

# Welcome



# ABOUT GACL

- 1. Gujarat Alkalies And Chemicals Limited is a Company promoted by Government of Gujarat in 1973.**
- 2. The company is the leading producer of Caustic Soda in the country with market share of around 15 %.**
- 3. The first Chlor-alkali Plant was commissioned in 1976 at Baroda with UHDE Mercury Cells.**

# ABOUT GACL

- 4. The company is the first in the country to convert the Mercury Cells into UHDE Membrane Cells.**
- 5. Presently company is producing Caustic Soda and Chlorine at two Complexes at Baroda and Dahej. Both the plants are operating on UHDE Membrane Cell Technology with a capacity of 1205 TPD along with 57 TPD of KOH in same stream of production.**
- 6. GACL had received National Energy Conservation Awards consecutively for four years from 2004 and many other awards including Corporate Governance.**

# ABOUT GACL

- 7. In addition, company is producing other allied chemicals viz. Potassium Hydroxide & Carbonate, Chloromethanes, Hydrogen Peroxide, Sodium Cyanide & Ferro Cyanide, Phosphoric Acid, Calcium Chloride, Aluminium Chloride, Poly Aluminium Chloride, Chlorinated Paraffin Wax (CPW) etc. The company has a basket of 27 products.**
- 8. GACL is a system driven and environmental friendly company with following certifications.**
- (A) IS/ISO-9001:2000, (B) IS/ISO-14001:2004 and**
- (C) IS-18001:2007**



## Energy Management Policy

### **GACL is committed to Energy Conservation by :**

Minimizing Specific Energy Consumption,  
Maximizing Capacity Utilization,  
Continuous fine-tuning and maintenance of operations,  
Upgrading of process and equipment for better energy efficiency,  
Motivating employees to achieve a minimum 1% reduction per annum in specific energy consumption,  
Monitoring and Reviewing energy conservation.



MANAGING DIRECTOR

**Gujarat Alkalies and Chemicals Limited**

## Power Intensive operation of GACL at Vadodara Complex

- Operation at Vadodara complex
  - Caustic Soda-470 TPD
  - Caustic Potash - 57 TPD
  - Chloromethanes - 95 TPD
  - Hydrogen Peroxide - 38 TPD

Total power requirement – 60 MW which is catered by

M/s GIPCL-37 MW

**Wind energy-16 MW (23.75+39 MW Wind farms)  
& balance by wheeling from our Dahej power plant**

## Future operation of GACL at Vadodara Complex

### ■ Future enhancement at Vadodara complex

- Caustic Soda-500 TPD
- Caustic Potash - 100 TPD
- Chloromethanes - 105 TPD

Total power requirement – 68 MW which is catered by

M/s GIPCL-36-37 MW

**Wind energy-16 MW (23.75+39 MW Wind farms)**

**Wheeling from our Dahej power plant-8 MW**

**Additional power requirement from MGVCL-8 MW**

# Power Intensive operation of GACL at Dahej complex

- **Operation at Dahej Complex**
  - 90MW Co-generation Captive Power Plant
  - Caustic Soda –735 TPD
  - Phosphoric Acid – 80 TPD
  - Hydrogen Peroxide - 39 TPD
  - Poly Aluminium Chloride – 50 TPD
  - Calcium Chloride – 50 TPD
  - Anhydrous Aluminium Chloride– 50 TPD

