motherson

Proud to be part of planet earth.

23rd National Award for Excellence in Energy Management

Marelli Motherson Automotive lighting India Pvt. Ltd.,Pune

Presented By:-

Shridhar Deshmukh (Unit Head-Operations)

Sahebrao Bhosale (Sr. Manager –Maint. & Energy)

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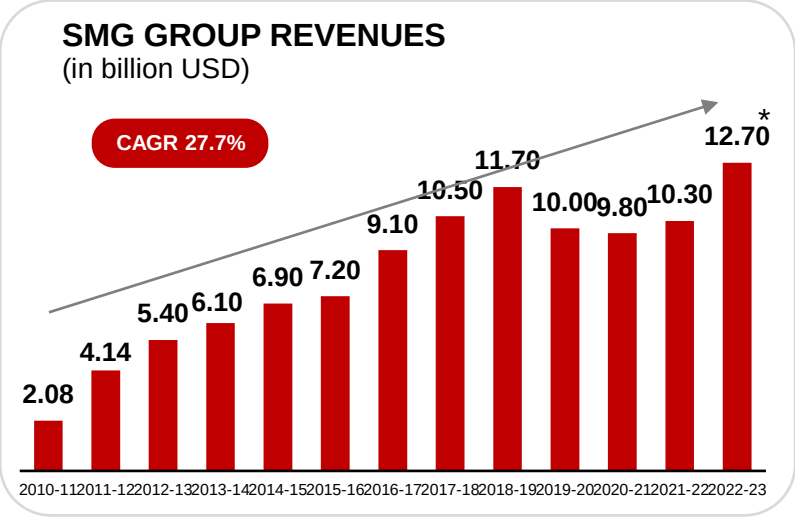
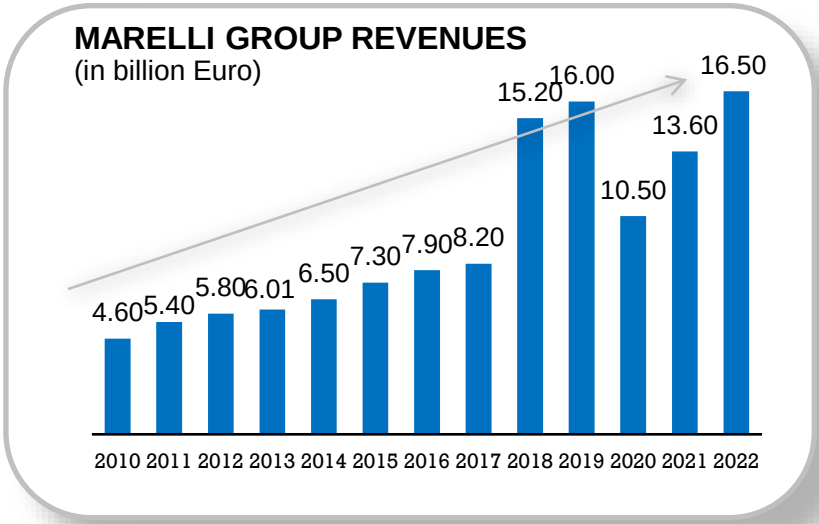
MARELLI

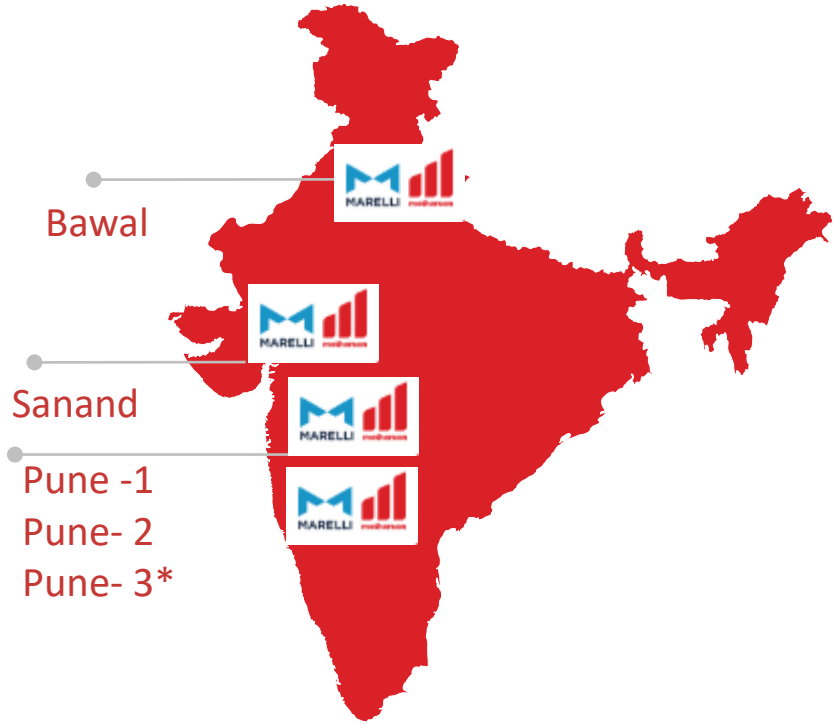
CII

1.Marelli Motherson – Company Introduction

- **50 : 50** Joint Venture between Marelli (formerly known as Magneti Marelli) & Samvardhana Motherson (India) to cater the growing Indian Automotive Market.



