CII National Award for Excellence in Energy Management - 2023
Ambuja Cement Ltd., Nalagarh

Mentor : Mr. Ankush Dutt – Unit Head

Presenter : Alok Sharma – Head E&I

Vision: *To be the most sustainable and competitive company in our industry*

Company Profile

- Ambuja Cements Ltd, a part of the Adani group..
- Total cement capacity of 70 million tonnes in India.
- Certified **five times water positive.**
- Also 3.5 times plastic negative, by burning as much as over 1,26,095 tonnes of plastic waste in its kilns, equivalent to 3.5 times of total plastic used.
- Company generates 6.5% of its energy from renewable resources.
- CSR arm ACF (Ambuja Cement Foundation) with presence in 21 locations spread across 11 states..

Plant Profile

- A Grinding Unit situated in Nalagarh, Himachal Pradesh (India). Commissioned in March'2010.
- Plant rated capacity is 1.50 Million Ton per annum.
- VRM : Make Loesche -LM56.3+3C; Capacity 250TPH.
- Classifier; Make Loesche –LSKS 102 CS.
- Bag House: Make Redycam; Designed Flow 869000 M3 /hr; Dust Loading 348 gm/M3;
- Packer: Make EEL; Two Nos; 16 Spouts double discharge 240 TPH each.
- Plant connected load :15MW; Contract Demand: 8.6MVA
- Cement Products at Nalagarh: PPC, & Kawach.
- First grinding unit in India certified as ISO 50001-2011.

Health & Safety Performance

LEAD INDICATORS									
	2014	2015	2016	2017	2018	2019	2020	2021	2022
Near Miss	75	29	56	37	27	31	43	58	63
Hazard	575	880	596	986	1108	812	1196	1226	1301
SOT	786	669	481	997	1025	568	916	1120	1179
LAG INDICATORS									
Fatality		0	0	0	0	0	0	0	
LTIFR	3.7	2.94	7.3	2.06	0	0	2.69	0	0.51
LTI	1*	01+01*	2	1	0	0	1	0	1
MTI	1	3	6			0	0	1	2
First Aid	8	3	6				4	1	2

