CII National Award for Excellence in Energy Management - 2022

AGI Glaspac – Bhongir (HSIL Ltd)

AGI glaspac

Presented By :
Sunil Kumar Verma
AGM - Electrical

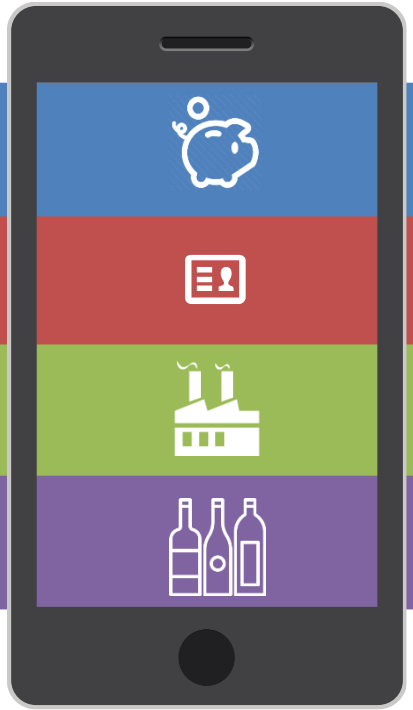
AGI glaspac-Snapshot

01 Rs. 1500+ Crores (209 million USD) Sales Every Year

02 Leading Container Glass Manufacturer from India

03 Installed Capacity Of 1600 Metric Tonnes/Day

04 Capable to Manufacture Container Size from 5 ml to 5000 ml



Our Mission

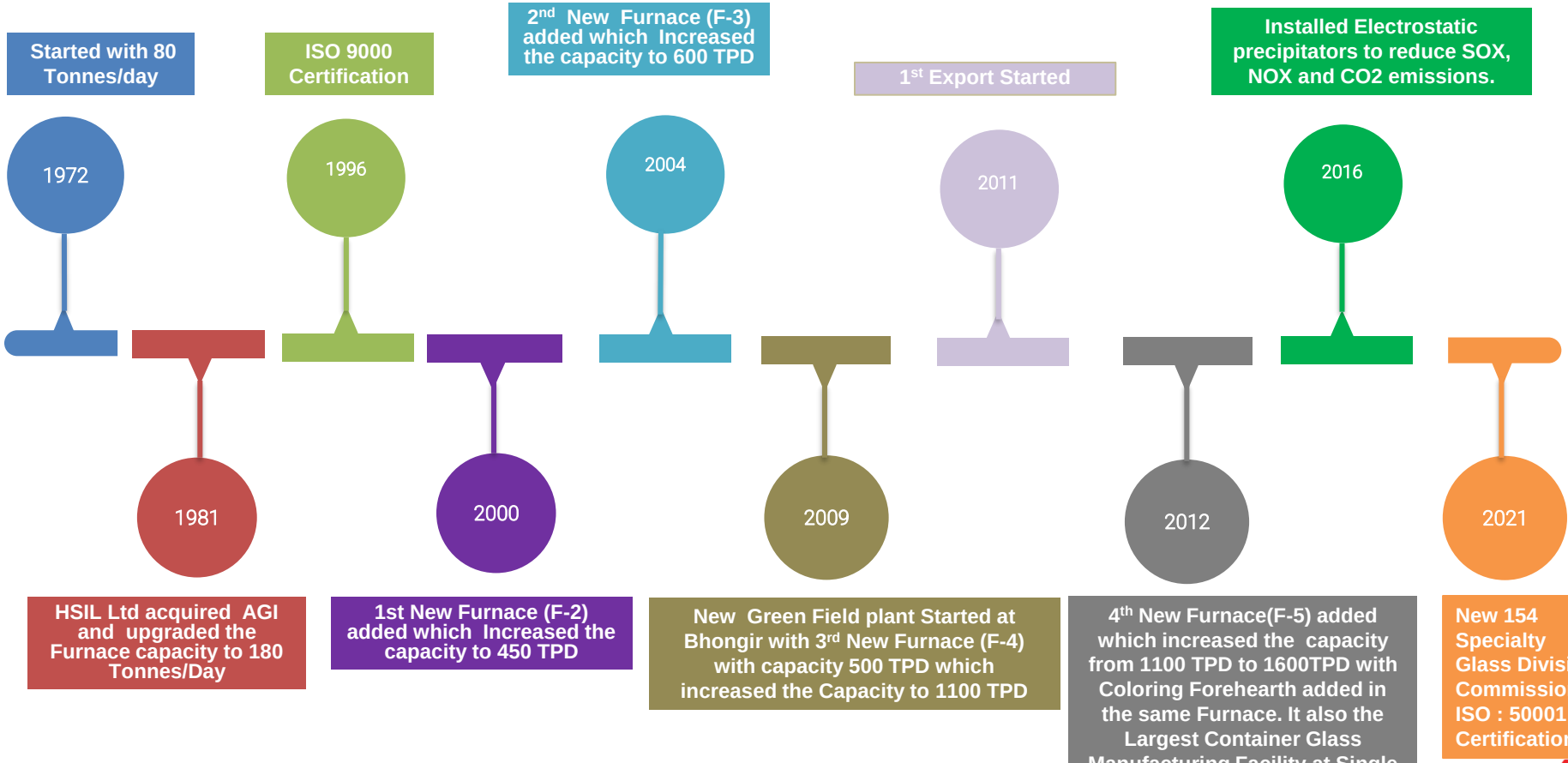
Innovative and Eco-friendly Glass Packaging Solutions