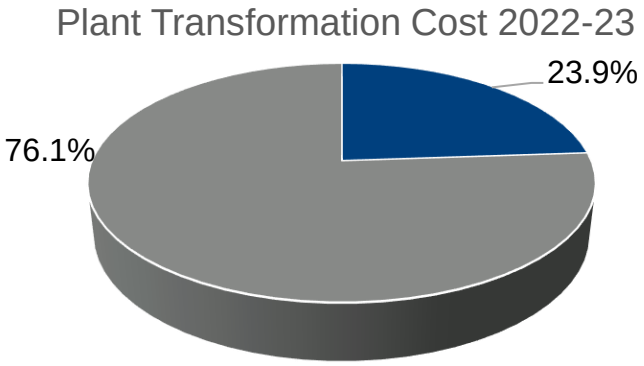




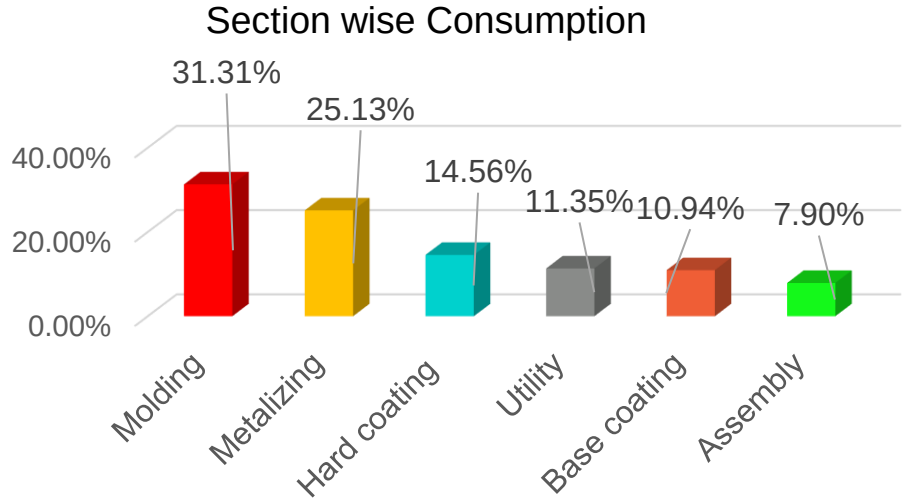
2. Manufacturing process

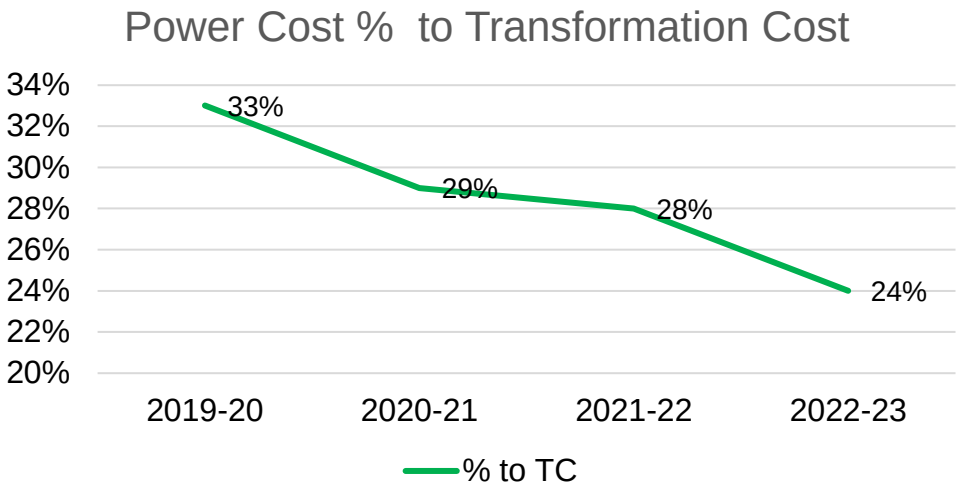
Product/Process	Head lamp	Rear Lamp	Air Intake manifold	PBA
Injection Moulding	HL housing Moulding; HL reflector Moulding; Hl bezel Moulding; Hl lens Moulding	RL housing Molding; RL lens outer Molding	Upper and Lower cover Molding	
Painting	Base coating; Hard Coating			
Surface Coating	Metalizing	Metalizing		
Assembly	Assembly	Assembly	Assembly	Assembly

3. Energy Consumption Overview



- **Energy (98.94 Mil. INR)**
- **Labor+Mainte.+Scrap+Consumables+Packaging (396.00)**



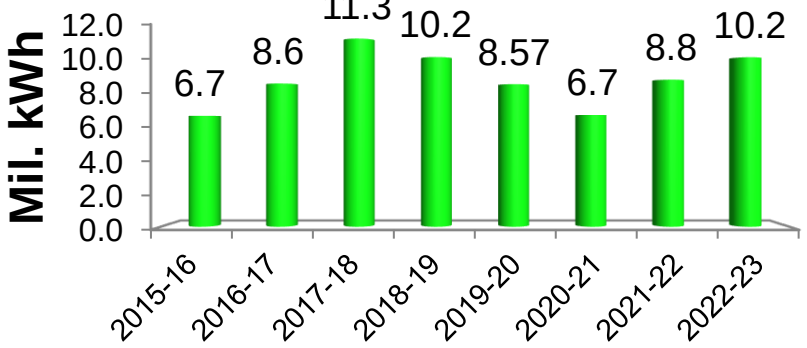


27% reduction over last 3 years

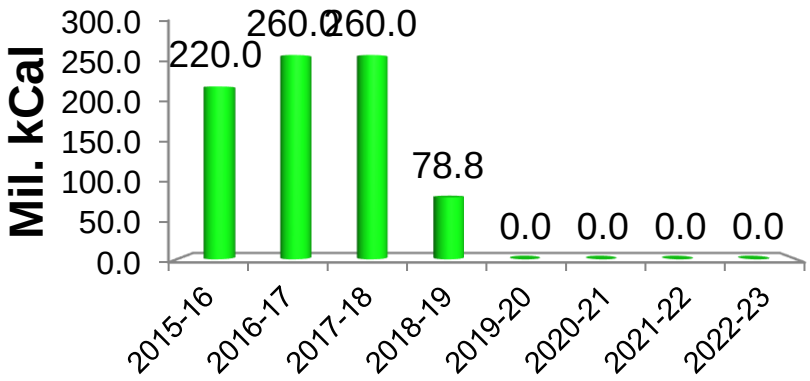
Power cost has been consistently dropping against the transformation cost.

3. Specific Energy Consumption

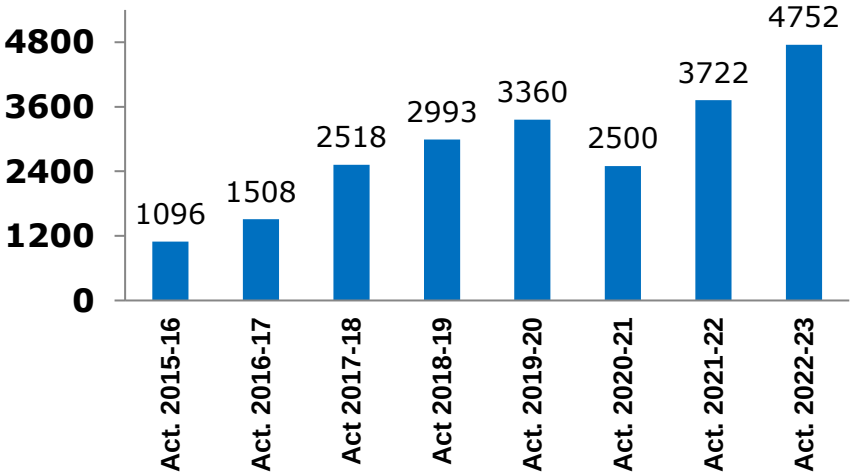
Total Electrical Energy Consumption (MSEDCL + Solar+ DG)



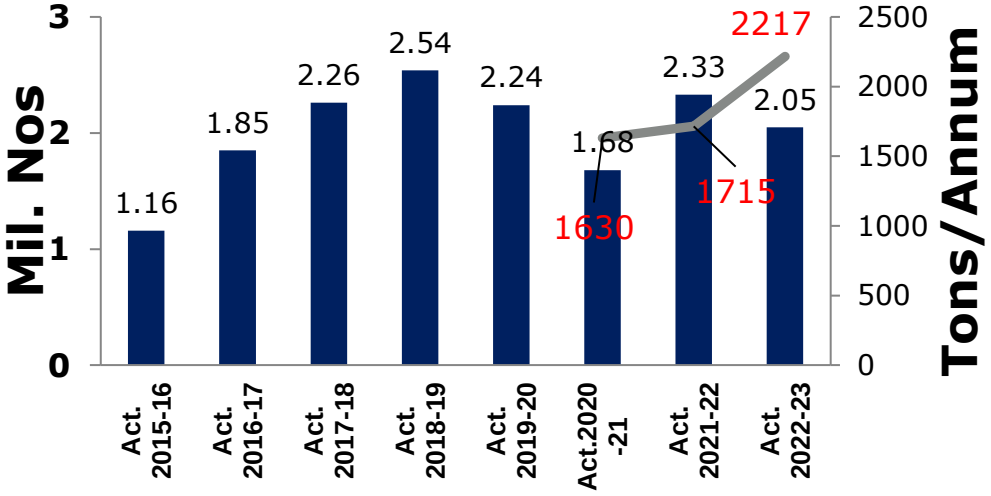
Total Thermal Energy Consumption



Sales Turnover in M. INR

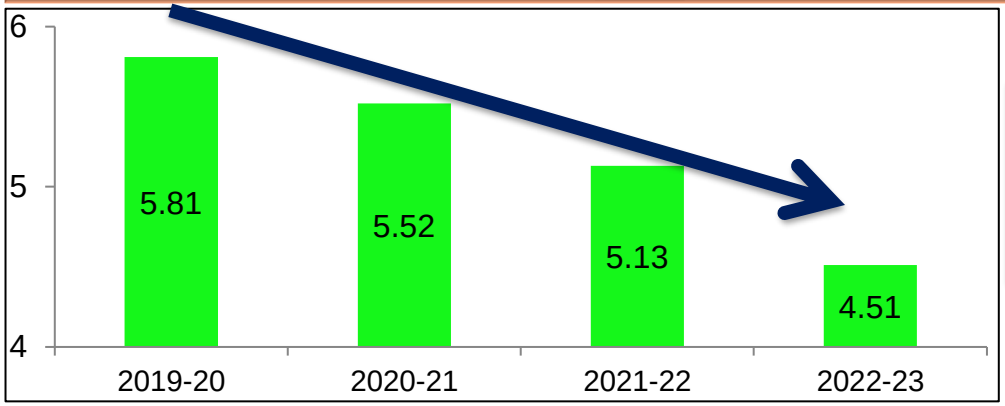


Volume in Million Nos.