INCREASE IN LEAD INDICATORS

DECREASE IN LAG INDICATORS

Awards & Certifications

CII Green Tech Award
for Water Positive

CII CSR Award

CII Award for Excellence in Energy
Management 2019

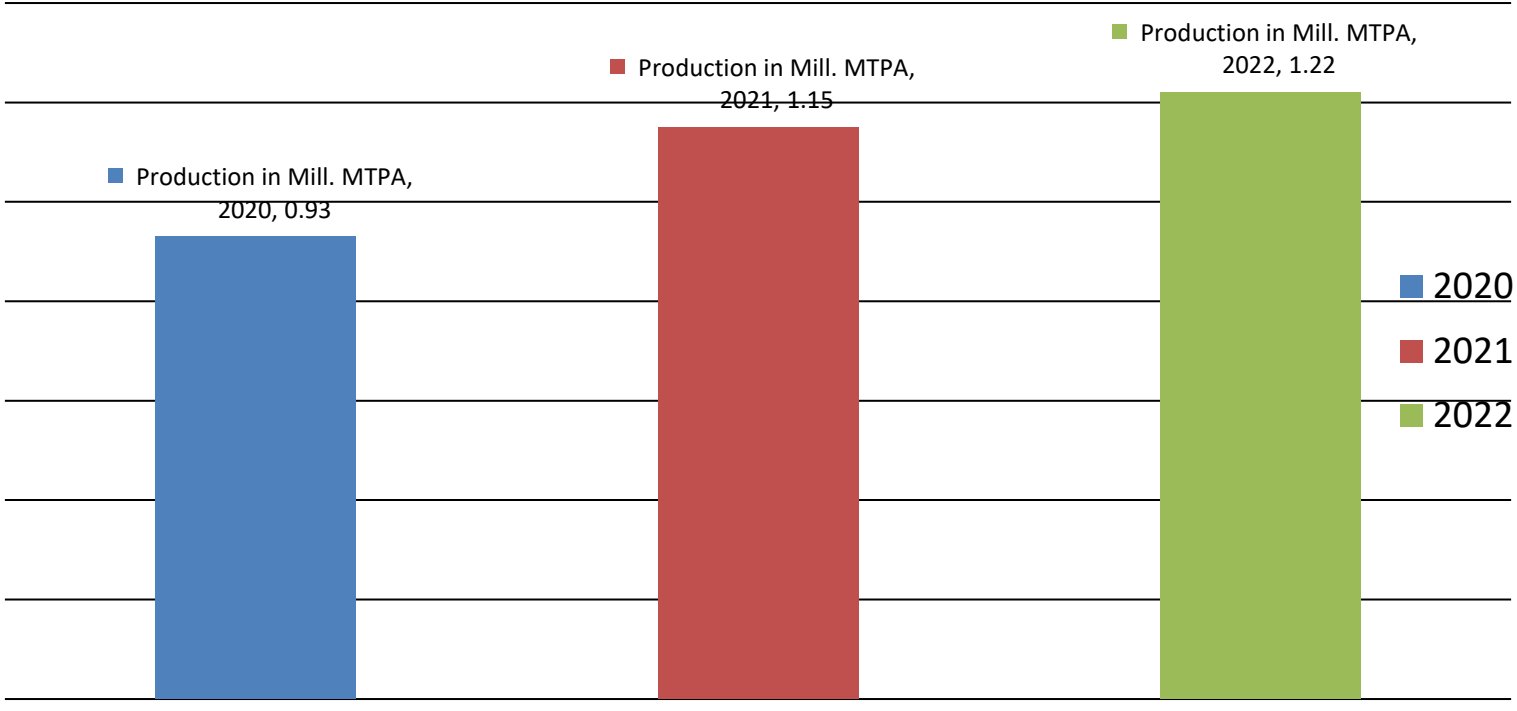
Best Plant Performance Award-ACL

CII Award for Excellence in Energy
Management 2022

"Most Clean" Unit Award-ACL

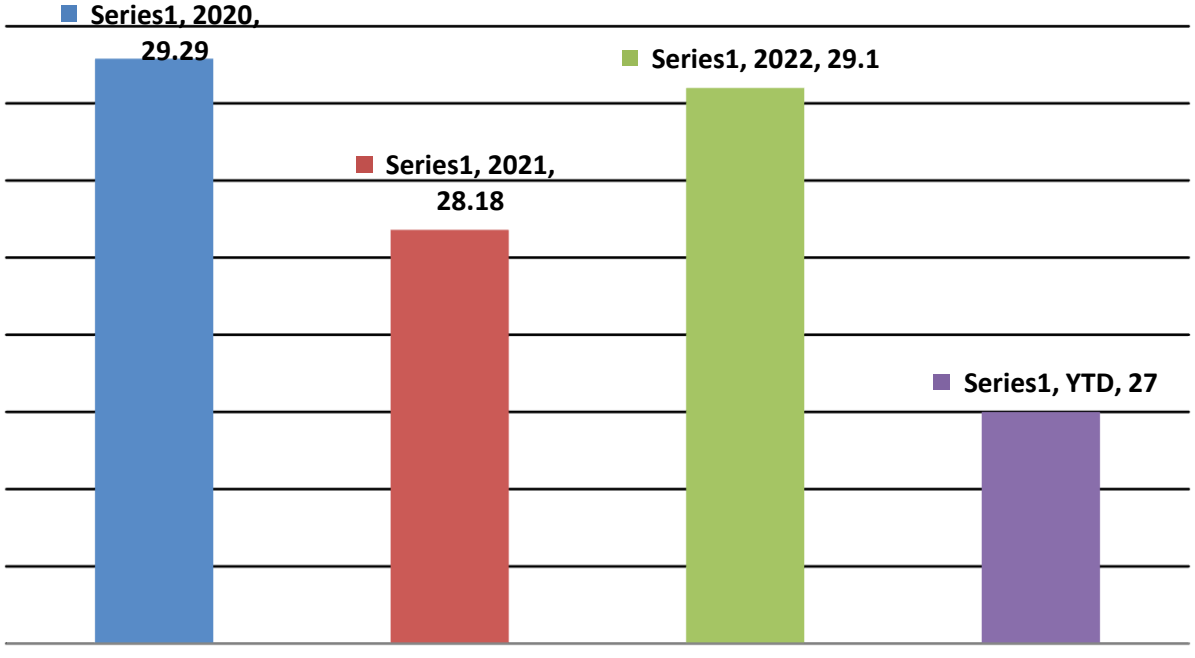
-OHSAS ISO 45000 ; QMS (ISO 9001:2008),
-EMS (ISO 14001); EnMS (ISO 50001:2011)

Production –Year wise (Mill Ton)



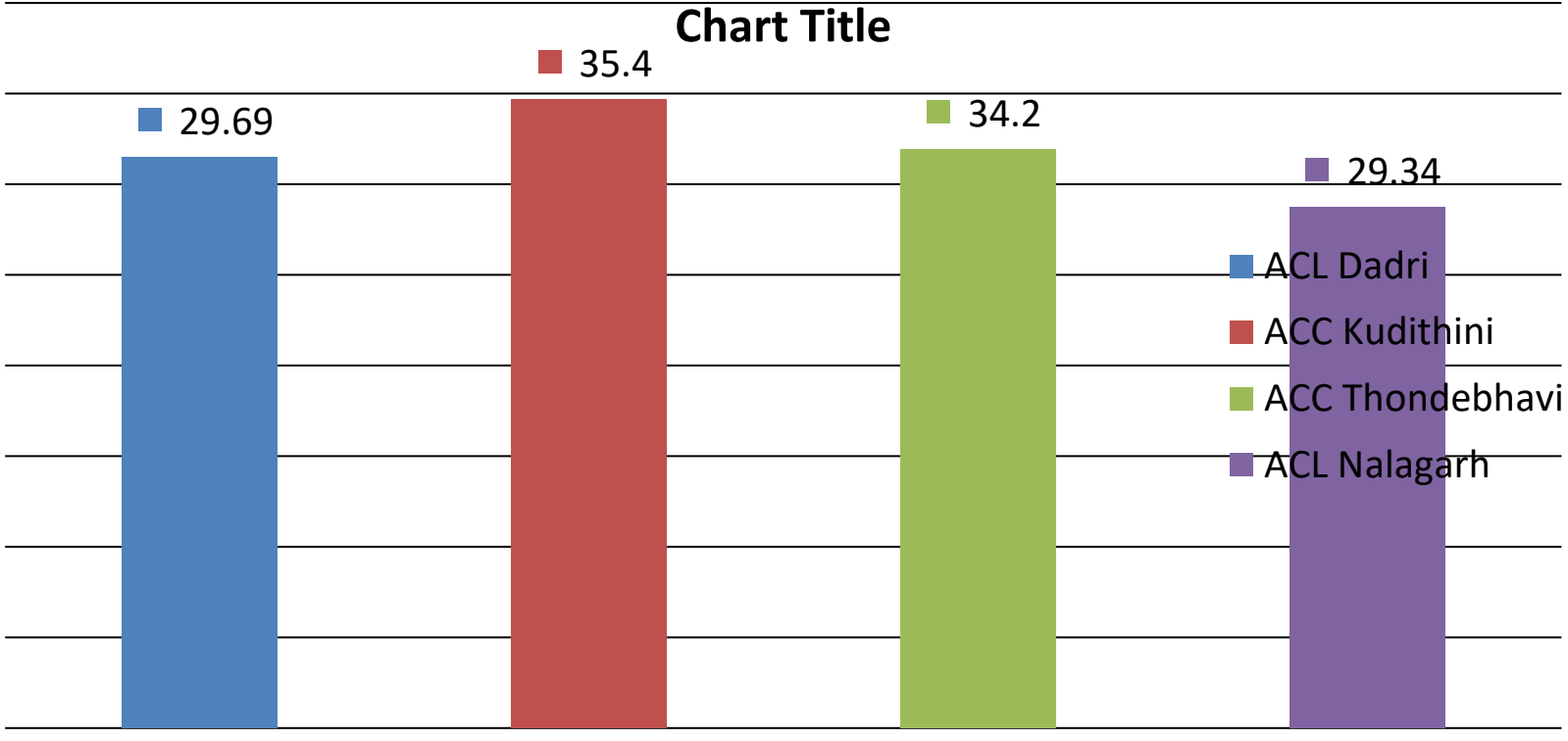
Reduction in Specific Electrical Energy Consumption

