



Driving Excellence

Best Practices: Energy, Environment & Efficiency

+

•

Gujarat Alkalies and Chemicals Limited

Dahej Complex

○

GACL: An Introduction



Gujarat Alkalies and Chemicals Limited (GACL), a forward-thinking corporation backed by the Government of Gujarat, has grown into one of the largest producers in the chlor alkali sector in India, spread over two complexes, Dahej and Vadodara, respectively.



With a VISION to be identified and recognized as a dynamic, modern, and eco-friendly chemical company with enduring ethics and values, as well as a MISSION to manage our business responsibly and sensitively, we strive for continuous improvement in performance and contribution to CSR activities in general.



In order to improve sustainability, GACL has developed a 90MW Combined Cycle Captive Power Plant at its Dahej complex. Furthermore, it owns 171.45 MW of wind farms and 36 MW of solar power plants.

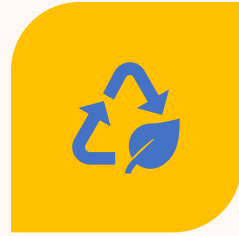
Importance of Energy Efficiency Chlor-Alkali Industries



OPTIMIZED POWER USE: EFFICIENT POWER CONSUMPTION, CRUCIAL IN CHLOR-ALKALI'S ELECTROLYSIS PROCESSES, BOOSTS COMPETITIVENESS AND CUTS COST



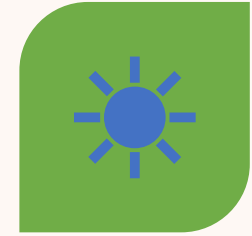
REDUCED GAS CONSUMPTION: EFFICIENT PROCESSES REDUCES DEPENDENCY ON FOSSIL FUELS.



EMISSION REDUCTION: ENERGY EFFICIENCY DIRECTLY CUTS GREENHOUSE GASES, VITAL FOR SUSTAINABILITY AND REGULATORY COMPLIANCE.



CARBON FOOTPRINT: LOWER ENERGY PER UNIT OF PRODUCTION SLASHES CHLOR-ALKALI'S SUBSTANTIAL CARBON FOOTPRINT.



RENEWABLE INTEGRATION: EFFICIENCY DRIVES ADOPTION OF SOLAR/ WIND POWER, REDUCING DEPENDENCY ON CARBON-INTENSIVE SOURCES.

Key Energy Consumption Factors Chlor-Alkali Industries

- Electrolysis Process Optimization
- Heat Recovery Strategies
- Effective Waste Management

Crucial Factors

- Reduced Energy Consumption
- Lower Operation Cost
- Minimize Environmental Impact
- Business Growth