3. Specific Energy Consumption

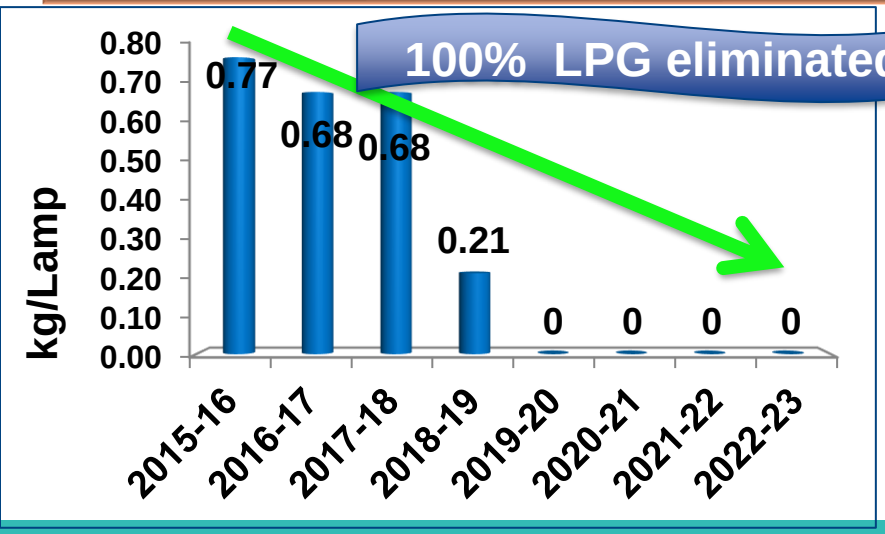
Specific Energy consumption kWh/Kg plant level

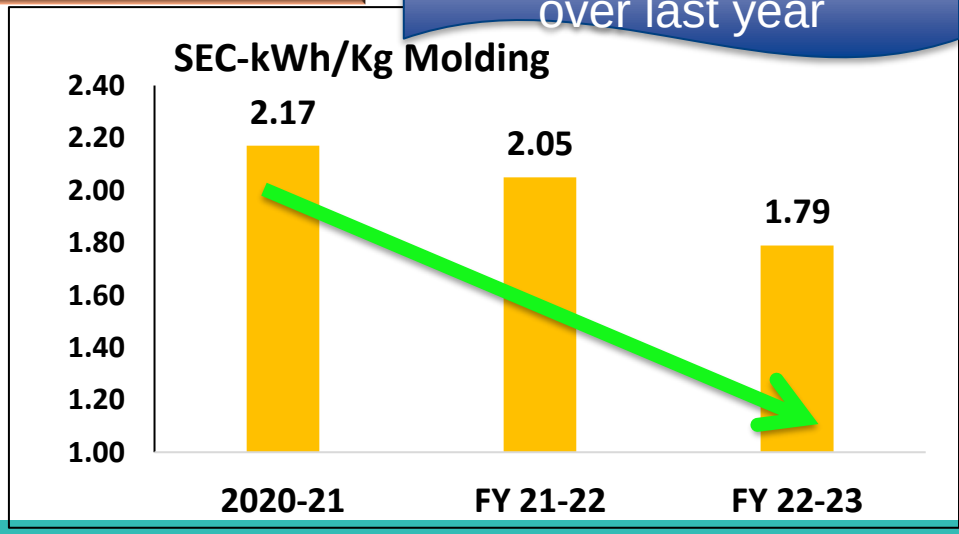


22% Reduction in last four years
Last one year 12.08% SEC reduction

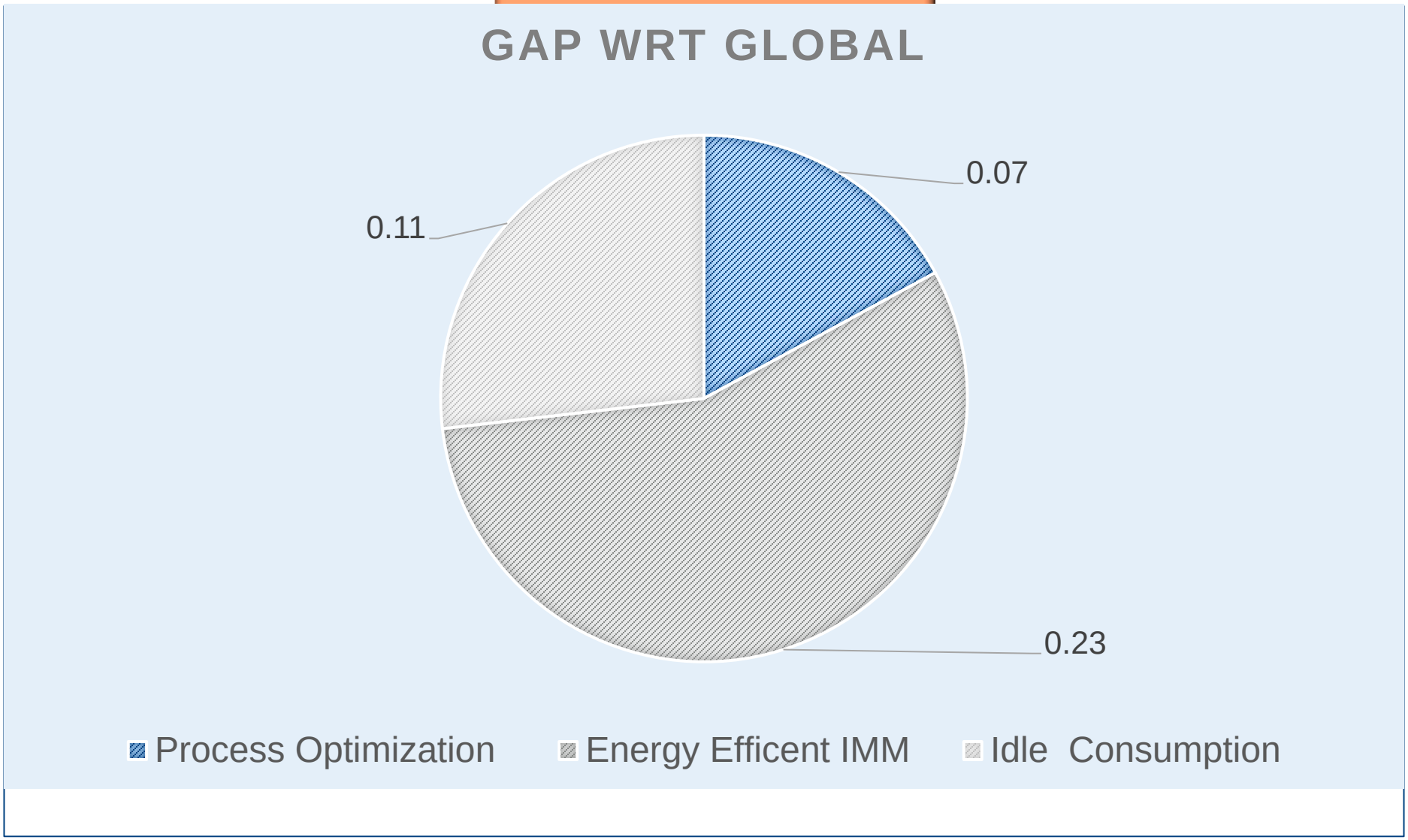
Specific Energy consumption Thermal, Kg Lpg /Lamp