Our Vision

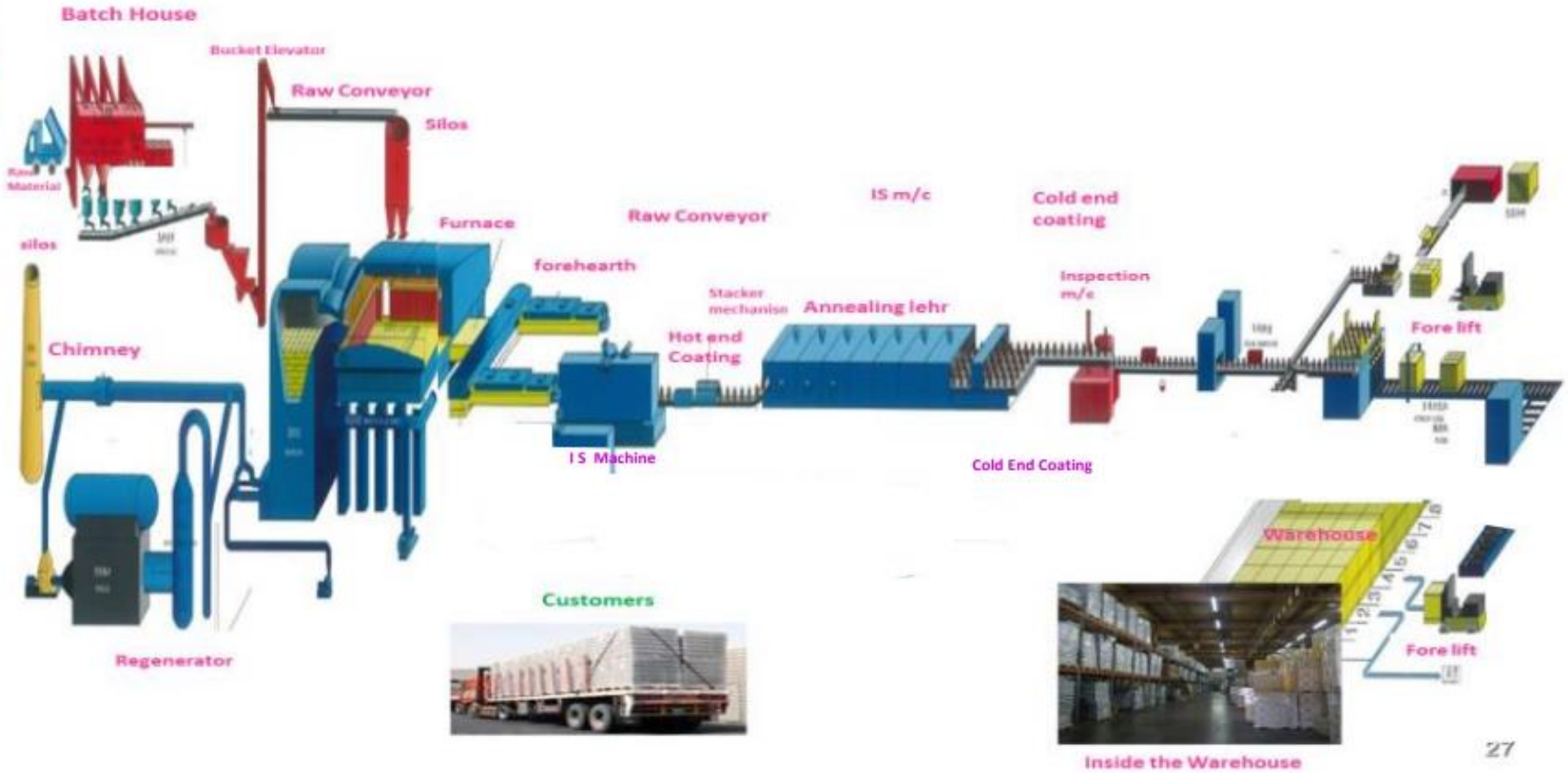
To Be The Most Preferred Glass Company Creating Value For The Customers And Stakeholders

AGI glaspac

Our Journey....


Started with 80 Tonnes/day
1972
1981
HSIL Ltd acquired AGI and upgraded the Furnace capacity to 180 Tonnes/Day
ISO 9000 Certification
1996
2000
1st New Furnace (F-2) added which Increased the capacity to 450 TPD
2nd New Furnace (F-3) added which Increased the capacity to 600 TPD
2004
2009
New Green Field plant Started at Bhongir with 3rd New Furnace (F-4) with capacity 500 TPD which increased the Capacity to 1100 TPD
1st Export Started
2011
2012
4th New Furnace(F-5) added which increased the capacity from 1100 TPD to 1600TPD with Coloring Forehearth added in the same Furnace. It also the Largest Container Glass Manufacturing Facility at Single Location in Asia
Installed Electrostatic precipitators to reduce SOX, NOX and CO2 emissions.
2016
2021
New 154 Specialty Glass Division Commissioned ISO : 50001 Certification

Manufacturing Process of Glass Containers – 3D Lay out



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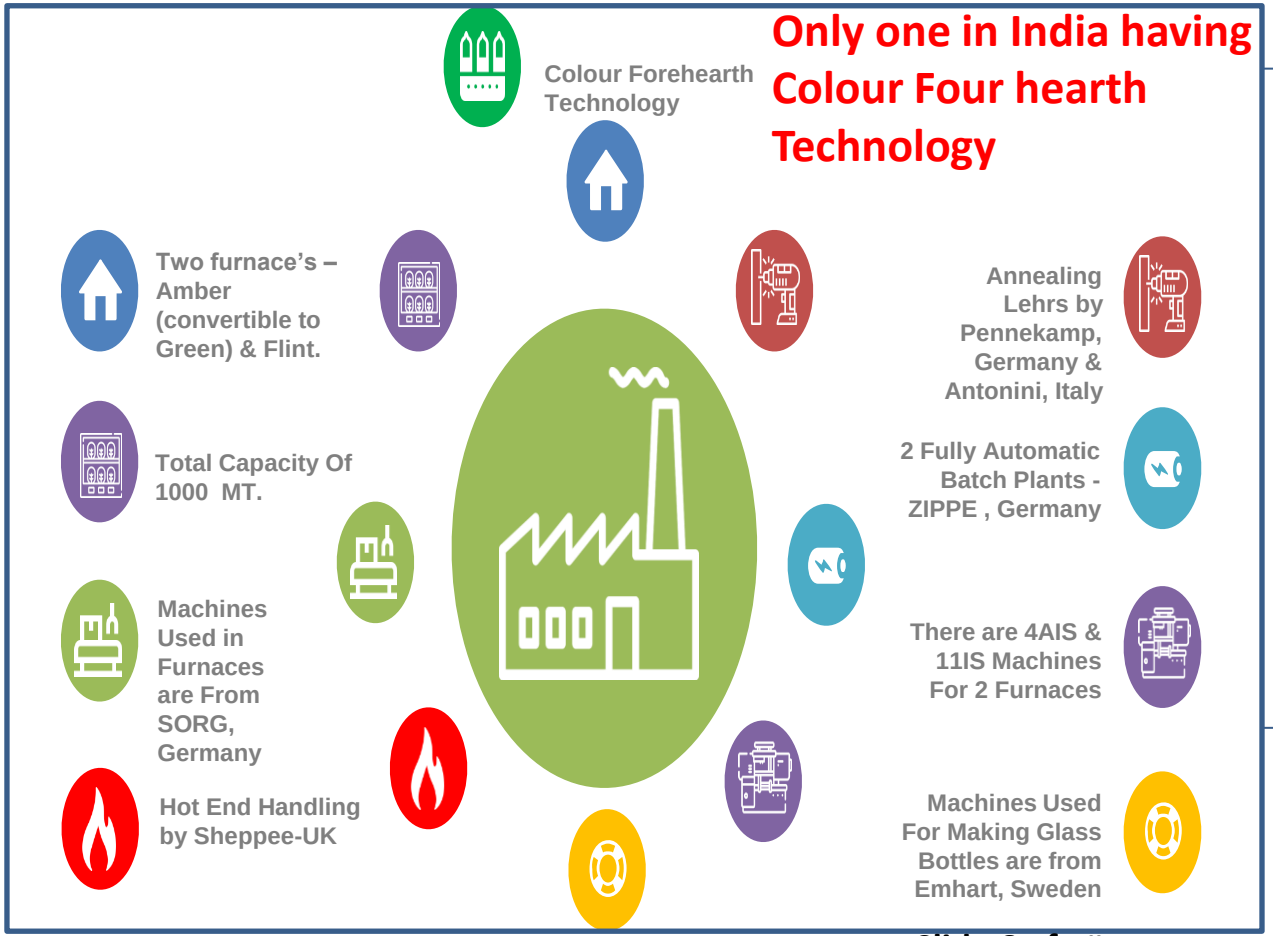
AGI glaspac Bhongir Manufacturing