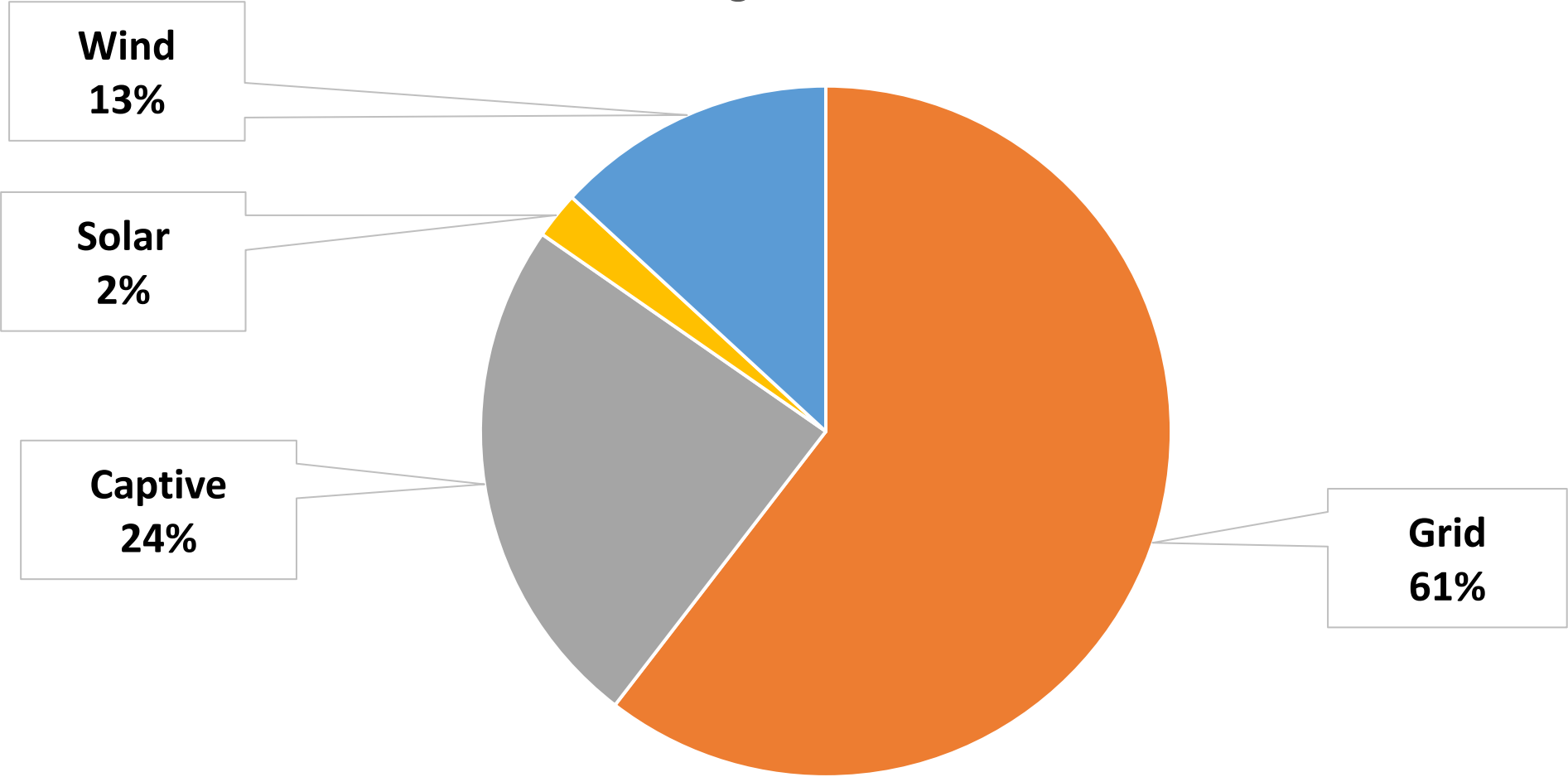
Benefits

- Regulatory Barriers
- High Investment Cost
- Resistance to change
- AI Utilization

Challenges

Renewable Energy Integration GACL Dahej

Existing Power Secnario



Best Practices : Energy Audit

PAT Scheme Compliance

GACL Dahej adheres to the Perform, Achieve, and Trade (PAT) Scheme, necessitating mandatory energy audits every three years for DC Plants. This ensures continuous monitoring and improvement of energy performance.

Non-DC Plant Audits

Energy audits for Non-DC plants are conducted regularly, ensuring comprehensive coverage of energy efficiency measures across the facility.

ISO 50001 Compliance

The plant maintains regular compliance with ISO 50001 standards, demonstrating a structured approach to energy management. This systematic framework ensures continual improvement in energy performance and efficiency.

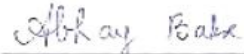


CERTIFICATE OF APPRECIATION

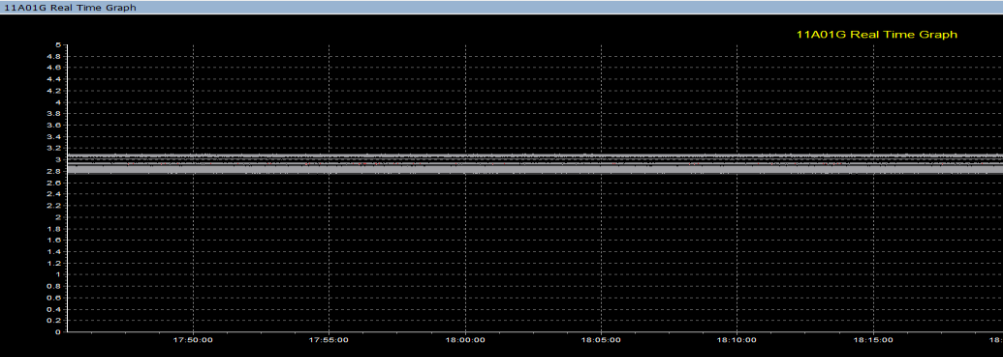
This is to certify that M/s. **GACL, Dahej, Gujarat**
has been recognised as a Top Performer Designated Consumer for **Chlor Alkali**
Sector of **PAT Cycle II** under **National Mission for Enhanced Energy Efficiency (NMEEE)**.