12.68% SEC reduction over last year





4. Competitors, National & Global Benchmark



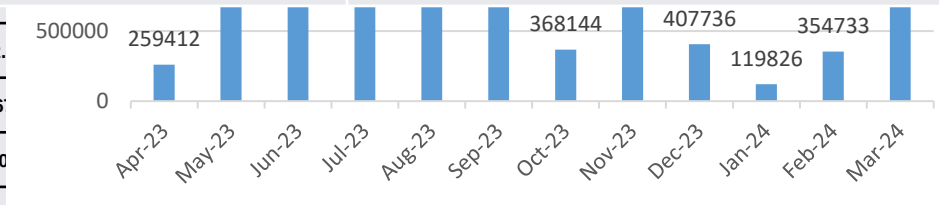
4. Road map to achieve Target / global benchmark

Energy Saving Projects Plan
(No of Projects)-2023-24

Type	No of Projects	kWh Savings
Idle loss	61	1,21,426
Set point optimization	11	56,820
New technology /Retro fitment	57	7,28,812
Total (Inclusive all type)	146	10,82,005

Encon Project Planned for 2023-2024

						ving/Year in INR	Investment	ROI in month	Budget	Responsibility	Status	P	D	C	A	
	regulator and sensor provided f	May-23	1440													
13	Tecno electrical panel cooling fan off by interlocking with heating contactor	May-23	57.6	662.												
14	1050 T vfd to be restarted	May-23	44928	5166												
15	550T-II conveyor deionization blower against anstatic air bar	May-23	3600	4140												
16	Induction Heater to DP pump for arzuffi 3	Jun-23	18720	196560	145000	8.9	Capex	Prashant	Completed	01/05/2023	24/06/2023	25/06/2023	25/07/2023			



4. Competitors, National & Global Benchmark- Road Map

MMLI having 3 fixed pump machines & 2 DFE pump machines. already we are retrofitted 2 nos and replacement plan as below

Replacement plan	2023-24	2024-25	2025-26	2026-27	2028-29	2029-30
350T	0					
1000T		1300T	650T	1050T		
1500T					1500T	1500T-2

For our application involving parts with higher weight and higher operating temperature, the AE machines are not energy efficient.

Tonnage	350T AE	350T Servo	550T AE	1000T AE	1500T Serv
kWh Std.	8.75	9			
actual kWh/kg	0.6	0.9			
Cost apx-INR	1.00 Cr	0.80 Cr			
ROI in Years	23		41 years	Negative	9 years

4. Major Encon Projects Planned in 2023-24

Short Term Plans

- IE 1 motors replacement with IE 3 7 no's. (Ongoing)
- Dehumidifier consumption optimization (Ongoing)
- IMM cooling pump close loop with oil temp - 5 Nos (FY 23-24)
- Conveyor, Panel AC, IMM pump idle off - (FY 23-24)
- Parameter optimization Type 2 Projects (FY 23-24)

Mid Term Plans

- Heat pump for annealing oven (FY 23-24)
- SCR to be provided to Annealing ovens (FY 23-24)
- ISO 14064 certification (FY 23-24)
- Thermal Energy storage system - (FY 23-24)
- Lab chiller load shifted to main chiller- (FY 23-24)

Long Term Plans

- Hard coat hot air optimization-heating system (FY 23-24)
- WHRS-Compressor (FY 23-24)
- Drive for Negri bossi machines (FY 23-25)
- Old IMM servo conversion- 1050T (FY 24-25)
- Solar Power procurement with captive Mode (FY 24-25)

Marked projects from Global Business line/ Internal Benchmarking

Marked projects from External Energy Audit

4. Planned Project 1:-2023-25 Solar Power procurement through Group Captive Mechanism

Solar Power procurement through Group captive Mode :

GOVERNMENT OF INDIA
MINISTRY OF POWER

New Delhi, the 8th, June, 2005

NOTIFICATION

G.S.R. 379(E). - In exercise of powers conferred by section 176 of the Electricity Act, 2003 (Act 36 of 2003), the Central Government hereby makes the following rules, namely:-

1. **Short title and commencement.-**

(1) These rules shall be called the Electricity Rules, 2005.

(2) These Rules shall come into force on the date of their publication in the Official Gazette.

2. **Definitions.-**

In these rules, unless the context otherwise, requires:

(a) "Act" means the Electricity Act, 2003;

(b) the words and expressions used and not defined herein but defined in the Act shall have the meaning assigned to them in the Act.

3. **Requirements of Captive Generating Plant.-**

(1) No power plant shall qualify as a 'captive generating plant' under section 9 read with clause (8) of section 2 of the Act unless-

Sr.	Description	2023-25
1	Generation Expected (kWh/Month)	5,15,000
2	% renewable	100%
3	Investment (Lac INR)	1.60 Cr
	Capacity	4.375 MWp
4	ROI-Months	21
5	CO2 Off set (Ton)	4377
Target Completion Date:-May .2024		
Status:-Commercials under approval		