- Process : Fully Automated
- Forming Techniques
  - Blow – Blow
  - Press – Blow
  - NNPB
- Size of container Glass
  5 ml to 5000 ml

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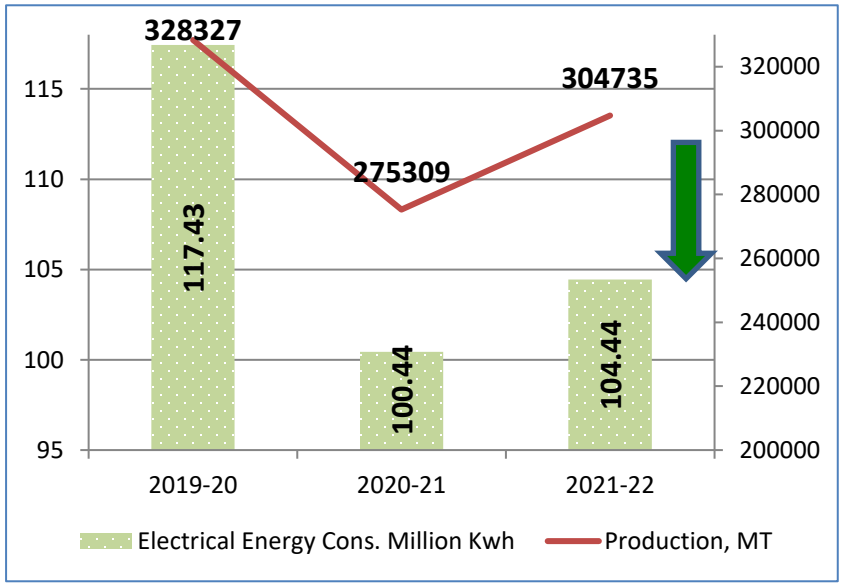
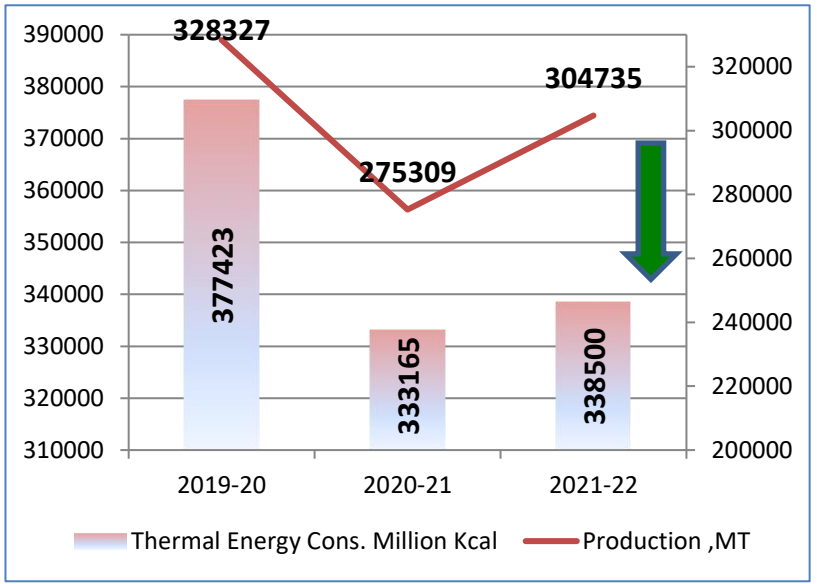
Electrical & Thermal Energy