This Certificate is presented on 1st March, 2023 by

Hon'ble Cabinet Minister (Power, New and Renewable Energy) Shri R.K. Singh
on the occasion of 21st BEE Foundation Day and celebration of 1st Decade of PAT Scheme.


Mission Director
(NMEEE)





Current		Catholyte Outlet T*		Catholyte Concentr.		Calc Total Voltage		11A01G		EMOS Pinhole Detector	
kA	°C	% w/w	VDC	Tag	Startup	Shutdown	Status				
11A01G	10.4	11A01G	87.8	Plant	32.1	11A01G	411.0	11A01G	OFF	OFF	250

Rack-1		Rack-2		Rack-3		Rack-4		Rack-5	
Cell No.	Volt	Cell No.	Volt	Cell No.	Volt	Cell No.	Volt	Cell No.	Volt
001	2.927	019	2.800	037	2.843	055	2.895	073	2.922
002	2.804	020	2.784	038	2.825	056	2.840	074	2.877
003	2.805	021	2.806	039	2.821	057	2.823	075	2.831
004	2.791	022	2.803	040	2.801	058	2.840	076	2.843
005	2.830	023	2.808	041	2.801	059	2.824	077	2.780
006	2.855	024	2.807	042	2.806	060	2.821	078	2.806
007	2.864	025	2.802	043	2.802	061	2.778	079	2.803
008	2.870	026	2.804	044	2.806	062	2.772	080	2.792
009	2.827	027	2.802	045	2.812	063	2.845	081	2.793
010	2.832	028	2.802	046	2.813	064	2.829	082	2.782
011	2.843	029	2.802	047	2.805	065	2.784	083	2.793
012	2.843	030	2.813	048	2.817	066	2.887	084	2.796
013	2.869	031	2.812	049	2.863	067	2.783	085	2.894
014	2.895	032	2.802	050	2.837	068	2.778	086	2.882
015	2.926	033	2.810	051	2.842	069	2.794	087	2.810
016	2.794	034	2.810	052	2.834	070	2.794	088	2.783
017	2.799	035	2.855	053	2.830	071	2.821	089	2.834
018	2.805	036	2.805	054	2.832	072	2.857	090	2.828

Calculated SIL Alarms (V)					Calculated Voltages (V)				Cells Recognition			
LOLO	LO	TIHV HI	TIHV HIHI	NGHV	Min	Max	Avg	Sum	Expected	Detected		
11A01G	2.531	2.581	3.088	3.154	3.001	11A01G	2.758	3.099	2.859	411.598	144	144

TOTAL VOLTAGE (V)				
RACK-1	RACK-2	RACK-3	RACK-4	
11A01G	101.6	101.5	102.0	106.5

Best Practices : Cell Voltage Monitoring System (R2)

Key Features

- Real Time Voltage Monitoring
- Early Detection of Issues
- Cell Performance Optimization
- Data Logging and Analysis
- Integration with Control Systems

Benefits

- Data-Driven Decision Making enforces
 - Improved Efficiency
 - Enhanced Reliability
 - Cost Savings

Best Practices : Caustic Evaporation Unit


Key Points

- 700 TPD Caustic Evaporation Unit
- Energy Efficient Plate Type Heat Exchangers (PHE)
- Energy efficient Steam Consumption
- Largest Capacity in the Nation

Impact

- Lower Operating Costs
- Reduced Energy Consumption
- Compact Space





Floating Solar Panel on Reservoir

Capacity – 0.732 KW

Best Practices: Engineering Service Dept

Individual Cell Voltage Monitoring:	Real-time monitoring for efficient electrolysis process optimization.
Cl₂ Tonner Temperature Monitoring & Tracking:	Ensures safe handling during filling & used RFID system for efficient tracking.
H₂ Pipeline Supply:	Direct, efficient supply at 50 Bar(G) to partners reduces logistics and enhances reliability.
Flameproof IIC Static Earthing Relay:	Enhances safety during H ₂ bottling with modern static earthing systems.
Radio Remote Units (RRC) for Crane Safety:	Prevents breakdowns, improving equipment reliability and worker safety.
HVAC AHU System Upgrade:	Replacement with new energy efficient units
Energy Saving Installations:	LED lights, efficient motors, VFD drives, and microprocessor relays reduce energy consumption.
Standard Operation Procedure:	Selection criteria for energy efficient cell system and membranes