## **Power Demand/Supply Scenario- Dahej complex**

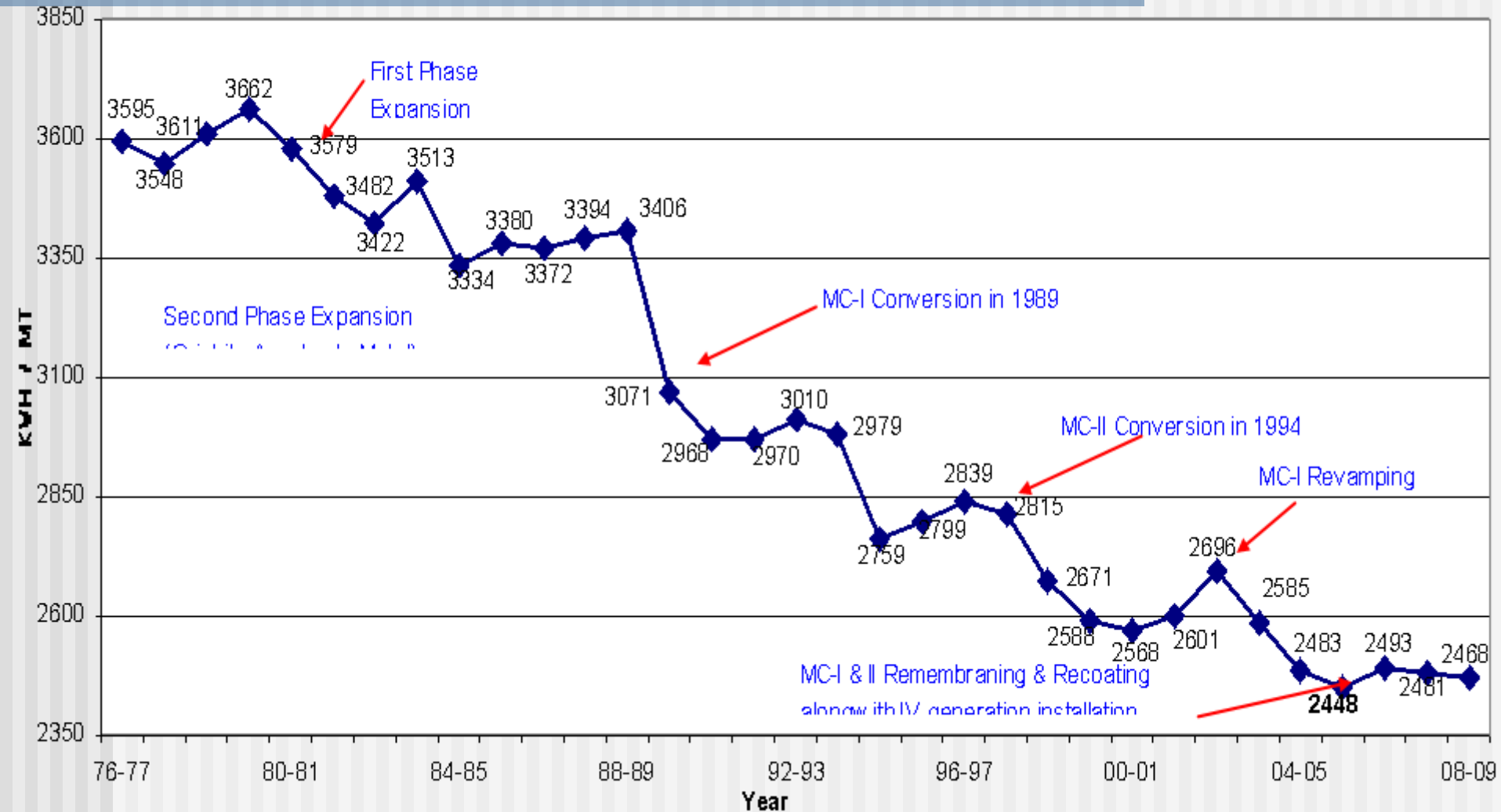
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**Power Generation CCP : 90 MW**