SEEC for KAWACH



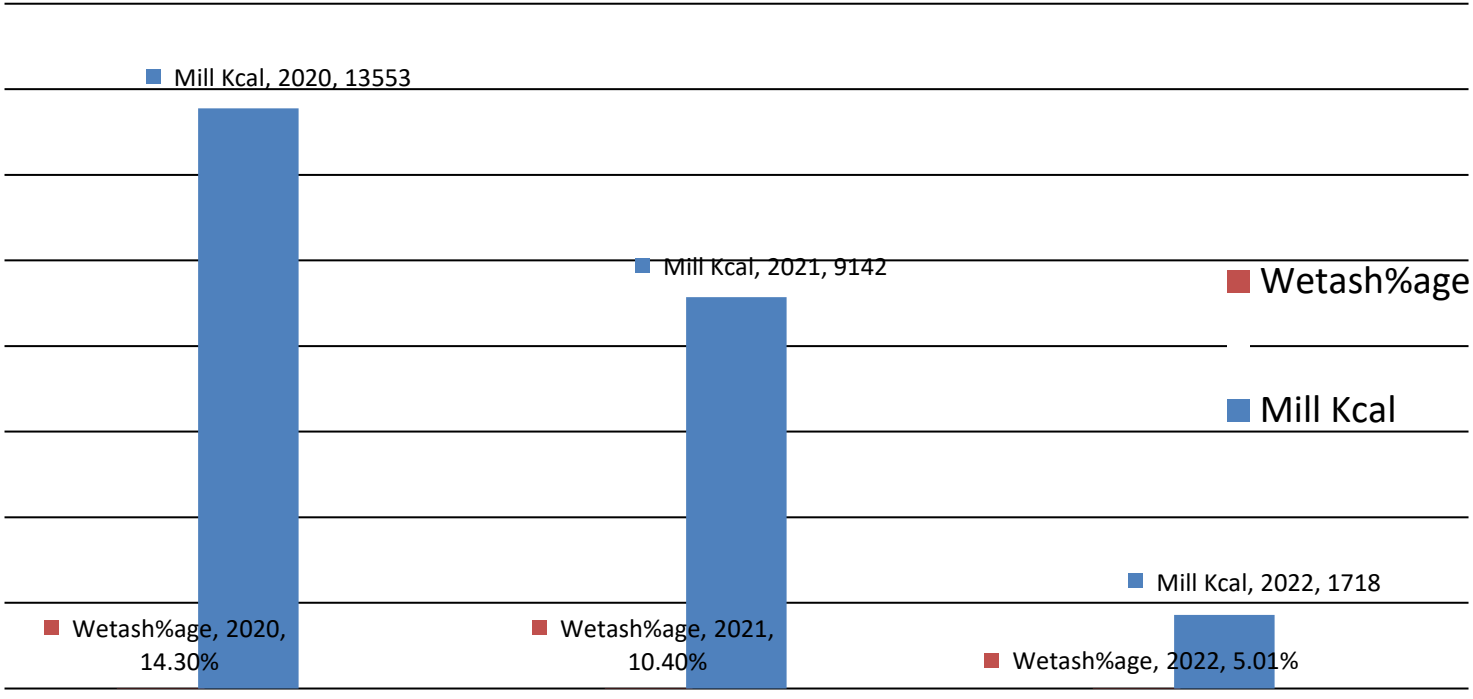
Unit / Ton

SEEC Benchmarking with Peers - 2022

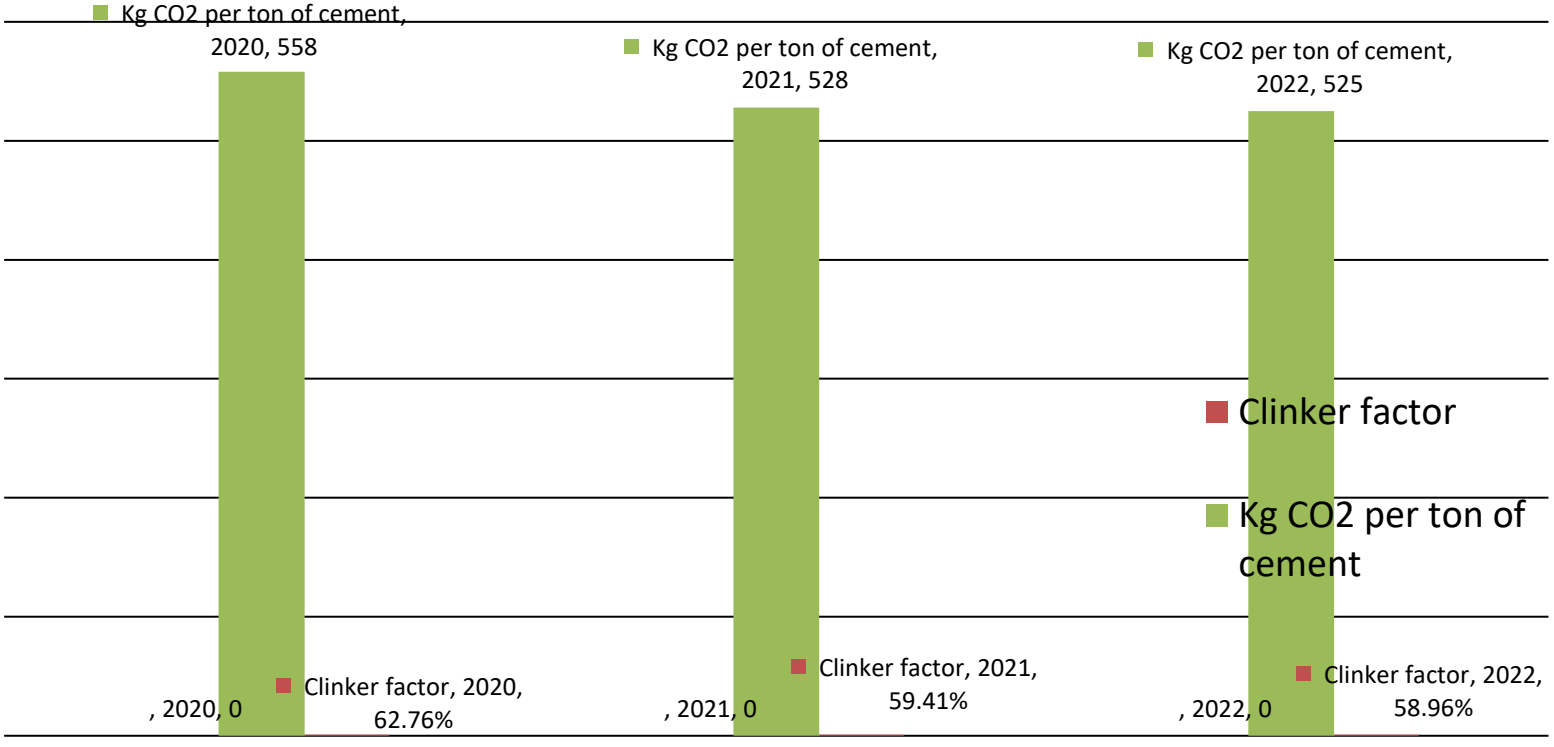


VRM Section Performance