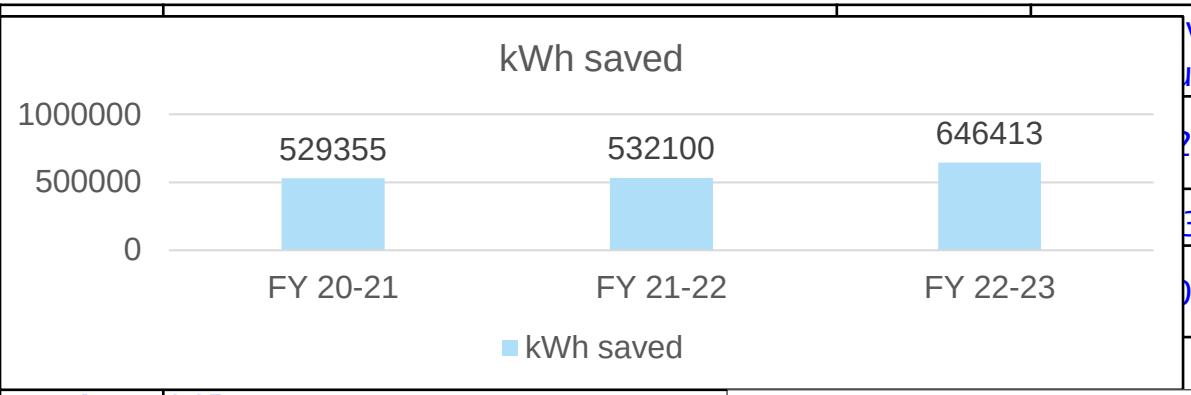
Injection Molding

Surface Coating

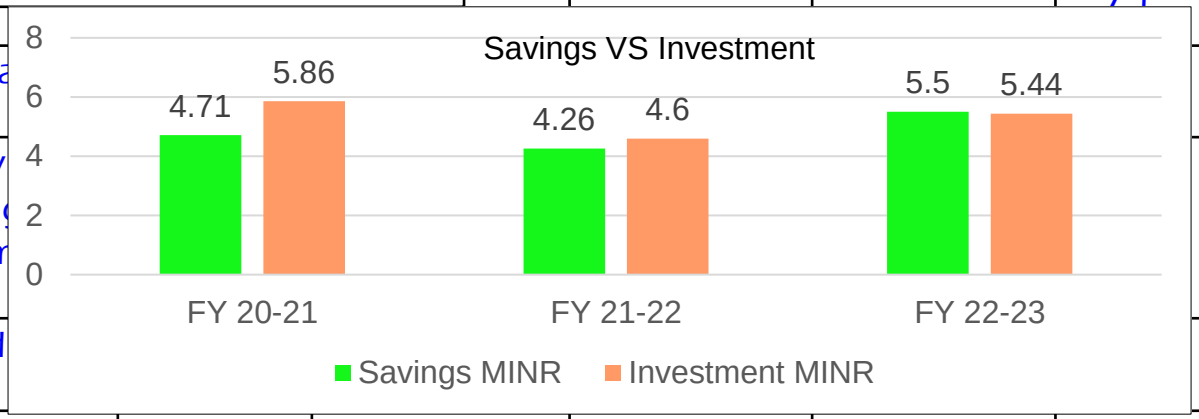
Assembly

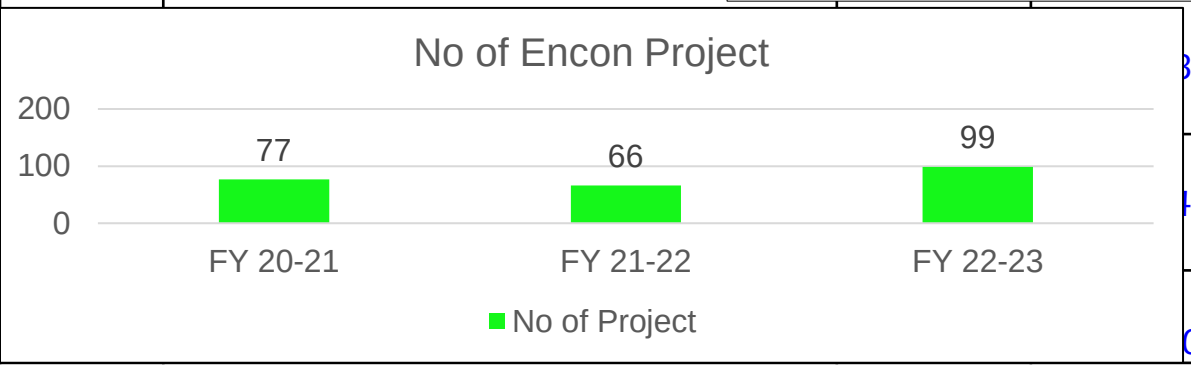
Utilities

5. Energy saving projects Summary



		ving ual	Cost Saved	Investment Made	ROI
		24	0.70	0.49	8.4
		33	1.25	0.75	7.2
		00	0.32	0.91	33.1
					7.1
4	SCR				
5	Air cooled chiller replaced with wa cooled chiller				
6	VFD to be installed in VMM rotary vacuum pump, injection mouldin borewell pump and dryer Vacuum blower				
7	sub zero controller to be provided office AC				
		30	0.13	0.05	4.6
		46	0.14	0.2	15.1
		0	0.08	0.01	1.5





5. Major Project -1: Old technology Asset Replacement

Before- We used 75 TR air cooled chiller, consuming 78 unit/hr. at 100% loading & its ikW/Tr is 1.04

Std. ikW/TR- 0.46

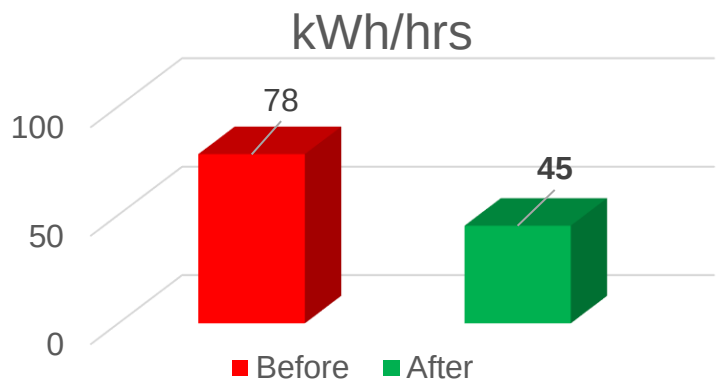
After- Replaced with 125TR water cooled chiller. consuming 45 unit/hr. at 58 to 60% loading. & its ikW/TR is 0.49

P D A C

Replication Potential-
MMLI Pune 2
MMLI Pune 3

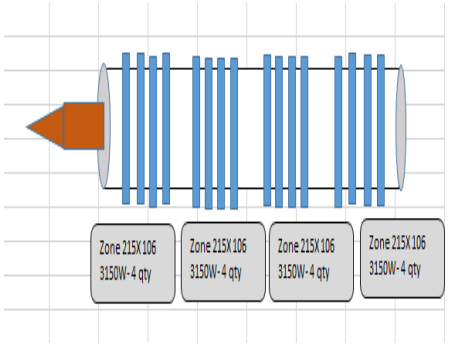
Benefits –
1) After installation of Pump 42.30% energy savings achieved .
2) Annually 247104 kWh

Co2 emission reduction/annum- 175 Tons

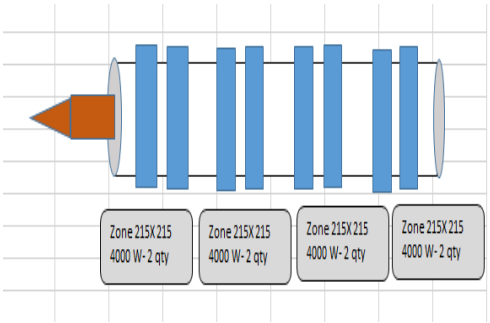


Benefit-2461156 INR/year
Cost-2429200 INR
ROI = 11.84 months

5. Major Project -2: Connected load reduction on IMM Barrel heating.



Before- Total barrel heater capacity 53 KW



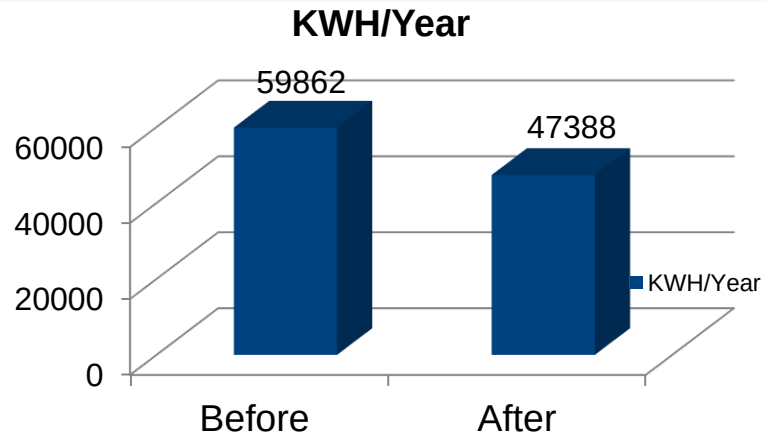
After-Total barrel heater capacity 36.9 KW

P D A C

Replication Potential -
15 Nos. IMM

Benefits –
1) After replacement of heaters 20.83% energy savings achieved .
2) Annual Savings 136033 kWh /1.25 M INR

Co2 emission reduction/annum- 96 Tons



Benefit-109895 INR/year
Cost-26572 INR
ROI = 2.9 months

5. Major Project -3 : To reduce energy consumption of rotary pump by providing VFD .

Before- rotary pump consuming more energy and starting current spike. pump vibration is also high. Only MPCB and contactor provided by manufacturer.

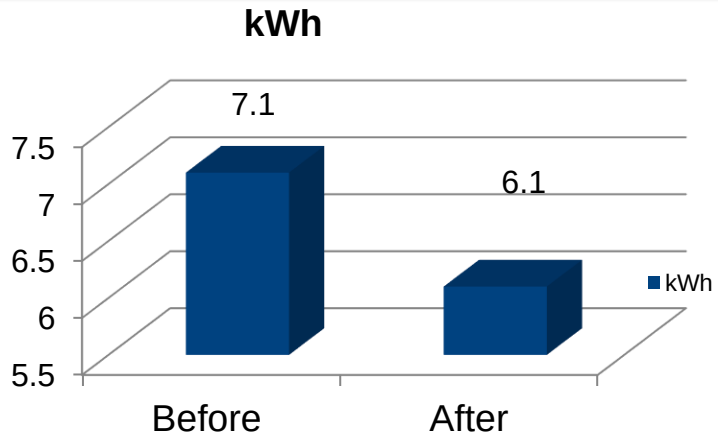
After- Installed 15 KW VFD to rotary pump. Now starting current and vibration also reduced. Double protection provided to rotary pump

P D A C

Replication Potential -
08 Nos VMM

Benefits –
1) After replacement of heaters 14.08% energy savings achieved .
2)Annual Savings-59903 kWh/0.6 M INR

Co2 emission reduction/annum- 42 Tons



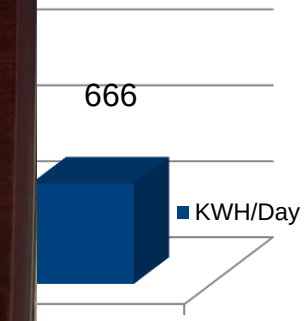
Benefit- 74580 INR/year
Cost-47000 INR
ROI = 7.56 months

6. Innovative Project -1: Energy Saving in Defrost system in Tecno Machine

Before - manu
restart of r

cuit developed
netic valve &
point.