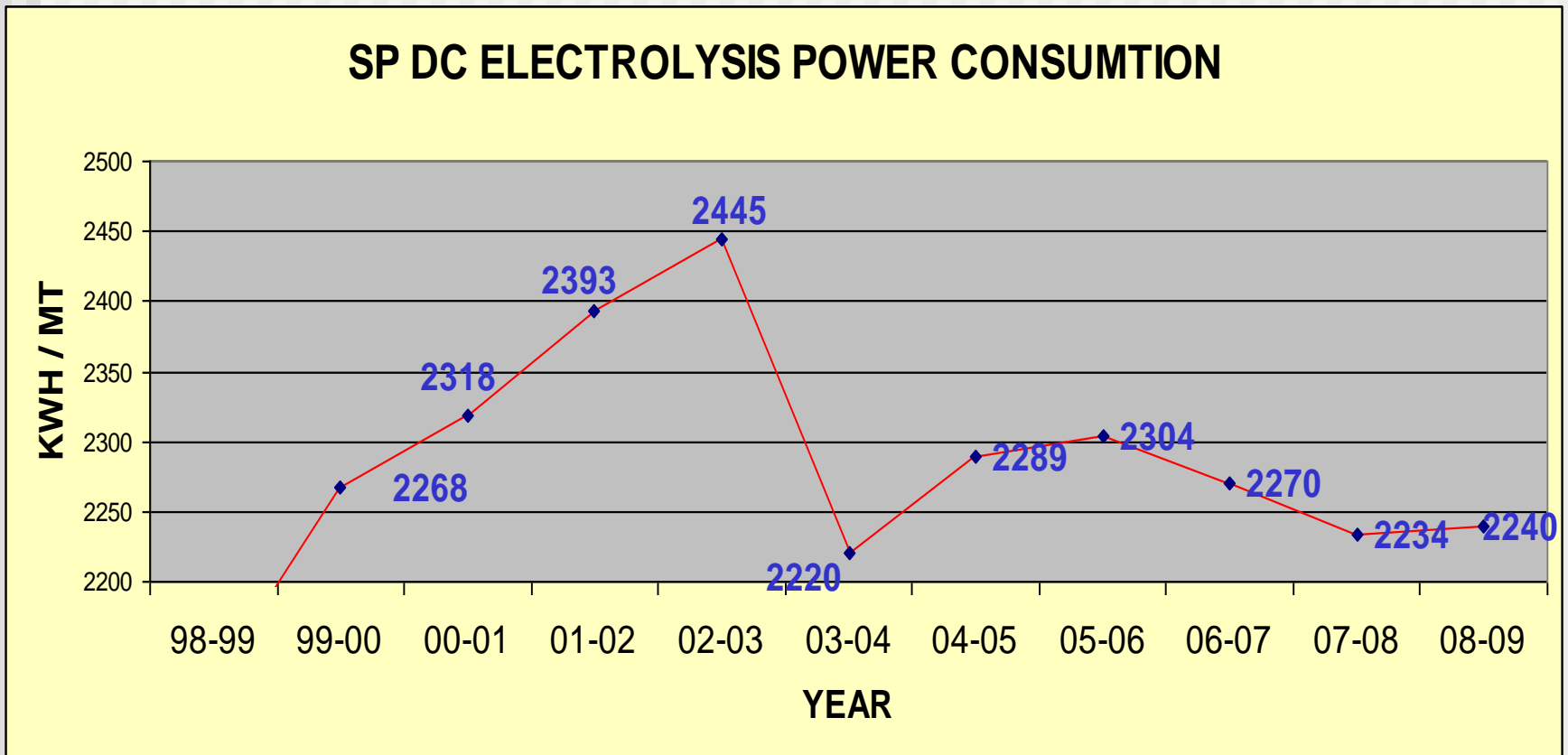
**In House Consumption : 82 MW**

**Wheel / Sale : 8 MW**

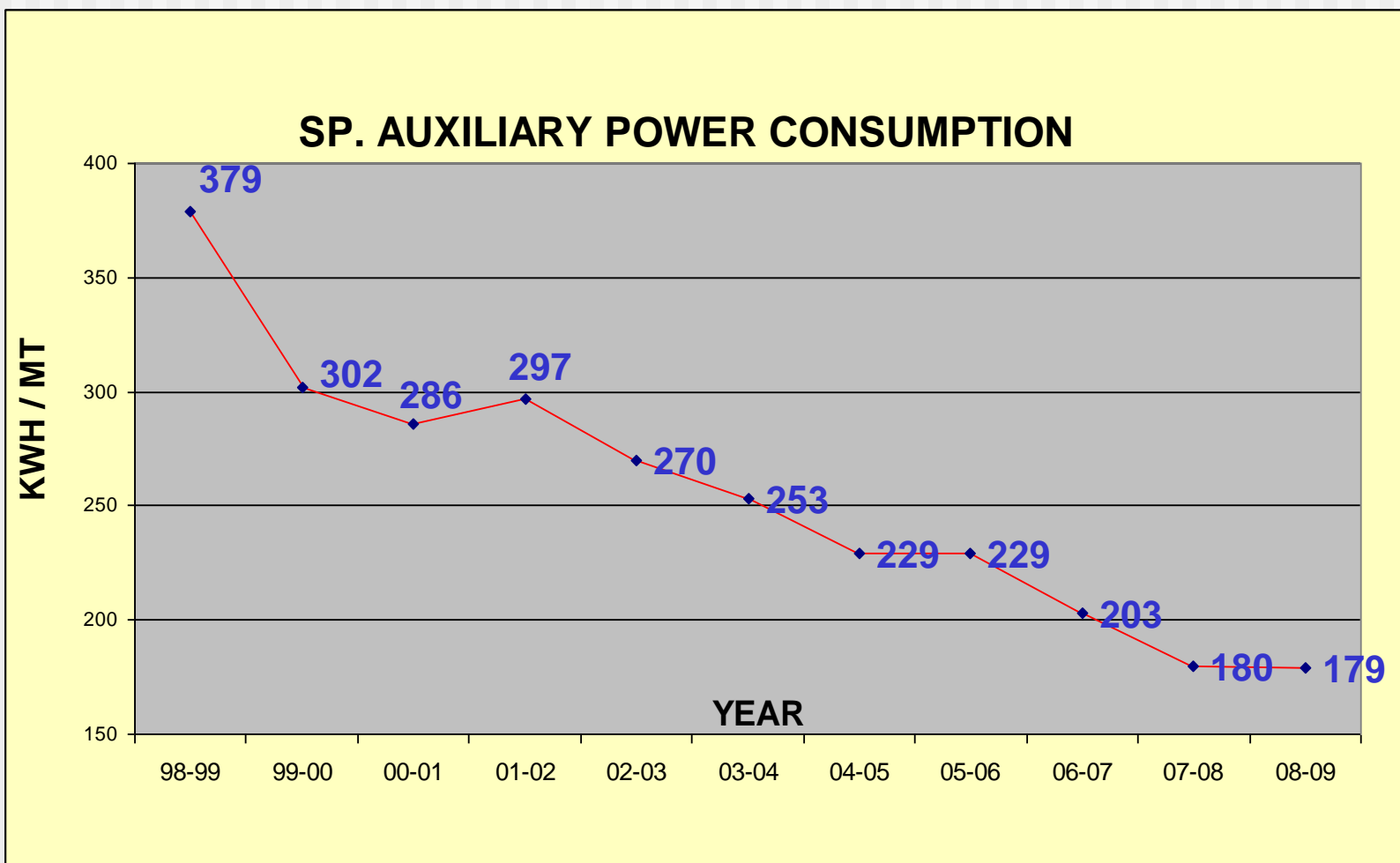
# Power consumption per ton of NaOH since 1976



# SP. RECTIFIER POWER CONSUMPTION



# SP. AUXILIARY POWER CONSUMPTION



## Steps taken towards Energy conservation at Dahej Complex

- Regular timely replacement of of New Energy Efficient membranes at in 2003 – 04 and in 2006-07 & 2007-08 Saving had achieved in three years.
- Amount save in Three years 1875.68 Rs. lakhs
- Energy saved in Three years 574.64 kwh lakhs

# Mini STG Installation across PRDS in CCP

- Mini Steam Turbine installed across the PRDS in CCP which produced the 800 kw power by utilizing the pressure drop from 20kg/cm<sup>2</sup> to 2 kg/cm<sup>2</sup>
- Total power generated per year : 31.68 kwh lakh
- Total amount saved per year 60.00 Rs. Lakhs

# Optimization of pumps and Motors

- Replaced the higher size pumps and motors with lower suitable size.
- Total power generated  
per year : 1.91 kwh lakh
- Total amount saved  
per year 3.97 Rs. Lakhs

# Optimization of operation of pumps

- By installing Redox meter in Hypo system for monitoring the chlorine quality and Hypo monitoring one number 75 KW pump was only run instead of two pumps.
- Power saved per annum -  
3.48 KWH lakhs
- Amount saved per annum -  
6.92 Rs. lakhs

# Performance improvement of pumps

- Over hauling the pumps, motors and replacing the warned out impellers, the efficiency of the pumps improved.
- Electrical energy saved
  - kwh-Lakhs : 53.01
- Invest. Rs.(Lakhs) : 10.00
- Saving Rs. (Lakhs) : 231.66

# Utilizing hydrogen in old CCU furnace as fuel instead of NG which saved the N.G. consumption.

- The CCU-1 (old) furnace was run with natural gas. By modifying the burner system to suit for hydrogen and natural gas dual firing system, which more or less the hydrogen gas only utilized instead of natural gas. After this modifications, the natural gas saved to the tune of 11963 Mkal/annum ( 17.55 lakhs NM3/Annum of Natural Gas)
- Investment: Rs.in lakhs 20 . 00
- Saving : Rs. in lakhs 169 . 62