Thermal Energy Consumption



Reduction in CO_2 Emission



MTBF (Hrs)

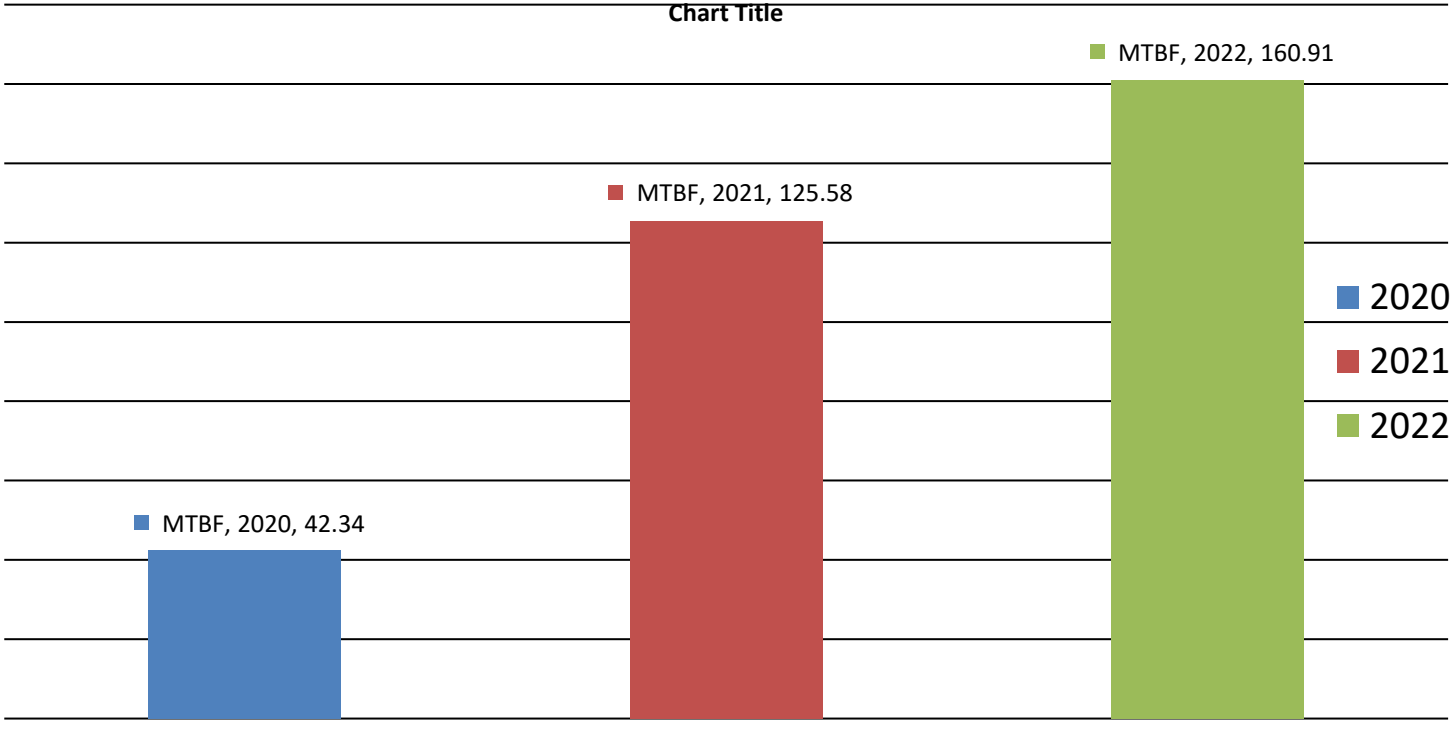
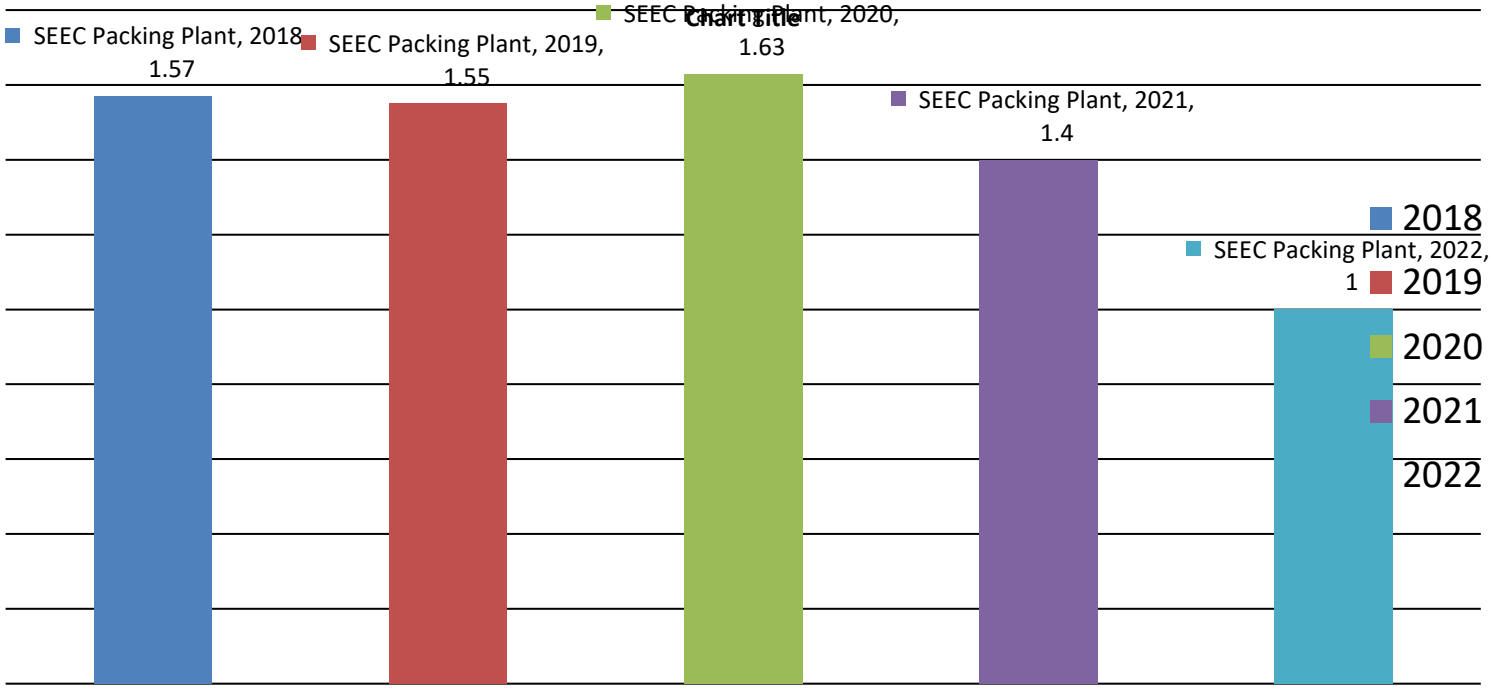