Benefits –
1) After re
07.50% e
2) Averag
3) 10% pr
4) 3 hours
cleaning t



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Innovation level- first time globally in this make of VMM

6. Innovative Project - 2 : Capturing of Idle losses and reporting automatically

MACHINE DESCRIPTION	07:00-08:00	08:00-09:00	09:00-10:00	10:00-11:00	11:00-12:00	12:00-13:00	13:00-14:00
Engel-1100T	37.9	37.7	38.1	38.7	38.3	37.6	39.1
Engle-1500T-1	42.49	41.22	39.29	13.00	37.56	49.80	46.08
Engle-1500T-2	46.00	52.00	63.00	60.00	37.00	42.00	20.00
Engle-1500T-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Engle-1500T-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ferromatic-310T	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Kraussmaffei-500T-1	29.28	27.73	26.30	28.19	28.33	28.18	27.15
Kraussmaffei-500T-2	21.80	20.80	23.40	23.20	21.50	23.90	15.10
Negribossi-1000T	20.00	23.00	25.00	24.00	25.00	24.00	24.00
Negribossi-430T	3.00	10.00	12.00	12.00	12.00	11.00	9.00
Negribossi-550T-1	22.53	21.83	22.08	22.01	21.54	21.69	21.64
Negribossi-550T-2	10.50	1.20	1.00	0.30	0.00	0.00	0.00
Negribossi-850T	22.00	15.00	12.00	22.00	23.00	23.00	20.00

Before- Daily and hourly consumption of machines from EMS

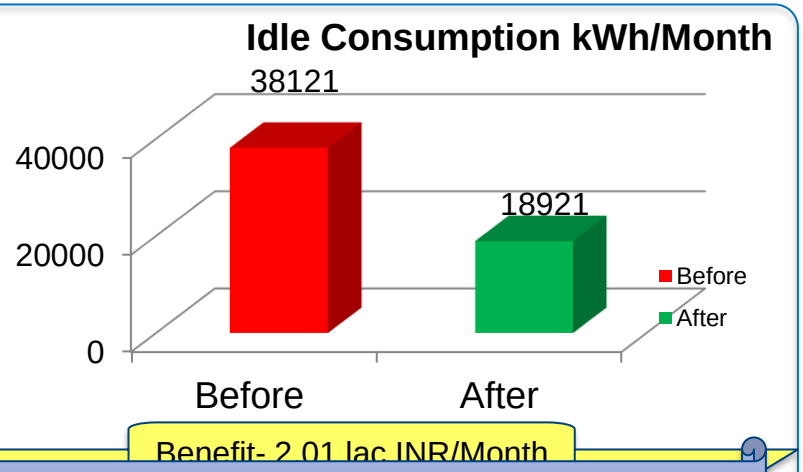
FeederName	7:00-8:0	8:00-9:0	9:00-10:0	0:00-11:0	1:00-12:0	2:00-13:0	3:00-14:0	4:00-15:0	5:00-16:0	6:00-17:0	7:00-18:0
Engle M/C-2	6.57	0.04	10.25	14.66	18.42	32.92	21.49	18.00	16.04	15.21	25.50
VRF metalizing	8.00	8.40	9.10	8.40	9.70	10.30	11.90	12.60	10.90	12.60	11.80
Engle M/C-1	32.48	34.06	40.29	40.77	38.56	33.05	39.62	40.38	41.76	38.68	39.37
Store Area	12.70	11.70	12.00	12.00	13.10	11.30	12.40	13.20	14.60	15.20	15.20
430 T Machine	13.50	13.70	13.70	13.60	13.90	13.20	13.80	13.30	13.50	13.90	13.30
650 Ton TOSHIBA M/C	27.00	27.00	25.00	27.00	26.00	27.00	24.00	14.00	28.00	28.00	27.00
550 Ton M/C-1	11.92	5.05	0.11	0.12	20.11	6.87	0.49	4.77	26.26	23.07	21.85
910 Ton M/C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1300 Ton M/C	35.00	34.00	35.00	35.00	35.00	35.00	35.00	34.00	32.00	36.00	35.00
850 Ton M/C	15.12	15.11	15.08	15.14	15.08	15.08	15.00	15.15	9.16	4.99	8.43
1100 Ton M/C	26.40	27.10	27.80	27.60	28.10	24.90	28.10	28.20	27.40	28.30	28.20

After- Machine wise and hourly reports of useless consumption with live alert-SMS & Email

P D A C

Replication potential -

1. All Machines useless consumption capturing
2. All MMLI units



Innovation level- threshold Defined as per our process & auto reports generated from EMS.

6. Innovative Project - 3 : To installation of IGBT based SVG against APFC

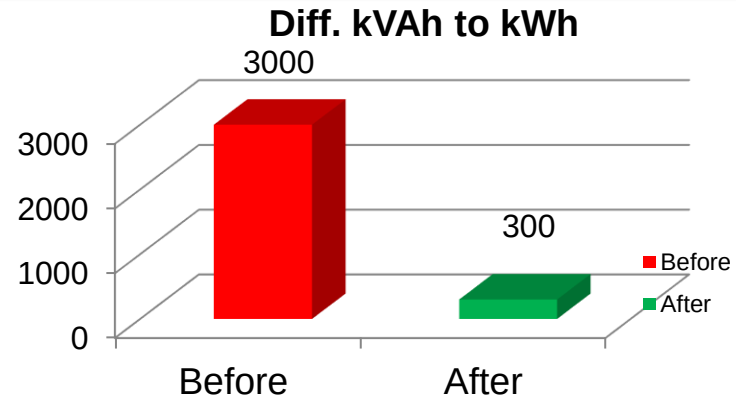
Before- Earlier APFC panel installed. Which is response is very less. Power factor maintain only 0.995. Major gap between active and reactive power.