Best Practices: Effluent Treatment

Key Features:

- **3300 KLD Wastewater Treatment Plant**
- **Effluent Input: 3300 KLD**
- **Treated Water Capacity: 2490 KLD**

Impact:

- **Reduced Environmental Footprint**
- **Conservation of Water Resources**
- **Enhanced Environmental Compliance**

Compliance Certification



CERTIFICATE

Management system as per
ISO 45001 : 2018

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

GUJARAT ALKALIES & CHEMICALS LIMITED
PO: Dahej, Taluka: Vagara,
Dist: Bharuch - 392 130,
Gujarat,
India



operates a management system in accordance with the requirements of ISO 45001 : 2018 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Manufacture of Chlor Alkali and Allied Chemicals with Associated Utilities /Supporting Services.

Certificate Registration No. **44 126 110916**
Audit Report No. **2.5-5061/2011**

Valid from **12.05.2023**
Valid until **11.05.2026**
Initial certification **28.05.2011** (BS OHSAS 18001)

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **06.05.2023**

TÜV NORD CERT GmbH Am TÜV 1 45307 Essen www.tuev-nord-cert.com
TUV India Pvt. Ltd., 801, Raheja Plaza - 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in



CERTIFICATE

Management system as per
ISO 14001 : 2015

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

GUJARAT ALKALIES & CHEMICALS LIMITED
PO: Dahej, Taluka: Vagara,
Dist: Bharuch - 392 130,
Gujarat,
India



operates a management system in accordance with the requirements of ISO 14001 : 2015 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Manufacture of Chlor Alkali and Allied Chemicals with Associated Utilities /Supporting Services.

Certificate Registration No. **44 104 114159**
Audit Report No. **2.5-5061/2011**

Valid from **12.05.2023**
Valid until **11.05.2026**
Initial certification **30.04.2011**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **06.05.2023**

TÜV NORD CERT GmbH Am TÜV 1 45307 Essen www.tuev-nord-cert.com
TUV India Pvt. Ltd., 801, Raheja Plaza - 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in



CERTIFICATE

Management system as per
ISO 50001 : 2018

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

GUJARAT ALKALIES & CHEMICALS LIMITED
PO: Dahej, Taluka: Vagara,
Dist: Bharuch - 392 130,
Gujarat,
India



operates a management system in accordance with the requirements of ISO 50001 : 2018 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Manufacture of Chlor Alkali and Allied Chemicals with Associated Utilities /Supporting Services.

Certificate Registration No. **44 764 17391321**
Audit Report No. **2.5-5061/2011**

Valid from **11.05.2023**
Valid until **10.05.2026**
Initial certification **17.05.2017**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **06.05.2023**

TÜV NORD CERT GmbH Am TÜV 1 45307 Essen www.tuev-nord-cert.com
TUV India Pvt. Ltd., 801, Raheja Plaza - 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in



CERTIFICATE

Management system as per
ISO 9001 : 2015

The Certification Body TÜV NORD CERT GmbH hereby confirms as a result of the audit, assessment and certification decision according to ISO/IEC 17021-1:2015, that the organization

GUJARAT ALKALIES & CHEMICALS LIMITED
PO: Dahej, Taluka: Vagara,
Dist: Bharuch - 392 130,
Gujarat,
India



operates a management system in accordance with the requirements of ISO 9001 : 2015 and will be assessed for conformity within the 3 year term of validity of the certificate.

Scope -

Manufacture and Supply of Chlor Alkali and Allied Chemicals with Associated Utilities /Supporting Services.