# PERFORMANCE ENHANCEMENT OF WASTE HEAT RECOVERY UNIT – II BY ERECTING CPH

- WHRU-II Stack Temperature has reduced from 155 oC to 130 oC.
- Hence, L.P. Stream consumption in Dearator is reduced from 10 Mt. / Hr. to 6 Mt./Hr.
- STG generation is increased by 1MW (Approx.).
- Combined Cycle Heat Rate is improved by 40 Kcal / KWH.
- Net saving in terms of money:  
 $40 \times 81 \times 24000 \times 3.5 / 1870 = \text{Rs. } 1.45 \text{ Lac / day.}$
- Total Project Cost = Rs. 130 Lacs.
- Pay back period =  $130 / 1.45 = 90 \text{ days.}$

## Up-rating of GTG-1

- Up-rating of GTG-1 and replaced the turbine 2nd, 3rd path buckets and blades, which has given a better performance and reduced the heat rate from 3112kcal/kwh to 2936 kcal/kwh in open cycle.

NG saved in 2008-09 : 96.15 Lakhs SCM

Amount saved : 1,442.26 Lakhs Rs.

Expenditure incurred : 472.46 Lakhs Rs.

# Switching off 5 nos. Air Compressors and installing high Capacity Screw Compressors

- Five nos. of air compressors used to supply the air to individual plants. After installation of Energy Efficient Air Compressor (ATLASCOPCO), which alone supplies the air to all plants and stopped all other five compressors.
- Power saved per year  
kwh ( lakhs ) - 5.13
- Amount saved Rs. Lakh - 14. 98

# Saving of Thermal Energy

- Attending Steam leakages, providing thermal insulation properly on bare lines and replacing many defective steam traps and reduced the steam line pressure to 10 kg/cm<sup>2</sup> by which frequent pop up of pressure relief valve stopped. Thermal Energy saved is :
- Thermal energy saved 7792 MKcal per annum.
- Amount saved is 21.15 Rs. lakhs per annum

# Installation of VFDs

- Variable frequency drives installed to suit the process requirement to control the process variations on requirement basis.
- •Electrical energy saved kwh-Lakhs : 2.78
- Investment Rs.(Lakhs) : 8.00
- Saving Rs. (Lakhs) : 12.06

# Saving in Lighting System

- Installation of low voltage lighting transformers, Replacing conventional chokes with Electronic chokes and Energy efficient lamps in place of existing HPMV lamps.
- Electrical energy saved kwh-Lakhs : 1.49
- Investment Rs.(Lakhs) : 5.00
- Saving Rs. (Lakhs) : 5.78

# Steps taken towards Energy Management

- **Appointment of Full Time Energy Manager**
- **First company to use NG from GSPC as feed stock for 90 MW Captive Power Plant from November 2001 onwards**
- **Tapping the Low Pressure NG for Power plant from Jolwa fields by installation of compressor**

# Solar Cooking system installed for main canteen for cooking 500 persons

- Solar Cooking system installed for main canteen for cooking 500 persons. In place of Natural gas / LPG cylinders for cooking solar thermal system installed. Calculations per year basis is as given below :
- NG/LPG energy saved Mkcal : 705.60
- Investment Rs.(Lakhs) : 25.00
- Saving Rs. (Lakhs) : 8.25

# Steps taken towards Energy Management

- Arranging the sale of surplus power to GEB and thus improving the PLF of Captive Power Plant
- Arranging additional low cost Power from GIPCL
- Utilization of carbon dioxide from the stack gases of boiler for the production of potassium carbonate
- Changeover of Boiler from F O to NG in Baroda Complex

# Needs of Today

With the increasing demand for energy supplies, shrinking resources and increasing environmental degradation, the emphasis on renewable energy sources is increasing. Of all the renewable energy sources, Wind power has achieved rapidly increasing levels of technological and economic maturity in the past two decades and has reached a mature stage of development and presently Wind Power is one of the most popular and commercially exploited renewable energy options. Decreasing capital costs, a variety of production, capital and tax subsidies and more robust wind turbines has increased the potential opportunity for Wind Power to penetrate in both grid/connected and remote generation applications.