Chart Title
MTBF, 2022, 160.91
MTBF, 2021, 125.58
MTBF, 2020, 42.34
2020
2021
2022

SEEC Packing Plant



Project Implementation methodologies-Energy Management Division

Alok Sharma
(Certified Energy Manager
DGM-E&I)

Raj Garg
(P&QC)

Deepak Dhiman
(E&I)

Harjeet Singh
(PM cell)

Pritam Pal
(Mechanical)

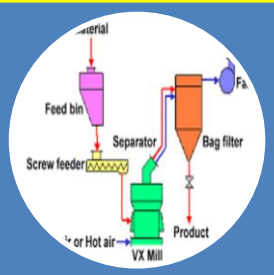
Harcharan Singh
(P&QC)

Jaspreet Singh
(Mechanical)

- Perform daily power analysis
- Conduct internal audits
- Evaluate new ideas,
- Implement new initiatives
- Ensure compliance of energy audits points

Project Implementation methodologies-Energy Circles

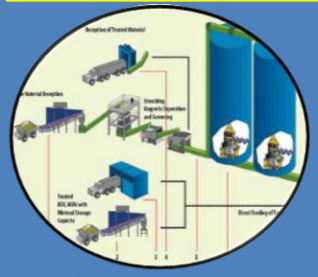
Energy Circle - 1



VRM Mill Section

04 Members

Energy Circle - 2



Raw Material Handling Section

04 Members

Energy Circle - 3

Utilities & Lighting Section

04 Member

Energy Circle - 4

Packing Section

04 Member

- Daily Energy Observation Tour(EOT) to observe any abnormality
- Ensure timely compliance of points identified
- Analyze idle running of equipment operation

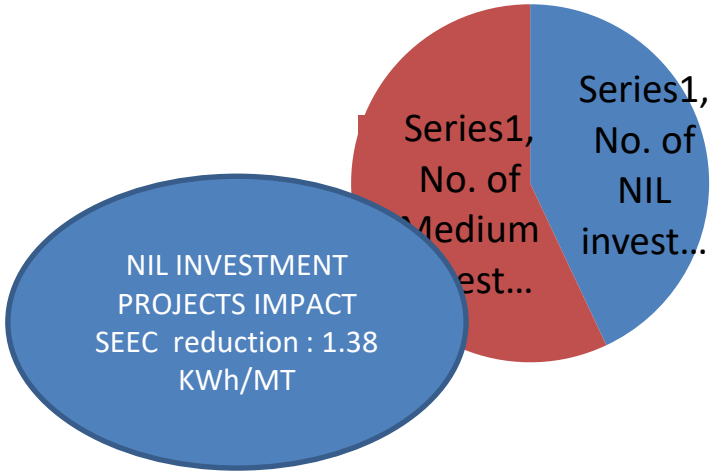
Energy saving Ideas

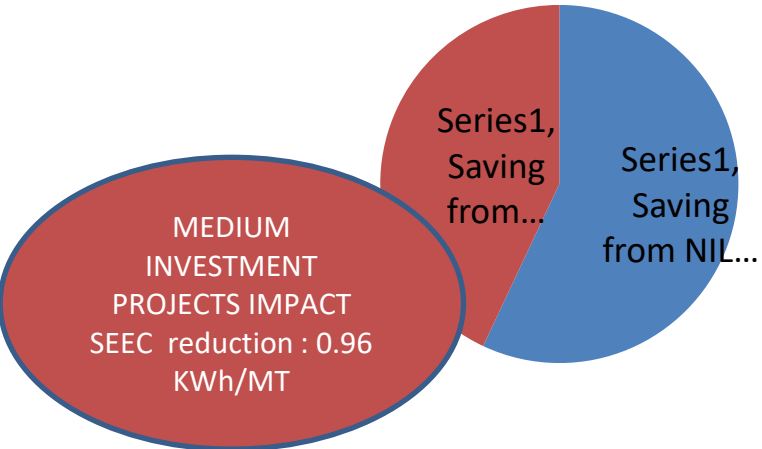
- In 2022, we have received 112 ideas.
- After evaluation, 57 ideas were shortlisted for implementation.
- 45 ideas have been implemented.
- Best ideas have been awarded.

PROJECTS IN LAST 3 YEARS

YEAR	No. of Proposals	Investments(in million INR)	Savings(in million INR)	Pay Back (in Months)
2020	6	0.385	2.89	1.6
2021	13	2.901	8.254	4.22
2022	6	0.4	0.411	4.44

Summary : ENCON Efforts





Energy Conservation Projects (Summary for last 3 years)

No investment

- No of project implemented : 10
- Saving Kwh/T of Cement : 1.38
- Saving in INR, Lakh : 65.86

Medium Investment

- No of project implemented : 13
- Saving Kwh/T of Cement : 0.96
- Saving in INR, Lakh : **50**

SUMMARY OF PROJECTS IN 2020

YEAR	Description of Projects
2020	Optimization of Air conditioning.
2020	Replacement of conventional lights with LED lights – 150 nos.
2020	Replacement of lightly loaded motors with lower rating motors.

