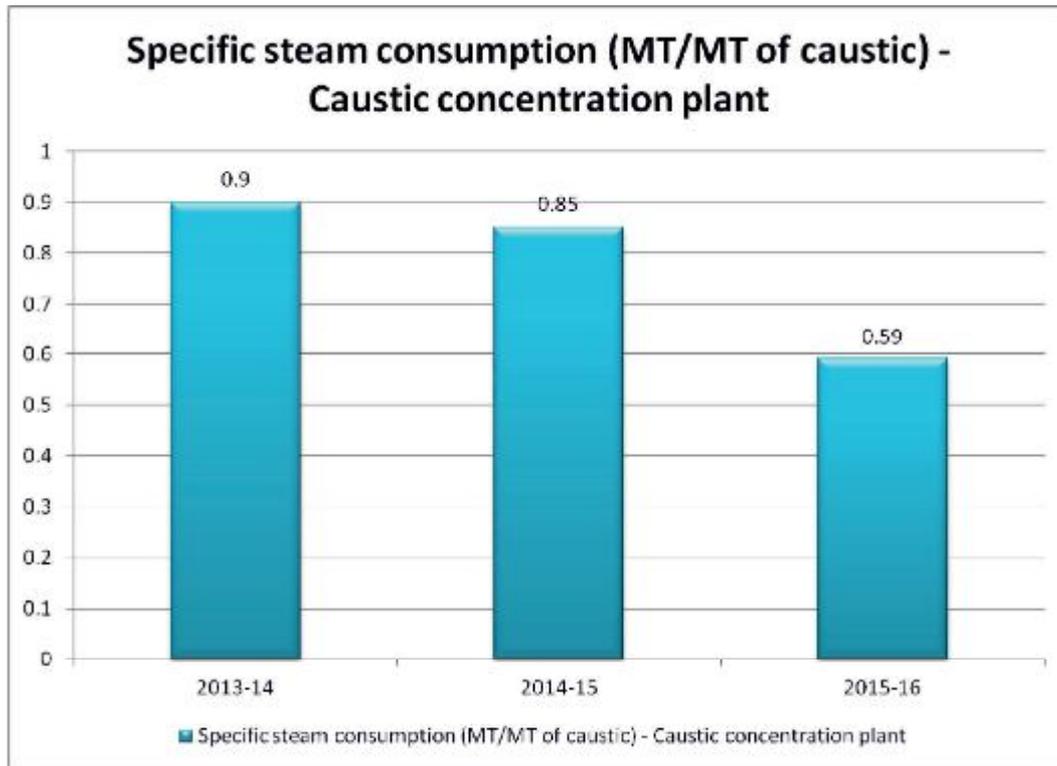
2: Revamping of Caustic Concentration Plant with Energy Efficient Triple Effect Evaporation System :

The old double effect evaporator was replaced with a new energy efficient triple effect evaporator for the production of 48% caustic soda lye from 32 % caustic soda lye. The specific consumption of steam was reduced from 0.85 to 0.59 Ton/ MT of caustic. This is the first plant in the world to use the thermic fluid as the heating medium, instead of steam.

The advantages of a triple effect evaporator is as follows :

- High heat transfer efficiency.
- Feed liquid evaporated with accelerated downward flow along the pipe wall suitable for evaporation of high viscous liquids.
- Economization of the steam is achieved by using the vapors generated from the first and second effect and so on as heating medium.





Total Investment (Rs.in Cr)	13.09
Year of Implementation	2015
First year cost savings (Rs.)	215,84,150
First year fuel oil savings (KL)	85.05
First year hydrogen gas savings (NM ³)	701000

3 : Optimisation of Plant- II Electrolyser Operation :

- Optimization of the operating load in Plant – II UhDe bipolar electrolyser has resulted in the reduction of the bus bar and rectifier losses.
- The losses were minimized due to the following:
 - Contact surface was checked and rectified.
 - All the Insulators were checked and weak ones removed and replaced.
 - Bus bar connectors were thoroughly cleaned and greased to reduce the bus bar drop across the circuit.
 - Electrolyser alignment was checked for better contact between electrolysers to reduce the voltage drop.

Year of Implementation	2015
First year cost savings (Rs.)	19,38,102
First year electrical energy savings (KWH)	380020

4: Energy Conservation by Installing Lighting Transformer Optimisation Of Plant- II Electrolyser Operation :

Installed a lighting transformer for feeding an optimum voltage to all the lighting systems i.e. supply voltage is 15 % lesser than the standard supply voltage for the lighting system

Total Investment (Rs.)	1,80,000
Year of Implementation	2015
First year cost savings (Rs.)	2,79,225
First year electrical energy savings (KWH)	54,750

5 : Energy Conservation by Installing LED Lamps

Plant Team studied the daily energy consumption for lighting by providing separate energy meter and based on the outcome of the study, measures were taken for the conservation of energy by replacing the existing lamps with energy efficient LED lamps.

- 150 nos. of 22 watts LED tube lights were retrofitted in place of 36/40 watts conventional light fittings.

Total Investment (Rs.)	1,12,500
Year of Implementation	2015-16
First year cost savings (Rs.)	95,625
First year electrical energy savings (KWH)	18750

6: Energy Conservation by Providing Variable Frequency Drives in Pumps.