Electrical Energy Cons. Million Kwh



Thermal Energy Cons. Million Kcal

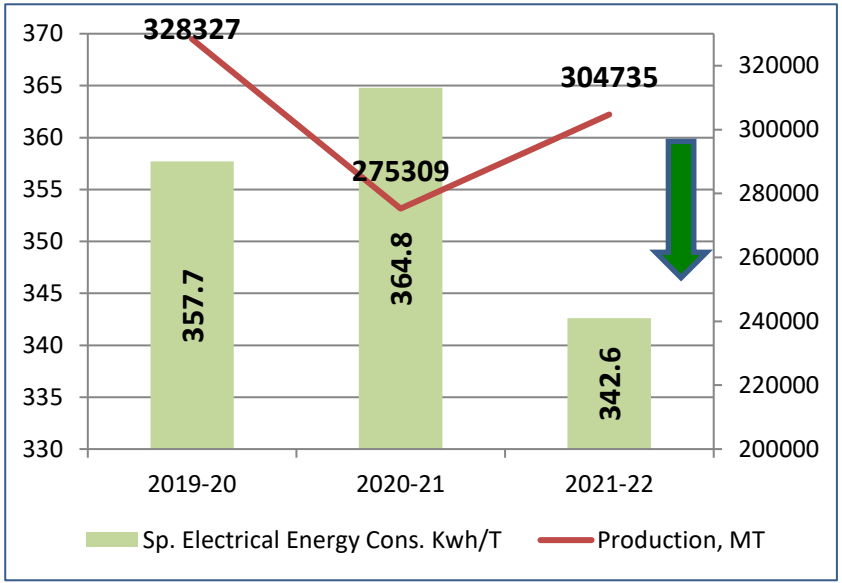


Production affected by COVID in 20-21 & 21-22 by 7.2 %

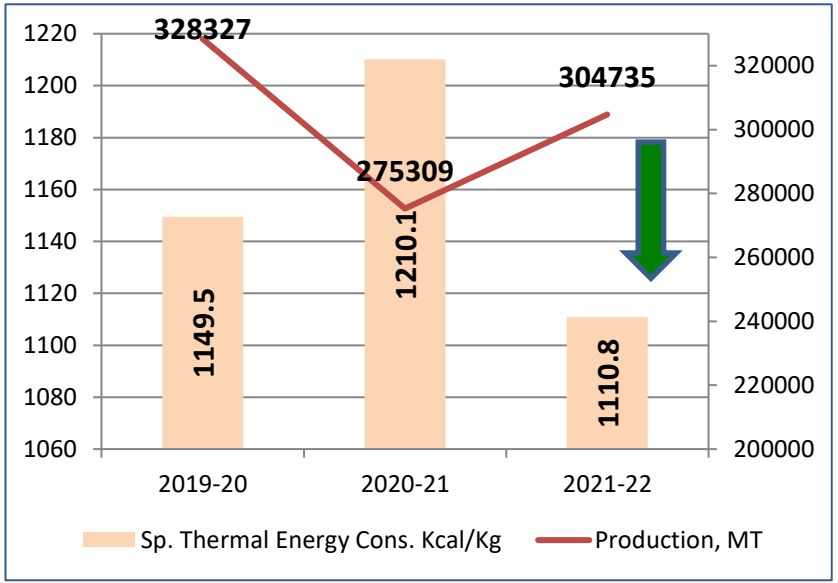
Electrical Energy Consumption decreased by 11.1% & Thermal Energy Consumption decreased by 10.3%

Specific Energy Consumption

Sp. Electrical Energy Cons. Kwh/Ton



Sp. Thermal Energy Cons. Kcal/Kg

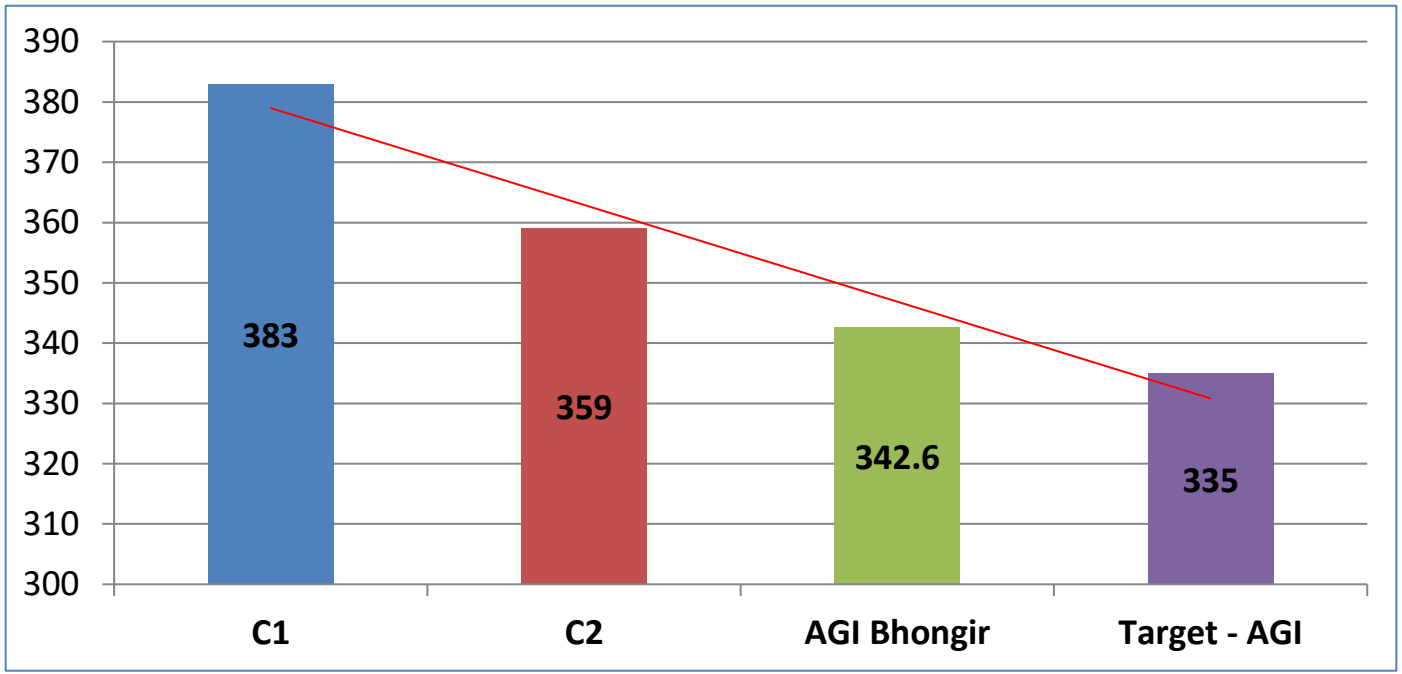


Commitment of doing the Excellence

Sp. Electrical Energy decreased by 4.2 % & Sp. Thermal Energy Decreased by 3.4 %
Even WHEN Production decreased by 7.2 % due to COVID

Benchmarking with Competitors

Specific Electrical Energy Consumption Benchmarking with competitors



Source : Data Collected from the plants websites

Energy Saving Projects Implemented in last Three years

Year	No of Energy Saving Projects	Investment (INR Million)	Electrical Saving Million Kwh	Thermal Energy Million Kcal	Saving INR Million	Impact on SEC (Electrical)	Impact on SEC (Thermal)
2019-20	11	15.02	2.97	0	16.629	9.05	0
2020-21	06	4.31	1.329	0	7.508	4.82	0
2021-22	06	67.5	1.049	9142	16.4	3.44	30.0
Total	**23**	**86.83**	**5.348**	**9142**	**40.53**	**17.31**	**30.0**

Implemented Energy Saving Projects 2019-20

Sr. No	Implemented Project	Annual Electrical Energy Saving Kwh	Annual cost of Saving Rs Million	Investment Rs Million	Payback Period Months
1	Installation of External inter cooler for IR compressors	420000	2.4	4.0	20.3
2	Installation of Energy Efficient Vacuum System	594000	3.4	10.0	35.7
3	Recover wasted condensed chilled water from air driers and use if for cooling water	43800	0.2	0.0	Immediate
4	Reduce air consumption by replacing defective valves & pneumatic fittings	220752	1.2	0.0	Immediate
5	Optimize the voltage of Auxiliaries distribution transformer in Furnace -5 Load center	87600	0.5	0.0	Immediate
6	Set dew point of all driers to 6-8Deg C	112128	0.6	0.0	Immediate
7	Reduce air consumption by arresting all indentified air leaks	236520	1.3	0.0	Immediate
8	Install enthalphy based automation for cooling tower fans	70080	0.4	0.9	27.0
9	Modify piping from compressor to header to reduce pressure drop	131400	0.7	0.0	Immediate
10	Installed bell mouth in Mould cooling fans	300468	1.7	0.1	0.8
11	Removing IGV and replacing the Bird screen in mould cooling blowers	761025	4.3	0.0	Immediate
	Total	29,77,773	16.6	15.0	10.8