SUMMARY OF PROJECTS IN 2020

YEAR	Description of Projects
2020	Optimization of running of Gypsum group.

Total Energy units saved in 2020(in Lakh KWh): 6.37

Saving in terms of KWh/MT: 0.68

SEEC reduction:
0.68 KWh/MT

SUMMARY OF PROJECTS IN 2021

YEAR	Description of Projects
2021	Optimization of drives to avoid idle Running.
2021	Optimization of flow at bag filter suction point
2021	Optimization of Gypsum & wet flyash group bag filter with moisture i.e stopping bag filter when moisture in gypsum is high.
2021	Optimization of clinker extraction drives with switch over modes.
2021	Optimization of DFA bin aeration blowers.
2021	S Roller removal from VRM

SUMMARY OF PROJECTS IN 2021

YEAR	Description of Projects
2021	Interlocking cooling tower operation with mill gearbox temperature.
2021	VFD installation in rotary screen.
2021	Reject belt operation controlled with level sensor.
2021	Installation of VFD in cement silo bag filter fan.
2021	Replacement of conventional lights with LED lights(=100 nos.)
2021	VFD installation in compressor.
2021	Installation of VFD in Bag Filter fans.

SUMMARY OF PROJECTS IN 2021

YEAR	Description of Projects
2021	Replacement of DOL operation of Bag filter fans with VFD.

Total Energy units saved in 2021(in Lakh KWh): 18.35

Saving in terms of KWh/MT: 1.59

SEEC reduction:
1.59 KWh/MT

SUMMARY OF PROJECTS IN 2022

YEAR	Description of Projects
2022	Optimization of the flow of P&V for USS (Unit Sub Station).
2022	Replacement of conventional lights with low wattage LED lights.
2022	Replacement of HT motor cooling blower impellers with FRP.
2022	Optimization of Motors as per load requirement.
2022	Optimization of blower for flyash bulker unloading.

SUMMARY OF PROJECTS IN 2022

Total Energy units saved in 2022(in Lakh KWh): 0.82

Saving in terms of KWh/MT: 0.065

SEEC reduction:
0.065 KWh/MT

Last three years Major Energy Conservation Projects

Sr. No.	Description of Projects	Energy Saving Lakh KWH	Annual Saving INR Lakh	Investment INR Lakh
1	Installation of VFD in cement silo bag filter fan	0.36	1.62	2
2	Installation of VFD in compressor	3.96	17.82	14.41
3	Replacement of DOL started bag filter fan with VFD	1.48	6.66	8.1
4	Installation of VFD for flyash tippler bag filter fan to optimize fan speed with loading and unloading operation	0.182	0.819	2.17

Total Annual Energy saving : 5.98 Lakh KWh

Low hanging Fruits - NIL Investment

Sr. No.	Description of Projects	Energy Saving Lakh KWH	Annual Saving INR Lakh
1	Optimization of flow of bag filter fan after suction point	2.325	10.5
2	Optimization of Gypsum & DFA group bag filter with moisture i.e stopping bag filter fan when moisture in gypsum is high.	1.98	8.9
3	Optimization of DFA bin aeration blower	0.65	2.9
4	Optimization of pressure for compressor	0.40	1.989

Low hanging Fruits - NIL Investment

Sr. No.	Description of Projects	Energy Saving Lakh KWH	Annual Saving INR Lakh
5	Optimization of AC operation	0.30	1.34
6	Reject belt operation controlled with level sensor	0.25	1.13
7	Optimization of drives to avoid idle running	1.56	7

Total Saving of Energy Units(in Lakh KWh): 7.465

Saving in terms of (in Lakh INR): 33.759

Energy Units saved: 7.465 Lakh KWh

Major Encon Projects planned in 2023-25

Sr. No.	Description of Projects	Annual Energy Saving (in Lakh	Annual Saving (INR Lakh)	Investment (INR Lakh)
1	Direct clinker feeding clinker transfer to		85	20
2	Installation of VFD Filter.		25	40
3	Installation of MV VFD House Fan .		60	150

Investment: INR 290 Lakh
Target Energy Saving:
- **35.11 Lakh KWh**

Innovative Projects Undertaken

Online Boulder Segregation

- In house manufacturing of Online Boulder Removing arrangement

Every day we used to face 9-10 feed cuts due to jamming of clinker weigh feeder with boulders. We installed online boulder removing arrangement, thereby eliminating the feed cuts.

- Team Efforts: Analyzing the
  Brainst
- Impact it created: SE

SEEC reduction : 0.1 KWh/MT

- Replication potential: Replication in other
- Units is possible.

Replacement of DOL operation with VFD

- Replacement of DOL operation with VFD for Fly Ash Screw Conveyor in Unloading System: Replacing DOL with VFD results in providing high torque during jamming problem and hence clo ing.

- Team Efforts: Analysing the pr ble options and then use VFD as a unique applicatio

SEEC reduction of 0.092 KWh/MT

- Impact it created: SEEC reduction 0.092KWh/MT.

- Replication potential: Possible in all other screw conveyors.

Optimization of Bag filter fan flow as per Clinker tippler operation

- Optimization of Bag filter fan flow by controlling motor RPM with VFD based on the feedback (through proximity switch) of clinker tippler position.
- Team Efforts: Analysing different feedback options to control bag filter flow.
- Impact it created: SEEC saving: 0.
- Replication potential: In Bag Filter fans.

SEEC reduction of 0.05 KWh/MT

Optimization of Bag Filters Air Velocity

➢Optimization of Bag filters air velocity by adjusting damper positions near venting suction points. It resulted into reduction of power consumption in 26 bag filters.

➢Team Efforts: Adjusting damper pos and Collecting and required data from site.

SEEC REDUCTION: 0.50 KWh/MT

➢Impact it created: Average power reduction: 11KW. SEEC saving: 0.50 KWh/MT

➢Replication potential: In all Bag Filters.

Exploration of new grinding aid

- Exploration of new grinding aid by doing lab ball mill trials of grinding aid supplied by different vendors at different dose.