- VFD's have been installed to provide energy savings by controlling the speed of the motors.
- Plant Team studied all the rotary equipment specification and actual requirement by monitoring the following parameters at various plant load conditions:

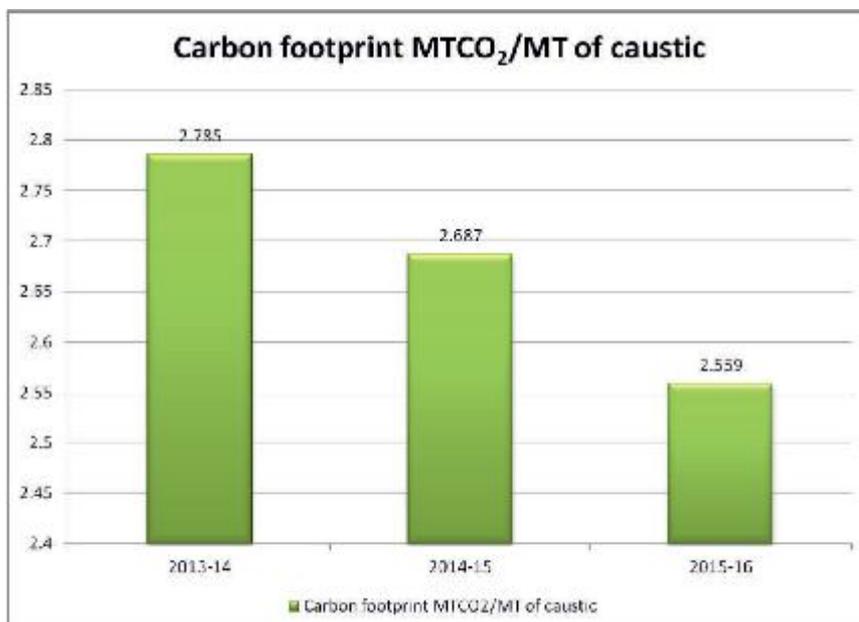
a) Capacity requirement b) Head requirement c) Pump discharge valve and control valve operating condition.

Based on the above study, the potential of energy savings was identified and measures have been taken to install VFD's wherever it was found suitable.



Array of VFDs as Energy Conservation Devices

Total Investment (Rs.)	3,00,000
Year of Implementation	2015-16
First year cost savings (Rs.)	11,76,458
First year electrical energy savings (KWH)	230678



SIEL CHEMICAL COMPLEX

Rajpura, Distt. Patiala (Punjab)

Unit Profile

Siel Chemical Complex (SCC) is a leading Chlor Alkali manufacturer in North India and one of the DC's of BEE's Chlor Alkali sector. It manufactures Caustic Soda (Flakes & Lye), Hydrochloric Acid, Stable Bleaching Power, Sodium Hypochlorite, Hydrogen and Liquid Chlorine.

SCC is located in an Industrial Estate in village Charatrapur, Village Khadauli, Rajpura approximately 6 km from NH1.

The manufacturing process is based on the environment friendly Membrane Cell Technology, that involves fine control of all process parameters with world's most sophisticated Distributed Control System (DCS). Safe operation is an integral part of the DCS.

The main raw material of the company includes Electricity, Salt and Water as major inputs. In this electricity constitutes about 65-70 % of cost of production and thus plays a very important role for the production of different products being manufactured at SCC.

SCC operates on power supplied by the Punjab State Electricity Board. It has the option of wheeling power from other states when wheeling costs become viable. SCC draws water from the Bhakra Canal and is not dependent on ground water.



Energy Conservation Measures:

Project 1

Refurbishment of Monopolar membrane cells (Electrolysers 9 no). These are used for Manufacture of caustic soda by Electrolyses process by passing of Direct current (DC)

Total Investment	Rs 315 Lac
Energy saving in the First year	Rs 176.51 Lac



Project 2

Replacement of Inefficient 72 TPD chlorine compressor with 85 TPD chlorine compressor Resulting 45 TPD chlorine compressor stopped which was running in addition to big compressor

Investment	Rs 12 Lac
Energy saving	Rs 40 Lac



Project 3

Speed of the blower of WAD 2 has been reduced 12% by replacing the pulley thus current reduced from 17 Amp to 12 Amp



Major Energy Conservation Initiatives taken in the year 2015-16:

S.N.	Job Details	Investment	Saving in Rs
1	Cell Refurbishment	315 Lac	176.51 lac
2	Energy Efficient lightening	0.40 Lac	2.36 lac
3	Replacement of motor of Freon compressor from 120 HP to 100 HP	0.9 (Arrange inhouse)	4.86 Lac
4	Speed reduction of WAD 2 blower	0.1 lac	1.92 lac
5	HCL filling point pipe size increased	0.05 Lac	0.20 lac
6	Replacement of chlorine compressor	12.0 Lac	40.85 Lac
7	Replacement of cylinder of air compressor	0.40 Lac	1.35 Lac

Energy Policy

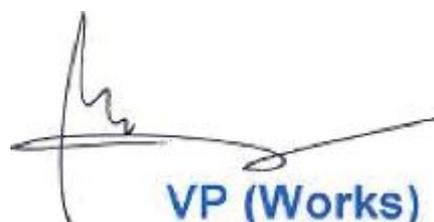


Siel Chemical Complex, Rajpura

Energy Management Policy

Siel Chemical Complex is committed to Energy Conservation by:

- 1. Maximizing the Capacity Utilization**
- 2. Promote Energy saving jobs and maintaining Cell House**
(Electrolyser & Bus-bar) efficiency
- 3. Promote Awareness & Importance of Energy Conservation among all employees through seminars, competitions.**
- 4. Recognizing suggestions given by employees for continual improvement in Process, Energy Conservation & Efficiency.**



VP (Works)