

Form - 1
Format for Information regarding Total Energy Consumption and Energy Consumption per Unit of Production

Name of the company	:	Gujarat Alkalies & Chemicals Ltd.	
Full Address	:	P.O. Petrochemicals – 391346 Dist: Vadodara	
Contact Person	:	Mr. P.N. Parikh	
Email address	:	pnparikh@gacl.co.in	
Telephone number	:	0265 - 2230855	Fax Number: 0265 - 2232130
Plant Address	:	P.O. Petrochemicals – 391346 Dist: Vadodara	
A.	Power and Fuel Consumption	2003 / 2004*	
1.	Electricity		
(a)	Purchased		
	Contract demand	61970	kVA (Contract demand is required to be mentioned in kVA only as per Gujarat State Electricity Board)
	Connected load	69443	kW
	Annual consumption	4369.71	kWh lakhs
	Total cost	14264.91	Rs. Lakhs
(b)	Own Generation		
	(i) Through diesel generator		
	Annual generation	NIL	kWh
	Annual diesel consumption	NIL	kilo liters
	Total fuel costs	NIL	Rs. Lakhs
	(ii) Through steam turbine/generator		
	Annual generation	NIL	kWh
	Fuel used ¹	NIL	
	(iii) Through Gas Turbine		
	Annual generation	NIL	kWh

* Since Energy Manager, Mr. M.N. Patel, is also applying for this competition with 2004-05 data, therefore, 2003-04 data is filled in this test form.

¹ State which type of fuel or energy was used (C = coal, B = biomass, O = oil, G = gas, E = electricity). If coal was saved state which grade i.e. C/I = imported, or C/F coal of grade F.

2.	Coal quality (Gross calorific value)	NIL	kCal/kg
	Annual consumption	NIL	Tonnes
	Total coal costs	NIL	Rs. Lakhs
3.	Oil		
	(i) Furnace oil	2003/ 2004	
	Annual consumption	5662.20	kilo liters
	Annual costs	611.43	Rs. Lakhs
	(ii) Low Sulphur Heavy Stock (LSHS)		
	Annual consumption	NIL	Tonnes
	Annual costs	NIL	Rs. Lakhs
	(iii) Hot Heavy Stock (HHS)		
	Annual consumption	NIL	Tonnes
	Annual costs	NIL	Rs. Lakhs
4.	Diesel Oil		
	(i) High Speed Diesel (HSD)		
	Annual consumption	NIL	kilo liters
	Annual costs	NIL	Rs. Lakhs
	(ii) Light Diesel Oil (LDO)		
	Annual consumption	NIL	kilo liters
	Annual costs	NIL	Rs. Lakhs
5.	Gas	2003 / 2004	
	(i) Compressed Natural Gas (CNG)		
	Gross calorific value	NIL	kCal/NM ³
	Annual consumption	NIL	NM ³
	Annual costs	NIL	Rs. Lakhs
	(ii) Liquefied Petroleum Gases (LPG)		
	Gross calorific value	NIL	kCal/kg
	Annual consumption	NIL	Tonnes
	Annual costs	NIL	Rs. Lakhs
	(iii) Piped Natural Gas (PNG)		
	Gross calorific value	8500	kCal/NM ³
	Annual consumption	30.90	NM ³
	Annual costs	112.785	Rs. Lakhs
6.	Biomass		
	Average moisture content, as fired	NIL	%
	Average Gross calorific value, as fired	NIL	kCal/kg
	Annual consumption	NIL	MT
	Annual biomass costs	NIL	Rs. Lakhs

B. Product mix specifications²

Product name 1:	Caustic Soda Lye (50% Concentration)	MT	(units)
Product name 2:	Caustic Potash Lye (50% Concentration)	MT	(units)
Product name 3:	Caustic Soda Flakes (Solid)	MT	(units)
Product name 4:	Chlorine (99.99%)	MT	(units)

It is suggested to include 'C' as under since title describes power consumption per unit of product.

C. Energy Consumption per unit of Production

		Electrical (kWh/unit)	Thermal (Million K.Cal/unit)
Product name 1:	Caustic Soda Lye (50%)	2519	0.4923
Product name 2:	Caustic Potash Lye (50%)	1950	0.5169
Product name 3:	Caustic Soda Flakes	40	0.300
Product name 4:	Chlorine	Co-product of along with product 1	Co-product of along with product 1
Product name 5:	Hydrogen	Co-product of along with product 1	Co-product of along with product 1

Remark: Electricity is consumed to produce Caustic soda/Potash Lye, chlorine and Hydrogen simultaneously and hence the specific energy consumption can not be separated out for only one

² For example if you are a cement manufacturing unit producing different grades of cement, you may like to say under product name 1: OPC grade – XXX Tonnes and under product name 2: Portland slag cement– XXX Tonnes and so on.

of the product mix in chlor-alkali sector.