- Team Efforts: Conducting the ball mill trials collecting and analyzing the data.

- Impact it created: TPH improved by 10 MT resulting in SEEC reduction by 0.6KWh/MT

- Replication potential: Further conducting ball mill trials for improving mill parameters.

Mixing of Grinding Aid for Kawach at the time of Packing

- Trials have been done for online mixing of the grinding aid for Kawach after extraction from Cement Silo.

- Will save costly grinding aid, which is Team Efforts: Conducting the ball mill trials collecting and analyzing the data.

- Impact it created: TPH improved by 10 MT resulting in SEEC reduction by 0.6KWh/MT

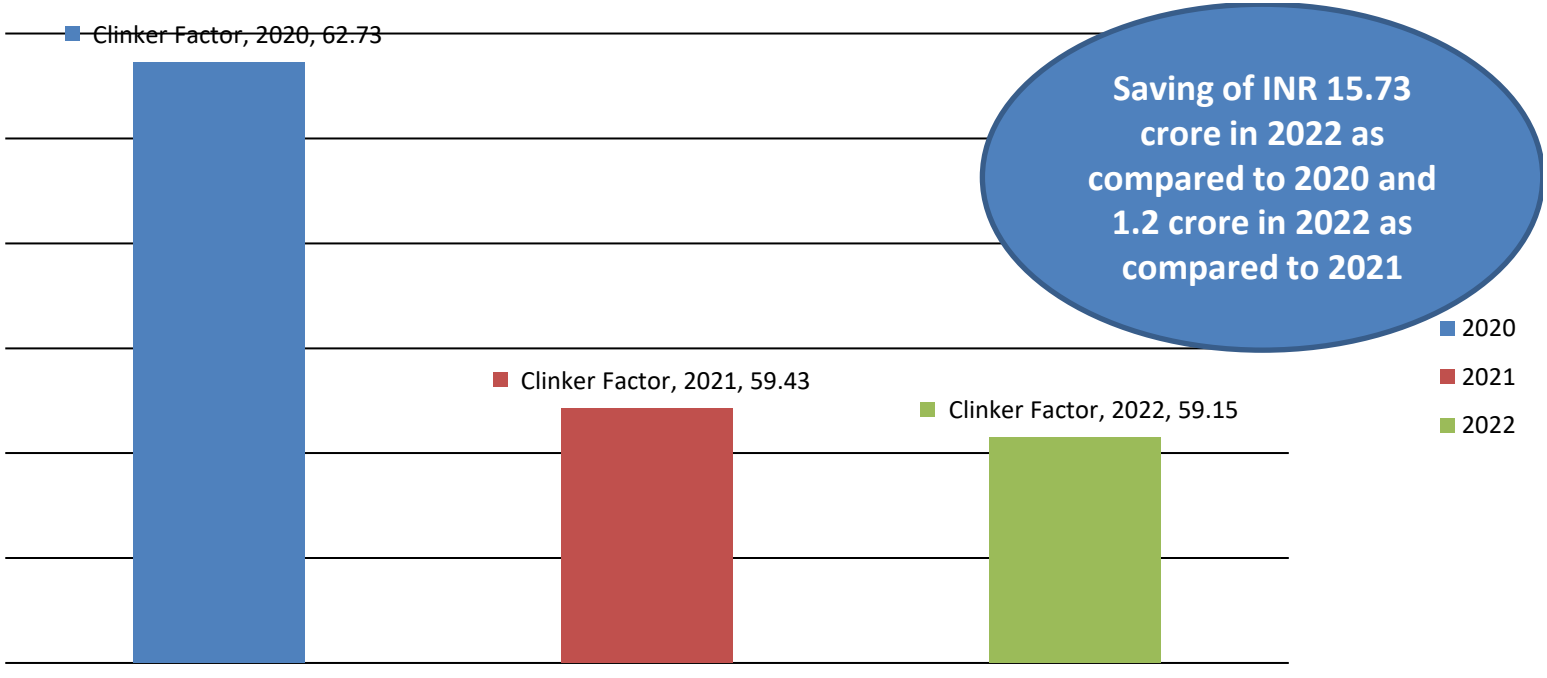
- Replication potential: Further conducting ball mill trials for improving mill parameters.

OTHER INITIATIVES

Air blaster at Gypsum Crusher

Annual Saving of 24040 KWh Energy units achieved by eliminating jamming problems

Savings with Clinker Factor Reduction



Saving of INR 15.73 crore in 2022 as compared to 2020 and 1.2 crore in 2022 as compared to 2021

Saving of Rs 15.73 cr in 2022 as compared to 2020 and 1.2 cr in 2022 as compared to 2021 by reduction of Clinker Factor.