# Benefits of Wind Power Generation

- Environment friendly green power
- Favorable Govt. Policy for the development of wind Farm
- Lower Cost of Generation Per Kwh over the Life of the project (20 Years)
- Availability of Turn key Project developers
- Low Gestation Period for the Implementation of Project (5-6 Months)
- Effective hedging Against Rising Fuel Cost.
- CDM Benefits

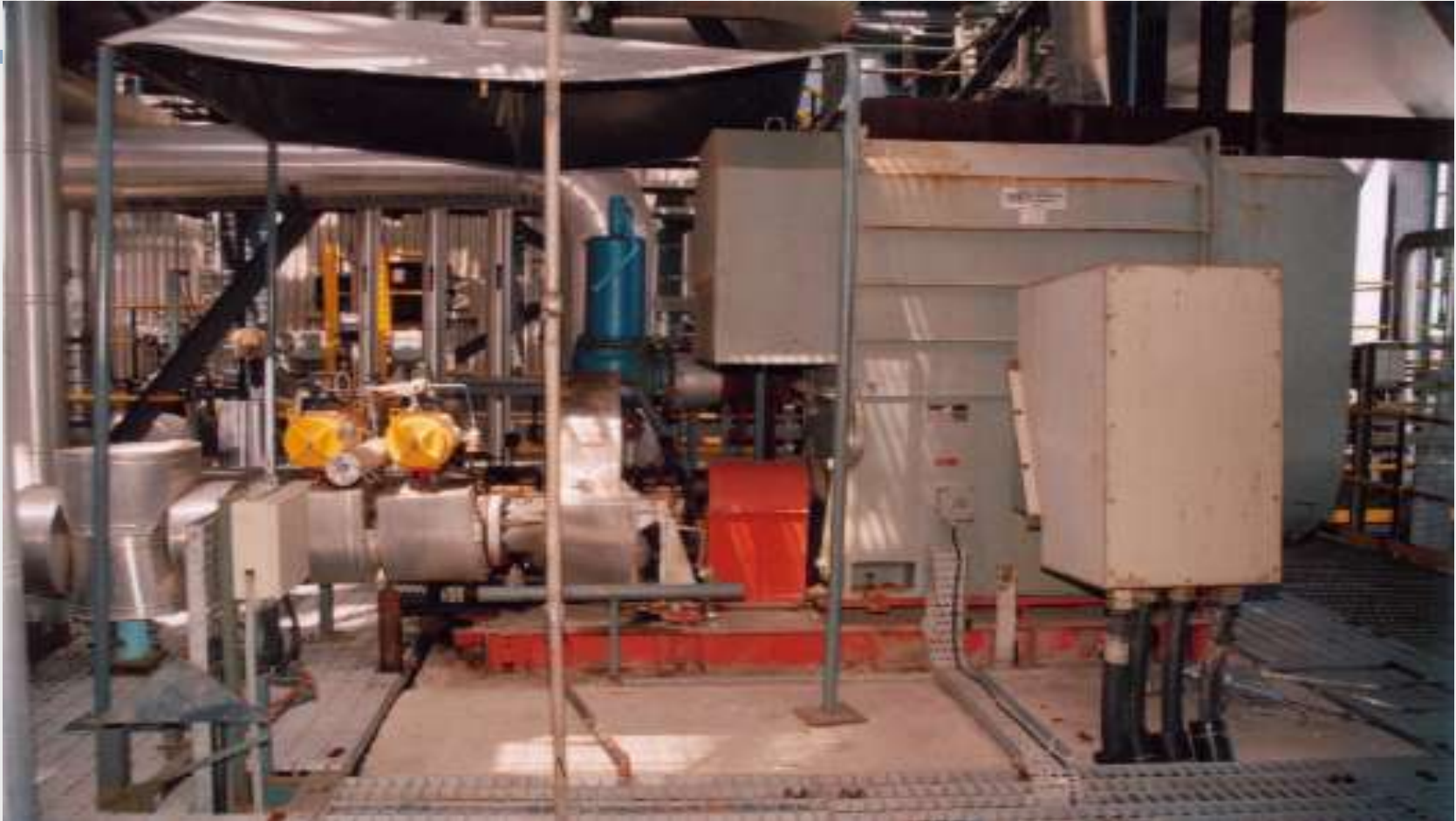
# GACL: Energy Conservation

## Membrane Cell- Overview



# GACL: Energy Conservation

## Mini Steam Turbo Generator



# Photos of Energy conservation



# Photos of Energy conservation



# Energy conservation is

- Energy conservation is a continuing process.
- It must be a part of normal work activities
- It requires active involvement of one and all
- It must have the full support of top management



## **GACL : Commitment**



**GACL – Thus remains committed to  
Energy Conservation and  
effective Energy Management**



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***THANK YOU***