After- 3 level IGBT based Static Var Generator (SVG) with inverter based technology to reduce delta between kVAh & kWh achieving power factor up to 0.999. Compensation with less than 15 milli second response time. 200 KVAr. Now PF is 0.999

P D A C

Benefits -

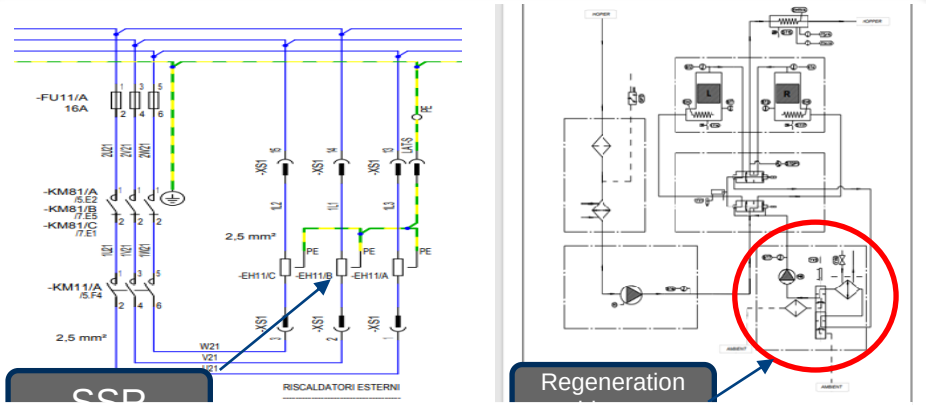
1) Average 32400 kVAh /year saving
2) Improve the Power Factor from 0.994 to 0.999
3) Excellent reactive compensation
4) Low thermal loss (≤3% of rated SVG capacity)
5) Reduced kVAh, kWh and cost



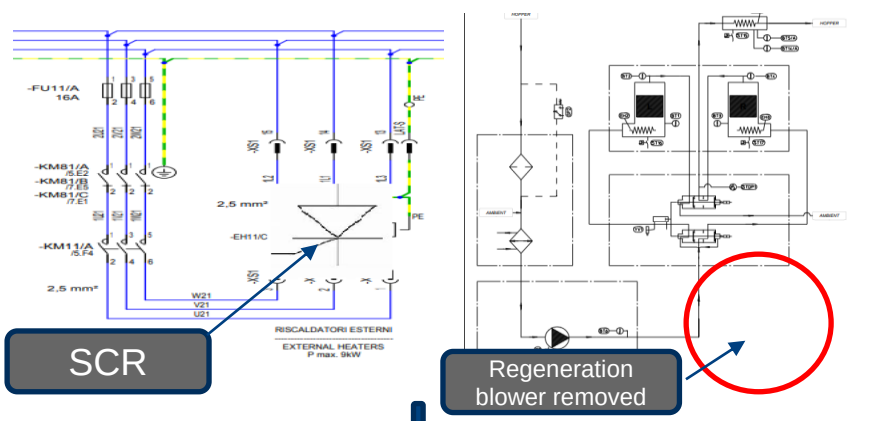
Benefit-317000 INR/year

Innovation level-New Technology & first time in lighting Division group Co..

6. Innovative Project - 4 : reduction in DH heating power consumption.



Before- Earlier 24VDC, 20 Amp three solid State relay used for Process heater given by manufactural

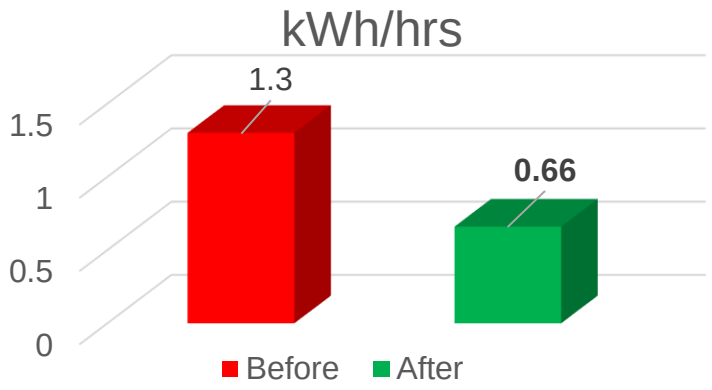


After- replaced SSR with SCR (silicon controlled rectifier.) 3 phase, 415VAC,15 amp, 7 kW, 0 to 10VDC control with external individual temp controller.

P D A C

Replication Potential -
1) DH -10 Nos

Benefits –
1) After installation of Pump 52.38% energy savings achieved .
2) Annual Savings- 51840/0.51 M



Innovation level-This is not yet started by pioneer Dehumidifier companies, we did in house

7. Utilization of renewable energy source

	Installed capacity Mil Kcal /annum (Thermal)	Inst. Plant capacity –Plant onsite(Electrical) kWp	Generation kWh	% of electrical energy	Off site installation
2015-16	260	0	0	0	0
2016-17	260	608	365113	4.2	0
2017-18	260	891	756738	6.7	0
2018-19	78.0	891	939584	9.2	0
2019-20	0	891	1088696	12.5	0
2020-21	0	891	1032877	15.13	0
2021-22	0	979	965829	11.04	0
2022-23	**0**	**979**	**999278**	**9.88**	**0**
Target 2023-24	0	979	61,65,000	64.00	0

To								
Renewable kWh	0	365113	756738	939584	108869 6	1032977	965829	999278
% of renewable	0	4.2	6.7	9.2	12.50	15.13	11.04	9.80
Tonnes of CO2 Offset	0	310	643	799	925	878	859	899

8. Waste Utilization & Management

Categories	Type of Waste	Waste generation FY 20-21	Waste generation FY 21-22	Waste generation FY 22-23	Recycle %	In house Projects to reduce wastes/Disposal method
Engg. Plastic waste (in Tonnes)	1. Engg Plastic 2. runners	197	140	186	99%	1) Online gate grinders for runner reusage on 6 Machines 2) Part weight reduction by runner size reduction 3) 100% recycling through authorized supplier
Packaging plastic waste (in Tons)	1. Wrap films 2. Polybag 3. Bubble bags	8.6	5.31	7.0	100%	1) Wrapping role size reduction, wrapping elimination and reusage for FG parts 2) Polybag elimination and recirculation up to -75%
General Waste (in Tonnes)	1. Carton 2. Paper 3. Cotton 4. Metal 5. wood	35	31	46	100%	1)Instead of wooden pallets usage of reusable plastic pallets 2)Reduction in general waste, stationery etc.
Hazardous waste (In Tones)	1. Oil 2. Oil soaked cotton 3. ETP sludge 4. Aerosole cont. 5. battery	3.6	3.1	2.23	99%	1)Disposal through Incinerator at MEPL authorized Vendor . 2)Process optimization

Recycling process of plastic waste (Polybag, Bubble bag & Wrapping film)

Recycling of plastic waste (Polybag, Bubble bag & Wrap film)

SR No.	Name of waste	Sale to Authorised re-cycler	Consent number and validity	Finished goods (granules) Sale to
1	Plastic waste (Polybag, Bubble bag & Wrap film)	Nazz trading company	0000129014/CO/2202000840, Valid up to 31.07.2023	Vendor/Manufactures in market

CTO- Naaz.pdf

Microsoft Excel Worksheet

Purchasing of wrapping role and child parts along with polybag and bubble bag from market by MMLI