Implemented Energy Saving Projects 2020-21

Sr.No	Implemented Projects	Annual Electrical Energy Saving Kwh	Annual cost of Saving Rs Million	Investment Rs Million	Payback Period Months
1	Arresting compressed air leakages from IS machines	577000	3.26	0	Immediate
2	Reducing pressure drop in compressed air line by modifying the same	30000	0.17	0	Immediate
3	External coolers for IR compressor no 2	300000	1.695	4	28.3
4	Reducing Voltage drop in F4 barrier booster transformer system	343000	1.935	0.17	1.1
5	Installation of timers for F5 Rejection conveyors	25000	0.1	0.0	Immediate
6	Providing level sensors for water tanks to avoid pump running	54000	0.3	0.1	3.9
	Total	13,29,000	8	4	6.9

Implemented Energy Saving Projects 2021-22

Sr.No	Implemented Project	Annual Electrical Energy Saving Kwh	Annual Thermal Energy Saving Million Kcal	Annual cost of Saving Rs Million	Investment Rs Million	Payback Period Months
1	Modification in furnace height to reduce thermal energy consumption	0	9142	16.4	60.0	43.9
2	Installation of BLDC Fans	9100	0	0	0.1	23.5
3	Energy Efficient cooler for IR3	300000	0	1.7	3.6	25.5
4	Reduction in voltage drop in F5 melting booster transformer	452000	0	2.6	0.0	Immediate
5	Modifying compressed air header of F5 to reduce pressure drop	173000	0	1.0	3.0	36.9
6	Instllation of FRP cooling tower fan	115000	0	0.8	12.2	187.3
	Total	10,49,100	9,142	22	79	42.2

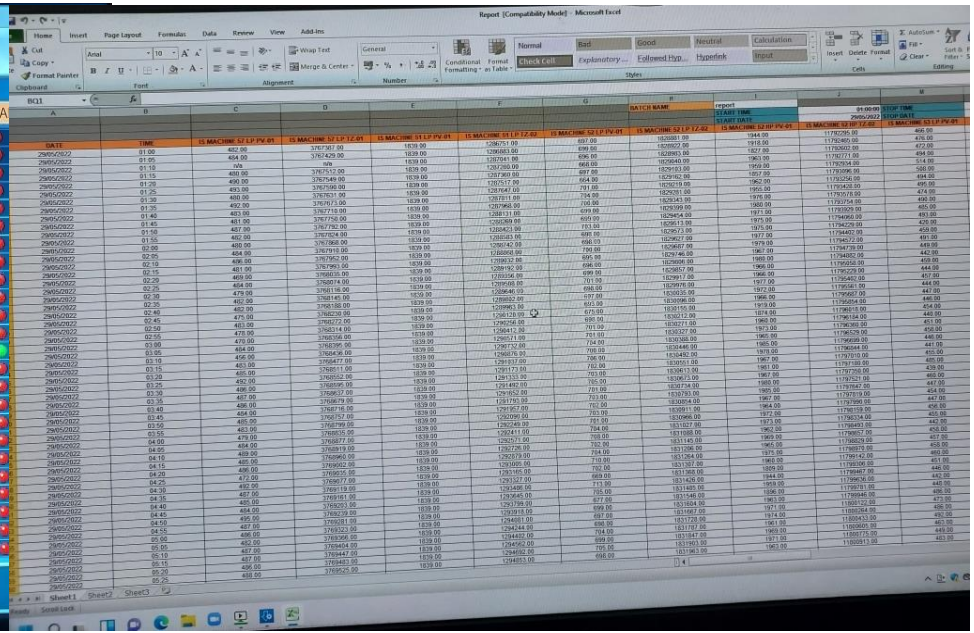
Installation of online leakage monitoring system for compressed Air

Problem identified:

- 15 Nos IS machine with more than 1800 Nos air operated solenoid valves
- Not possible to check leakages by simple method due to heavy noise area.
- Frequent chances of valve leakages due to speedy operation and heat
- During machine operation very difficult to distinguish between actual leakage or valve exhaust.

Implementation :

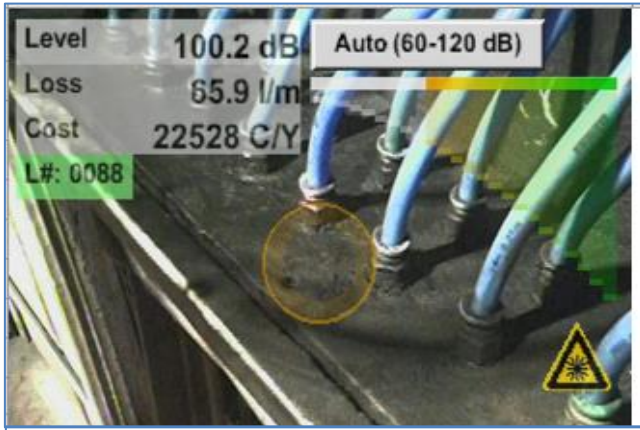
Installed SCADA system with online flow meters for real time monitoring and analysis



Online real time monitoring and report generation of compressed air consumption

Benefits :

By online monitoring and further identified the leaks using ultrasonic leak detectors and By checking and valves we arrested the leakages.