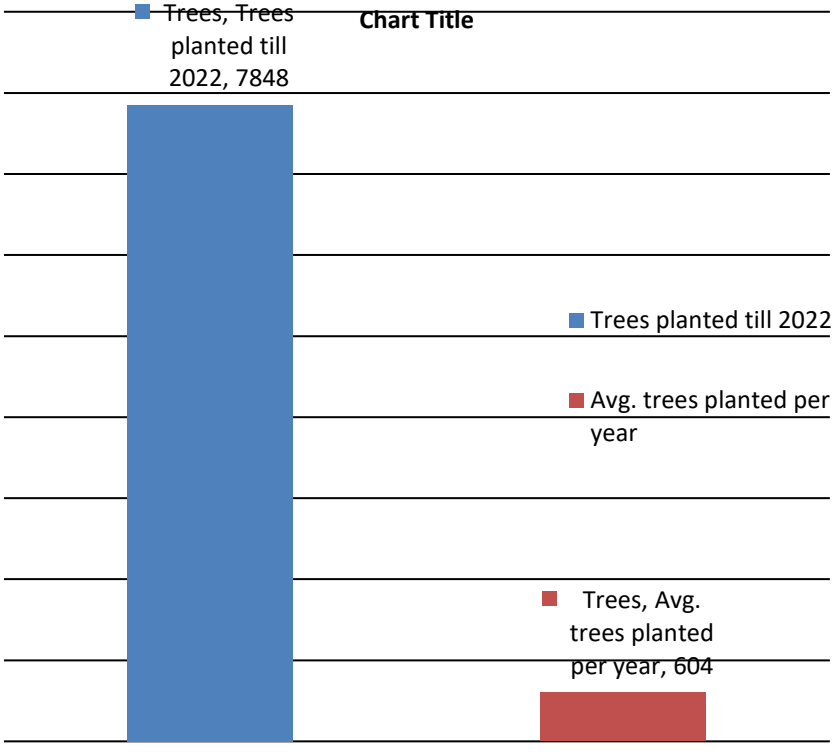
Road Map

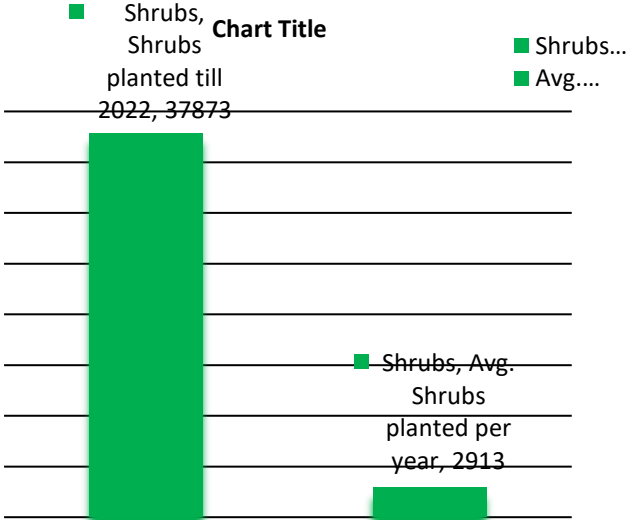
- Installation of MV VFD for Bag House fan, resulting in reduction of 1.5 unit/Ton.
- Setting up of 200 MW Solar Power plant in Gujarat for group companies, reducing power cost by 2 Rs. (40% green power)
- Regular optimization of routes of finished goods & raw material transportation to optimize the fuel consumption.
- Explore the possibility of deploying E-Trucks for material transportation.
- Exploration of new grinding aid by doing lab ball mill trials of grinding aid supplied by different vendors at different dose.
- Exploring the feasibility of online mixing of the grinding aid for Kawach after extraction from Cement Silo.

Green Supply chain Management

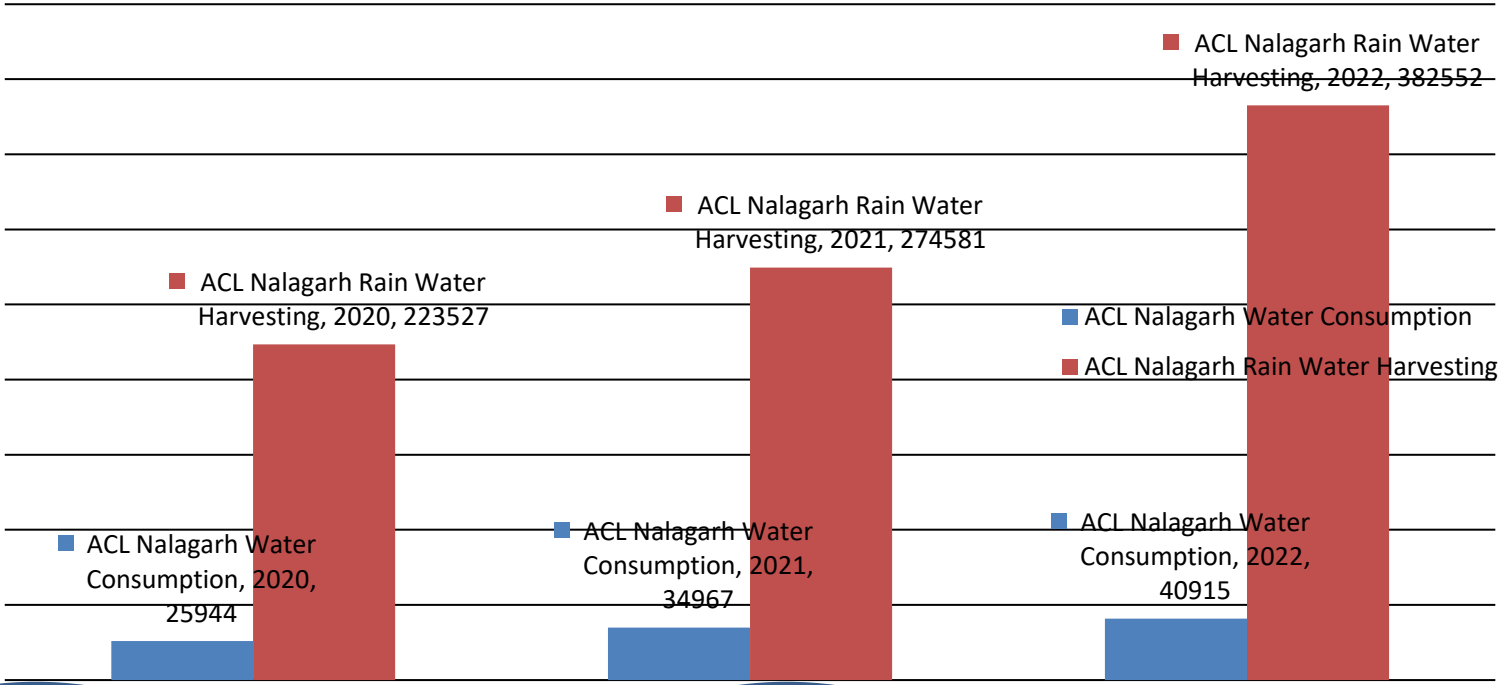
- Regular optimization of routes of finished goods & raw material transportation to optimize the fuel consumption.
- Motivating transporters to deploy bigger vehicles.
- Procurement of only 5 Star rated appliances, only IE3 efficiency motors etc.
- Procurement of Invertor Acs.
- Average lead reduced from 165 km to 162 Km in 2022 as compared to 2021.

GHG Initiative _ Plantation Data





GHG Initiative _ Rain Water Harvesting



8.6 times water positive in 2020

7.85 times water positive in 2021

9.35 times water positive in 2022

GHG Initiative _ Plant Area: **29Hectare** ; **Green Area : 41.31 %**

Total Area:
29 Hectares
Green Area: 41.31%


CAN.
Coming Together is a Beginning.
Keeping Together is Progress.
Working Together is Success.
Any Questions?

Thanks !!!