Certificate Registration No. **44 100 114159**
Audit Report No. **2.5-5061/2011**

Valid from **12.05.2023**
Valid until **11.05.2026**
Initial certification **30.04.2011**

Certification Body
at TÜV NORD CERT GmbH

Mumbai, **06.05.2023**

TÜV NORD CERT GmbH Am TÜV 1 45307 Essen www.tuev-nord-cert.com
TUV India Pvt. Ltd., 801, Raheja Plaza - 1, L.B.S. Marg, Ghatkopar (W), Mumbai - 400 086, India www.tuv-nord.com/in



Best Practices : Safety



PERSONAL SAFETY LIFE SAVING RULES

- BYPASSING SAFETY CONTROLS**
Obtain authorisation before overriding or disabling safety controls.
- WORK AUTHORISATION**
Work with a valid permit when required.
- ENERGY ISOLATION**
Verify isolation and zero energy before work begins.
- CONFINED SPACE**
Obtain authorisation before entering a confined space.
- WORKING AT HEIGHT**
Protect yourself against a fall when working at height.
- HOT WORK**
Control flammable and ignition sources.
- SAFE MECHANICAL LIFTING**
Plan lifting operations and control the area.
- LINE OF FIRE**
Keep yourself and others out of the line of fire.
- DRIVING**
Follow safe driving rules.

Product – Special Certifications

For any other communication

Address: Ahmedabad Branch Office-II-3rd Floor, Navajivan Amrut Jayanti Bhavan, Behind Gujarat Vidyapith, Off. Ashram Road, Ahmedabad, AHMEDABAD, GUJARAT, 380014

Phone: 079-27540317, 27540318, 27540319, 27540320

Fax: 07927540636

E-Mail: ahbo-2@bis.gov.in

Web: www.bis.org.in, www.manakonline.in

BUREAU OF INDIAN STANDARDS

Attachment to Licence No. CML- 7200130386

CM/L-No	Name of the Licensee with the Factory Address	Name of the Product	Indian Standard No.
7200130386	GUJARAT ALKALIES AND CHEMICALS LIMITED -GUJARAT ALKALIES AND CHEMICALS LIMITED , P.O. DAHEJ, TAL VAGRA , BHARUCH : 392130	CAUSTIC SODA - SPECIFICATION	IS 252 : 2013

Endorsement No. 5 Dated 01/09/2023

Whereas, the licence was valid upto Twenty Seventh September Two Thousand Twenty Three.

Now, consequent upon renewal, the validity of the licence given in schedule of the Licence Dated 26-SEP-2023 has been extended from Twenty Seventh September Two Thousand Twenty Three to Twenty Sixth September Two Thousand Twenty Four

Other terms and conditions of licence remain same.

Branch Head (Vadodra Branch Office)

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002. ,9 Bahadur Shah Zafar Marg, ,DELHI,110002

Contact No: +91 11 23230131, 23233375, 23239402

Fax: +91 11 23234062, 232

Email: info@bis.gov.in



The Public Health and Safety Organization

NSF Product and Service Listings

These NSF Official Listings are current as of **Monday, February 26, 2024** at 12:15 a.m. Eastern Time. Please [contact NSF](#) to confirm the status of any Listing, report errors, or make suggestions.

Alert: NSF is concerned about fraudulent downloading and manipulation of website text. Always confirm this information by clicking on the below link for the most accurate information: <http://info.nsf.org/Certified/PosChemicals/Listings.asp?Company=C053865&>

NSF/ANSI/CAN 60 Drinking Water Treatment Chemicals - Health Effects

Gujarat Alkalies and Chemicals Limited

PO Dahej, Tal Vagra
Bharuch, Gujarat 391346
India
91 265 2232681

Facility : Bharuch, Gujarat, India

Polyaluminum Chloride[AL]

Trade Designation
PAC10
PAC30

Product Function
Coagulation & Flocculation
Coagulation & Flocculation

Max Use
200mg/L
200mg/L

[AL] Based on an evaluation of health effects data, the level of aluminum in the finished drinking water shall not exceed 2 mg/L.

Sodium Hydroxide

Trade Designation
Caustic Soda Flakes

Product Function
Corrosion & Scale Control
pH Adjustment
Corrosion & Scale Control
pH Adjustment
Corrosion & Scale Control
pH Adjustment

Max Use
800mg/L
800mg/L
800mg/L
800mg/L

NOTE: Only products bearing the NSF Mark on the product, product packaging, and/or documentation shipped with the product are Certified.

Number of matching Manufacturers is 1
Number of matching Products is 5
Processing time was 0 seconds



Thank You...