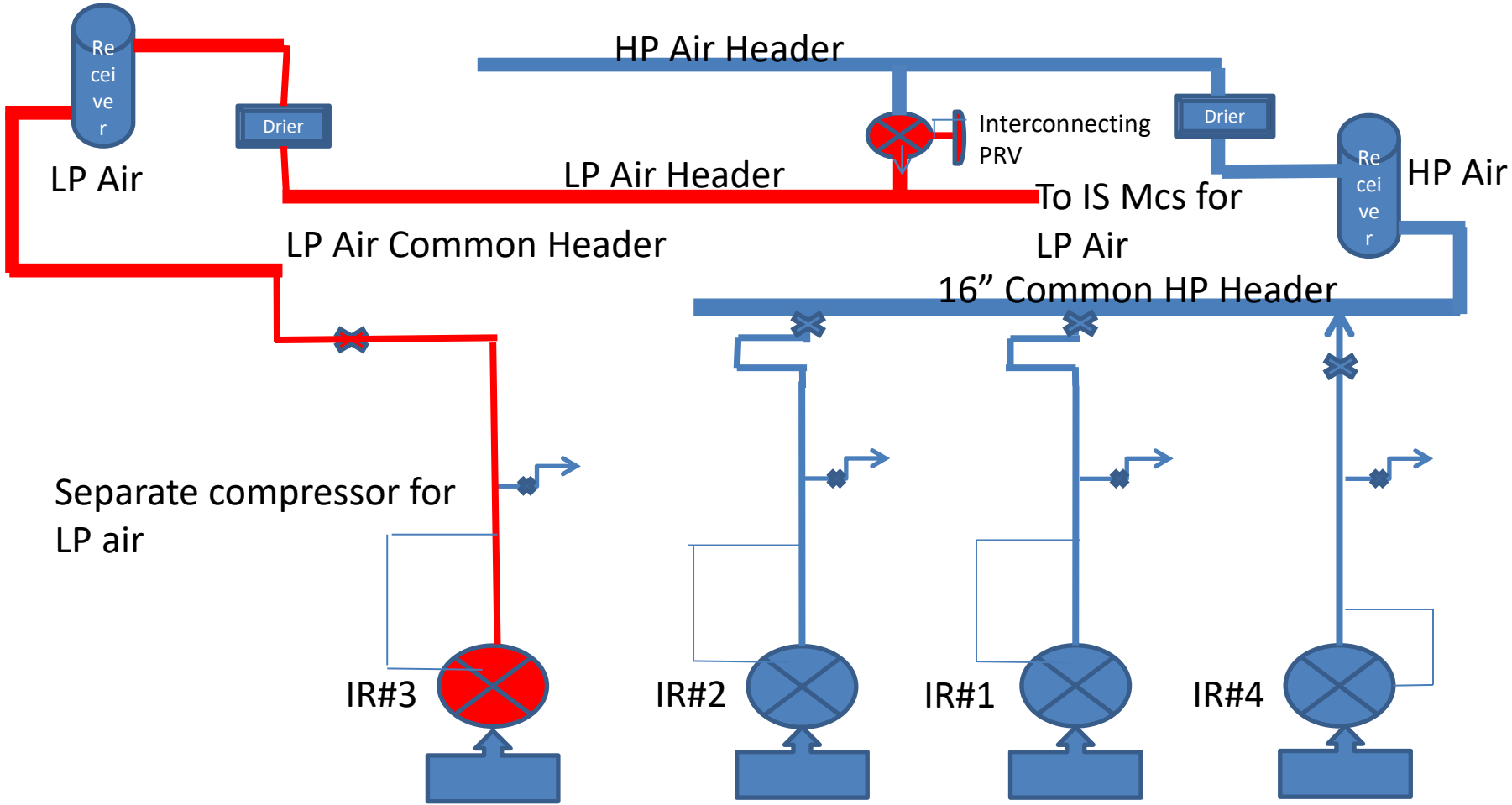
LeakTag:	**1**
Building - Place:	machine51 - wind cooling sec
Date Time:	03.05.2022 06:29:24
Leakage rate:	65.94 ltr/min
Costs per Year:	22,527.81 INR
Total CO2 emissions pe	2.19 tons
Priority:	
Comment:	

Total Benefits observed : 350 CFM of compressed air
Energy Saving achieved : 3.5 Lakh unit per year
Energy Cost Saving : Rs 23.7 Lakh per year
Investment : Rs 35.0 Lakhs (in phases)
SEC Reduction : 1.176 kwh/t

LP air controller to separate the generation of HP/LP air for IS machines

Problem identified:

- Generating compressed air at 3.2 bar but using at 3.0 bar and 2.0 bar in the IS machines
- Throttling of air from 3 bar to 2 bar for LP usage in machine, causing loss of energy.
- Earlier tried to use separate compressor for LP&HP but failed due to machine breakdowns because of demand fluctuation and tripping of LP compressors. Cost of machine breakdown is very high compared to savings.
- It is costly to buy standby LP compressors and to start it immediately if any one fails. Hence not tried again since installation.



PRV opens only when the pressure in LP header drops below the set point

Implemented Idea :

We installed one PRV in between LP & HP line with set point of LP pressure. Now if there is air fluctuation or extra demand of LP air then it is maked-up by HP air, also in case of LP Compressor tripping, we are able to make up LP air from HP air header.

Annual Saving	**6,68,136**	**Kwh**
Saving in INR	**37,74,966**	**INR**
Investment	**10,00,000**	**INR**
Payback	**3.18**	**Months**
SEC Reduction	**1.83**	**Kwh/t**

Problem identified:

During systematic measurement we observed significant voltage drop in the system

F4 Barrier Booster 1.2MVA Transformer						
Tap position:12(Delta), Tap Voltage:142V						
Near Transformer bushing		Near electrode		Voltage drop	Electrode Current	
Ph-Ph	Voltage (V)	El-El	Voltage (V)		Phase	Amp
U-V	**139.9**	E1-E5	**117.7**	**22.2**	**R**	**4028**
V-W	**141.8**	E5-E6	**133.9**	**7.9**	**Y**	**4587**
W-U	**140.7**	E1-E6	**113.8**	**26.9**	**B**	**4484**
Average	**140.8**		**121.8**	**19**	**Average**	**4366.3**
Total Boosting Power =		**921.1**	**KW**			

Voltage drop is directly associated to the power loss, for the same power to electrodes we have to give more input power due to losses.

Innovative Project – 3 (Reduction of voltage drop in furnace electrical boosting)

Reason Identified : It was observed that the size of bus bar is not adequate as per the Increased current of electrodes. Electrode current increased after enhancement of furnace draw.

Solution : We shifted the boosting transformer very close to furnace, avoiding lengthy busbar

Before
(Bus bar length is 21 mtr)

After
(Bus bar length is only 06 mtr)

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Innovative Project – 3 (Reduction of voltage drop in furnace electrical boosting)

F4 Barrier Booster 1.2MVA Transformer after shifting

Tap position:12(Delta), Tap Voltage:142V

Near Transformer bushing		Near electrode		Voltage drop	Electrode Current	
Ph-Ph	Voltage (V)	El-El	Voltage (V)		Phase	Amp
U-V	**140.1**	E1-E5	**128.4**	**11.7**	**R**	**4577**
V-W	**141.9**	E5-E6	**137.8**	**4.1**	**Y**	**4411**
W-U	**140.8**	E1-E6	**126.5**	**14.3**	**B**	**4140**
Average	**140.9**		**130.9**	**10.0**	**Average**	**4376.0**

Total Boosting Power =		**992.1**	**KW**
Earlier power on same tap =		**921.1**	**KW**
Difference	**=**	**71.0**	**KW**

Per year Saving	6,21,960	Kwh
Impact on SEC	1.84	KWh/t
Per year Saving in INR	35,14,074	Rs
Investment	2,50,000	Rs
Payback	**0.85**	**months**