Comments:

1. Sector should be identified in the form –1. (i.e Chlor-Alkali, Fertilizer, Alumina etc.)

2. For chlor-alkali sector Form-1 is suggested to modify to indicate

a. Type of Electrolysers: Membrane /Mercury/Diaphragm

b. Electrolysis A.C. power consumed to make Caustic Soda of 50 % concentration

(Membrane Cell technology gives only 32 % Concentration and hence it will require thermal energy to concentrate it to 50 %, which is a national standard. Thermal energy can be converted to equivalent electrical units)

Form - 2

Format for reporting status of implementation of energy conservation measures based on business plan of the company

Sl. No.	Description of measure	Category ¹	Investment (Rupees in lakhs)	Verified savings ² (Rupees in lacs)	Verified energy savings	Units ³	Fuel ⁴
1	Old membranes have been replaced by new energy efficient membranes of Electrolizers by which considerable amount of power is saved.	14	1700.00	779.38	238.74	Lacs kWh	E
2	Recycling of gland/seal water of caustic evaporation unit (DM water)	1	0.68	7.10	0.176	Lacs kWh	E
3	Recycling of seal water of vacuum pumps of caustic evaporation units (cooling water)	1	0.88	5.43	0.35	Lacs kWh	E
4	Shifted/replaced 3 pump-motors of 2900 rpm by 1400 rpm in Sodium Hypo plant (Spare available)	4	NIL	4.00	1.23	Lacs kWh	E
5	Recovery of HCl from sampling system. This saves neutralizing of the same in the effluent by caustic soda	8	1.00	2.25	112.5	Tons	
6	Installation of one low voltage Lighting Transformer for corporate building	9	1.20	1.49	0.495	Lacs kWh	E
7	Electrical Water Coolers, 4 Nos. have been replaced by in-house fabricated water coolers, utilizing spare chiller capacity.	8	0.10	0.10	0.05	Lacs kWh	E
8	Installation of two variable frequency drives to replace a level control valve of cooling water pit	4	2.50	0.70	0.2136	Lacs kWh	E
9	Hot insulation replacement in steam piping	7	2.82	0.45	3.75	KL OIL	O
10	Replacement of damaged leaking chilled water pipes	8	2.99	0.75	0.15	Lacs kWh	E
11	Cold insulation replacement in chilled water piping	7	4.58	1.12	0.224	Lacs kWh	E

Category –14 is suggested in form-3 which is **specific to the industry of chlor-alkali** which requires membranes to be replaced every three years for efficient energy use in the plants with membrane –cell electrolyzers.

¹ Use “C” number of form 3 as reference

² First year

³ Use conventional energy, volume or mass units with proper prefix k = 10³, M = 10⁶, G = 10⁹

⁴ State which type of fuel or energy was saved (C = coal, B = biomass, O = oil, G = gas, E = electricity). If coal was saved state which grade i.e. C/I = imported, or C/F coal of grade F.

Form - 3

Executive Summary of appraised Energy Conservation potential as identified in energy auditor report

C. No.	Area of improvement and modification	Investment (Lakh Rs.)	First year energy ¹ savings					First year cost reduction ² , Lakh Rs.					Life cycle years ³
			Oil (KL)	Gas (M ³)	Coal	Electricity (Lakhs-kWh)	Other Chemicals	Oil	Gas	Coal	electricity	Other: Chemicals	
1.	Better house keeping measures	4.65		-	-	2.676	-	0.5	-	-	13.38	-	10
2.	Installation of improved process monitoring and control instrumentation, or software	15		-	-	-	-	2.0	-	-	-	3.00	10
3.	Measures in the area of lighting	2.7	-	-	-	0.016	-	-	-	-	0.08	-	05
4.	Sizing, changing and controlling electric motors including variable speed drives	2.5	-	-	-	0.2136	-	-	-	-	0.70	-	10
5.	Retrofitting, modification or sizing of fans, blowers, pumps, including duct systems	1.5	-	-	-	2.42	-	-	-	-	6.0	-	05
6.	Performance improvement of compressors and compressed air distribution system (by reduction in discharge pressure)	Nil	-	-	-	0.45	-	-	-	-	2.25	-	05
7.	Improved insulation against heat or cold losses	7.40	50	-	-	-	-	-	-	-	1.57	-	05
8.	Recovery of waste heat for process heat or power generation (evaporator replacement)	8.0	75	-	-	-	-	-	-	-	9.0	-	05
9.	Loss reduction in transformers and power distribution within firm	1.20	-	-	-	0.495	-	-	-	-	1.49	-	15
10.	Fuel switching measures from fossil to fossil or fossil to renewable energy	10.00	3019	-	-	-	-	-	-	-	174.00	-	10

¹ Use commercial units of litre, kg, tons, normal cubic meter, kWh or MWh and indicate the unit. Indicate the anticipated potential in energy savings.

² Anticipated cost savings in the first year based on anticipated fuel savings.

³ Estimate the predicted life of the measure, meaning the number of years the level of first year energy savings or even larger amounts will materialise.

C. No	Area of improvement and modification	Investment (Lakh Rs.)	First year energy savings					First year cost reduction, Lakh Rs.					Life cycle years
			Oil	Gas	Coal	Electricity (Lakh kWh)	Other	Oil	Gas	Coal	Electricity	Other	
11.	Improvement of prime mover performance such as gas, steam, water, turbines or internal combustion engines	Nil	-	-	-	-	-	-	-	-	-	-	-
12.	Improvement of steam boilers and reduction of losses in steam distribution lines	Nil	-	-	-	-	-	-	-	-	-	-	-
13.	Modernization measures with benefits of energy consumption reduction USED LATEST VERSION-IV, ELECTROLYSERS IN PLACE OF VER.-I	784	-	-	-	23.3	-	-	-	-	64.56	-	10
14.	Replacement of equipments/ part of equipments to reduce energy consumption (i.e. membranes in chlor-alkali electrolyzers)	1700	-	-	-	238.74	-	-	-	-	779.4	-	5

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