Utilization of Renewable Energy

Year	Technology (Electrical)	Type of Energy	On site/Off site	Installed Capacity, MWp	Generation Million Kwh	% of over all electrical energy
2019-20	Electrical	Solar	On Site	8.6	12.051	10.26
2020-21	Electrical	Solar	On Site	11.6	13.117	13.06
2021-22	Electrical	Solar	On Site	13.7	17.252	16.52

Reduction of 16217 Tons of Carbon Emission per year

Target to increase renewable energy consumption by more than 25% in next two years

Waste Utilization & Management

Waste Fuel Utilization:

Sr No	Year	Type of waste Fuel	Quantity, MT	GCV, Kcal/kg	% of total fuel
1	2019-20	Petcoke	20111	8000	42.6
2	2020-21	Petcoke	13801	8000	33.14
3	2021-22	Petcoke	10880	8000	25.7

Solid Waste Management :

Sr No	Year	Waste Glass, MT	*Metal Waste*, MT	Used Paper Cartons, MT	Disposal Method
1	2019-20	2076.86	474.04	553.5	Disposal through Third party vendor for Recycling
2	2020-21	1724.24	157.78	301.84	
3	2021-22	2950.84	353.8	620.4	

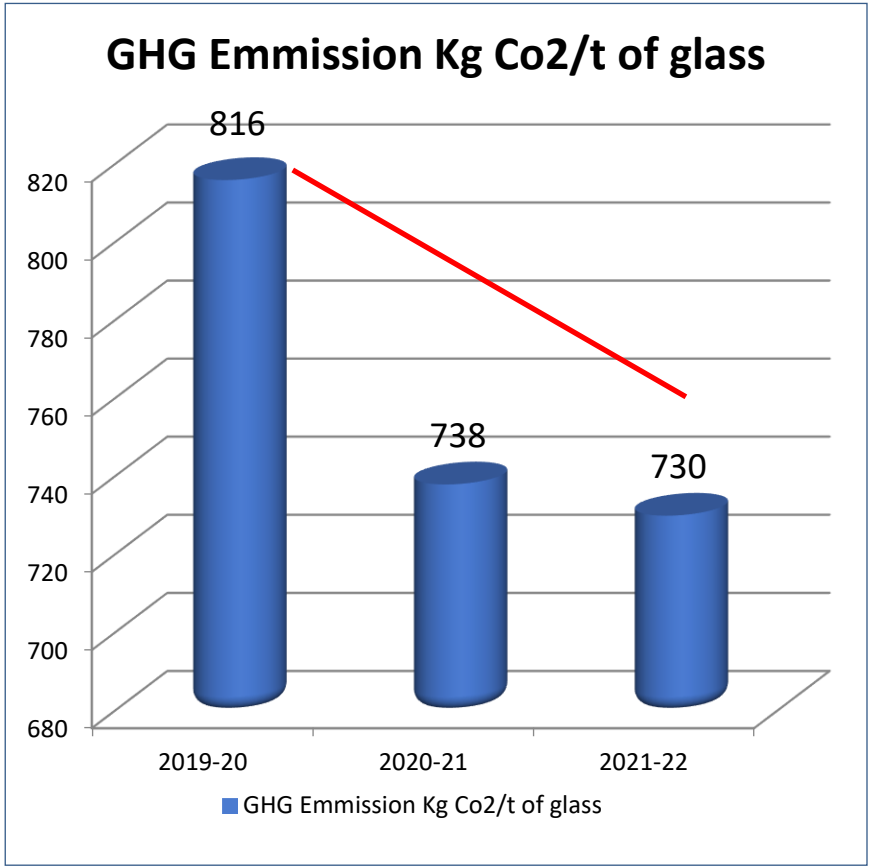
Waste Utilization & Management

Waste Water Management :

100 % Recycling of process waste water, making plant as Zero water discharge

Saving of 350 KL fresh water per day

GHG Inventories & Green Supply Chain



HSIL Limited Packaging Products Division AGI glaspac	Purchase Procedure QMS/EHS/FSSC/ISO 15378//EnMS	Doc. No :AGI/IMDP/15 Rev. No : 11 Date : 01-04.21 Page No. : 1 of 19

1.0 PURPOSE:

To establish and maintain a procedure for procurement of Raw-material, Fuels, Packing materials, General Stores Items, Indigenous Capital Items, Imported Raw-materials, Consumables and Capital Items, Mould Stores Items, Low Value Material which are below Rs. 5000/- (Rupees Five Thousand Only) and Items / materials required on emergency basis from time to time.

1.1 Issue of Annual Maintenance Contracts, Service Purchase Orders.

1.2 Evaluation and Registration of New Vendors and to review the performance of existing Vendors by Rating them periodically.

1.3 To achieve over effectiveness and efficiency in purchasing process and to ensure the Purchase or materials in Time, Right Quality from Right Source and conform to specified requirements.

2.0 SCOPE:

This procedure shall apply to all the Purchases of Raw-material, Fuels, Packing materials, General Stores Items, Indigenous Capital Items, Imported Raw-materials, Consumables and Capital Items, Mould Stores Items, Low Value Material and various activities of Procurement including Service Purchase Orders and Annual Maintenance Service Contracts.

2.1 All the new Vendors developed from time to time through Vendor Evaluation for 'A' Class items (List of A class items maintained in Purchase department subject to changes from time to time as per the requirement).

2.2 The Purchase procedure covers and applicable to Hyderabad and Bhongir Plants since the purchase department functions were centralized. The process of procurement of materials and services are same for both Plants under the above procedure. The purchase documents/records are being maintained separately for each Plant. The process of vendor evaluation cum registration is same for both Plants but the vendor rating shall be done separately for each Plant. Due consideration for energy efficiency shall be given during procurement of applicable header items (Raw Material, Fuels & Capital Items).

3.0 RESPONSIBILITY: Section In-charge / HOD / A.V.P. (Comml)

4.0 DEFINITIONS & ABBREVIATIONS:

A V P (Comml) – Assistant Vice President (Commercial)

HOD - Head of Department

S.I - Section-in-charge

Prepared by:	Approved by:	Issued by:
Date:	Date:	Date:

ISO Certifications: ISO 50001: 2018 Certified

FSCC 22000

ISO 9001:2015

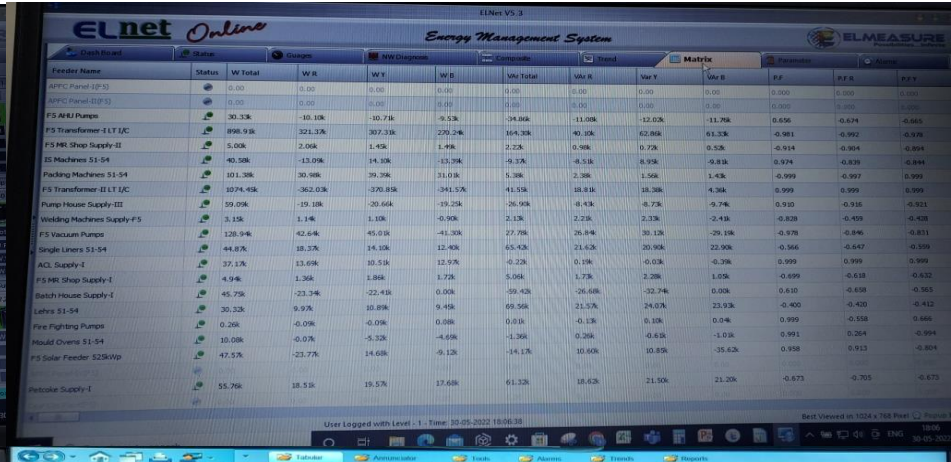
ISO 14001:2015

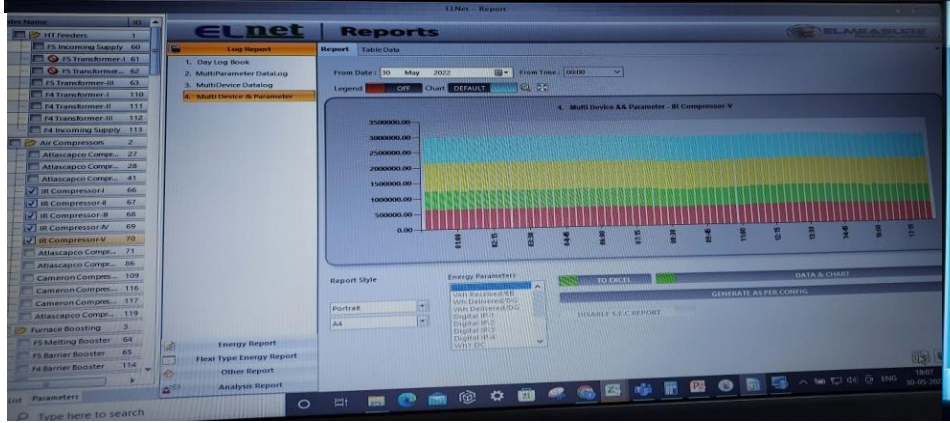
ISO 45001: 2018

ISO 15378:2011

ISO50001-2018

Online monitoring of Electrical Energy (EMS) and Compressed air consumption





Daily team review of all energy parameters with set targets and deviations

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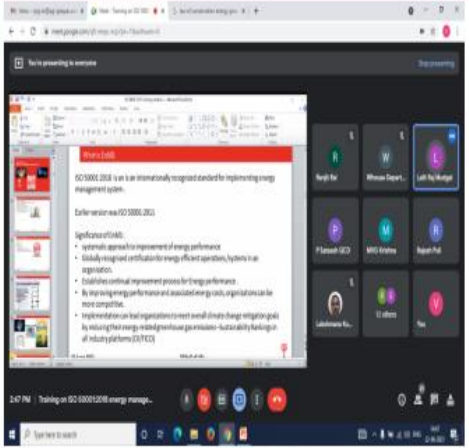
Training and Team engagement

Trainings imparted on Energy conservation and ISO 50001

Training

- ❑ Training on ISO 50001 :2018 Energy Management system
- ❑ Training on Energy Efficiency best practices
- ❑ Training on Compressed air usage
- ❑ Training on Energy Conservation awareness



IMS Policy

HSIL Limited
Packaging Products Division
AGI glaspac

Integrated Management System Policy

Our Integrated Management Systems has been established in line with our company Vision, Mission, Values and our business strategy. We are the manufacturer of soda lime glass containers.

It is AGI glaspac policy to design, develop, implement and maintain an Integrated Management System that meets the requirements of ISO 9001 (Quality), ISO 14001 (Environment), ISO 45001 (Occupational Health and Safety), ISO 50001 (Energy), FSSC 22000 (GMP & Food Safety) & ISO 15378 (GMP for Medicinal Use) effectively and efficiently.

- For us any defect in our product or any part of our activity which may lead to any concern about Quality, Food Safety, Energy efficiency, environment or safety of "our workers, visitors to our operations and the public" is non-negotiable.

Our approach to ensure consistency within our vast system is to develop good understanding of our employees about organization management system requirement as well as customer requirements through regular awareness campaigns.

AGI glaspac is committed to:

- Comply with the standards to which we are certified to, all relevant legal requirements, local rules and regulations, interested parties concerns as well as customer's expectations of their glass packing needs.
- Provide & maintain Healthy and Safe Working environment to all concerned.
- Pursue sustainable growth while continually improving our integrated management system performance through availability of adequate information & resources.
- Prevent impact on environment; conserve natural resources; ensure efficiency in energy performance; achieve highest health & safety standards for our employees and to achieve highest food safety standards for the consumers.
- Ensure effective communication of policy / programs and active involvement of all employees / interested parties w. r. to Quality, Environment, Health & Safety, Energy Efficiency, GMP and Food Safety.
- Consider energy performance improvement during all stages of operations including design activities as well as procurement of products / services.
- Periodic monitoring, analysis and review of Policy and objectives.

President & Chief Executive Officer

Our Testimonials

GPEMA-2021

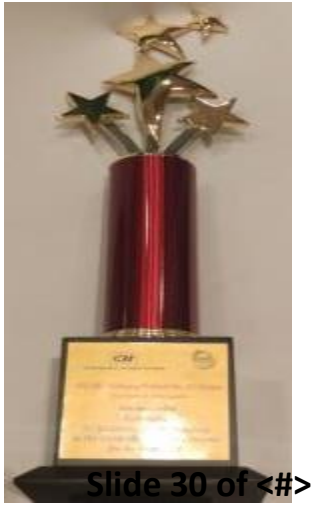
FICCI -2021

CII – 2020

CII – 2019

CII - 2018

CII - 2015



Future Roadmap

01 To Reduce the Carbon emission per MT of glass from 713 CO2 kg to 540 CO2 kg in Next 5 years, equivalent to 6.4 Mn Trees per annum.

02 Planned Installation of Waste Heat Recovery System.

03 To Increase the Usage of Cullet through improvement in Cullet quality and increase in cullet collection.

04 Additional 5 MWp solar power installation is under discussion

05 All the Future New Infrastructure & Installation with respect to IGBP (Indian Green Building Rating System) Rating System

06 Usage of Plastic Pallets in place of Wooden Pallets in association with Garden Polymers which is a Group company of AGI

Carbon Reduction to 540 CO2/ kg in Next 5 years equivalent to 6.4 Mn trees per annum

Installation of 1.5 MW WHR plant for furnace flue gases

11 August 2022

Thank You