Manufacturing process of lamp by MMLI

Generated Plastic Waste Storage by MMLI

Transportation of plastic waste for recycling by MMLI

Storage & Segregation of polybags for recycling by recycler

Loading & crushing of polybag by crushing machine

Loading, melting & cooling process of crushed plastic

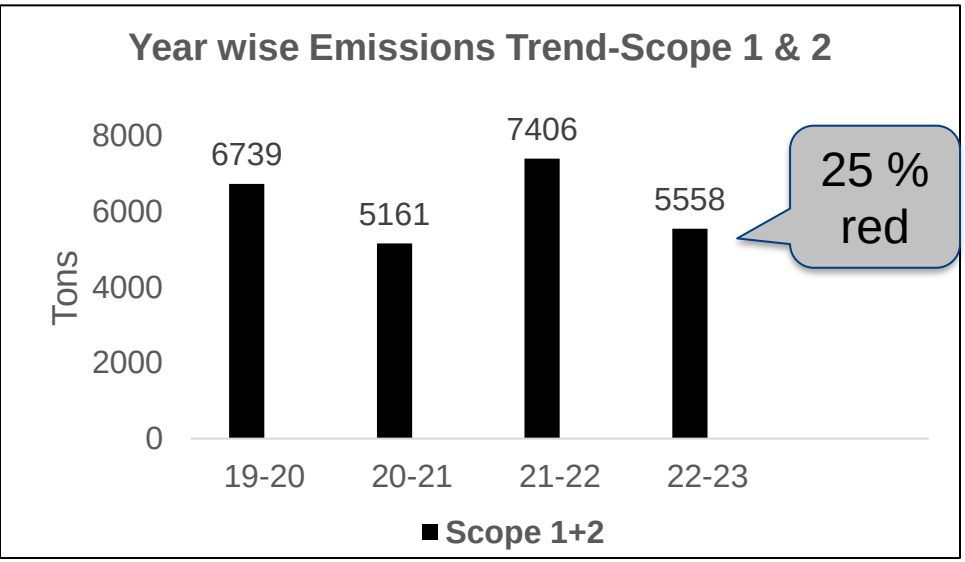
Stacking of finished goods

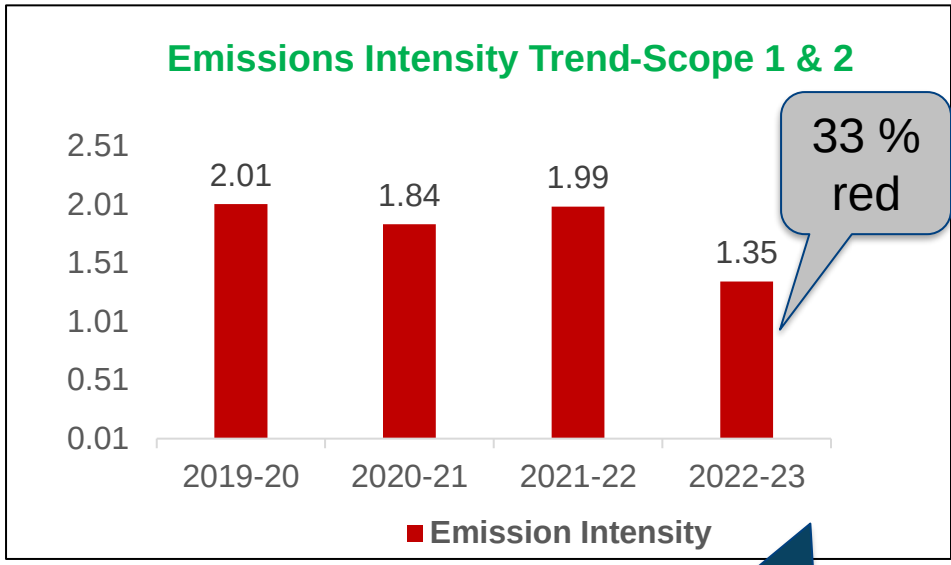
Final granules

Transportation of finished goods in market (granules)

The recycled plastic granules are now used in the production of new production

9. GHG Inventorisation





- **Reduce Scope 1 + Scope 2 emissions by** **25% by 2025**
- **50% by 2030**
- **75% by 2035**
- **Carbon neutral (Scope 1+ Scope 2) by 2040**
- **ISO certifications :-**
  - **ISO 50001 - Energy Management System - Certified in 21-22**
  - **ISO 14064 - GHG reporting- by 2023-24**
  - **ISO 14040 - LCA – Life cycle assessment - by 2024-25**
  - **ISO 14067 - PCF – Product Carbon Footprint - by 2025-26**
- **SAQ 5.0 - > 95 % by 2024**
- **Water Neutral :- 2024-25**

Emission Intensity –
Sanand Unit -1.85
Bawal Unit – 1.68
Pune -2 - 1.79

9. Target (short/long term) for GHG emission reduction

Key Partners : ***Who will help to deliver ?***

- *Identify the key external partners / suppliers ?*
- *Identify the key internal Motherson divisions and OP-COs that will assist in this Net Zero transition plan delivery.*

Give details below :

1. Solar plant installers and providers onsite and offsite with CAPEX and OPEX models
2. WTG providers offsite
3. State Grid suppliers
4. DG green fuel conversion retro fitting suppliers
5. Green/low carbon fuel suppliers.
6. Professional energy auditors

Key activities : ***How do we propose to do it ?***

1. Install roof top solar in CAPEX/OPEX model.
2. PPA for renewable power in CAPEX/OPEX mode
3. Agreement with GRID suppliers for green energy at premium price.
4. DG conversion to green fuel
5. Energy conservation projects to reduce energy consumption
6. Replace AC refrigerants with low GWP refrigerants.

Key resources : ***What is needed to succeed ?***

1. Legal team
2. Purchase team
3. Finance team
4. Facility management
5. Specialist with good understanding of state policies on green power procurement
6. Energy managers and auditors
7. Energy measurement devices and Online EMS

Value proposition : ***What do we need to do ?***

- *Which Scopes does the proposal apply*
- *What is your Co2e baseline ?*
- *What needs / pain points does the ideation satisfy ?*
- *Does the idea / product / service offer any key USP's ?*

Give details below :

1. Replace Fossil fuel energy by green energy.
2. Reduce Scope 1 and Scope 2 emissions of the plant
3. 2020-21 Baseline of 5721 T of CO_2 eq.

Target timing : ***What are the key milestones ?***

1. Get quotes on Open Access PPA for renewable energy in CAPEX/OPEX model and validate ROI. – **2025-26**
2. Initiate and finalize green power purchase agreement with state Grid supplier – **2038-39**
3. Get the feasibility of running the DG on green fuel or in hybrid mode.
4. Get quote for DG conversion to hybrid mode and validate ROI.
5. Carry out energy audits, identify and quantify the losses, work out the ROI of proposed solutions – **alternate year**

Benchmarking : ***Who are our competitors ?***

- *Are established players active in the field ?*
- *What are their key product and performance attributes ?*
- *What are the competitors price points ?*

Give details below :

1. CAPEX and OPEX solar installations – M+, Clean max, Sun-source are capable players- Most of them use standard installations.
2. No installer use dual sided panels yet.
3. For WTG used asset is preferred over new asset.

Budget activities : ***How much do Motherson need to invest ?***

1. Open access Captive Solar power purchase – 16 Minr to be covered in CPAEX 2025-26
2. Encon activities budget to be covered in CAPEX and OPEX in 2023-24 – Apprx 4 Minr
3. Green Power purchase from state GRID, 3.4MWh, at cost of 2.4 Minr – Plan in OPEX of 2028-29 onwards

Revenue stream : ***How much return can Motherson expect ?***

1. SOLAR capex model – apprx 24 months
2. ENCON projects – ROI within max 18-24 months

10.Green Supply Policy

Responsible value chain

Responsible sourcing of materials; product subcomponents, packaging (ensuring recyclability wherever possible); inbound, inter-company and outbound logistics

- Implement Product Carbon Footprint (PCF) processes and awareness throughout thevalue chain.
- Improve energy efficiency use and promote use of renewable energy throughout the supply chain.
- Actively support the implementation of carbon offset initiatives in the value chain.
- Target to avoid the use of conflict minerals and removal of any SOCs from our product lines and processes throughout the value chain

Source :- Motherson sustainability report

10. Green Supply chain management

Total No . Of Supplier accessed	Year	Encon Projects Nos.	Evaluation Done	kWh Saved (‘000)	Green Energy Projects	Encon ROI (Avg.)
32	2020-21	72	43	3.39	0	< 1 year
48	2021-22	147	110	7.18	1	<2 year
93	2022-23	207	170	107.7	3	< 2 years

- Energy Checkpoint added in monthly assessment check sheet
- Supplier trainings on project implementation
- Evaluation done during monthly audit
- ROI sheets verified during meeting with concern section heads in supplier company
- In discussion with 16 Suppliers for rooftop solar installation .

10.Green Supply Chain management

Sr.	Sustainability Parameter	2021-22	2022-23	2023-24	2024-25	2025-26
1	Adhere to Motherson Supplier Code of Conduct	O	100%	Act.- 96%		
2	Supplier coverage with SAQ 4.0					
	Direct material(Local)	100%	90%	Act.- 89%		
	Direct Material (Imported)		90%	Act.- 85%		
3	SAQ 4.0 Score - Direct material suppliers	50%	60%	Act.- 69%		90%
4	ISO certifications - Direct material suppliers					
	ISO 14001	O	85%	Act.- 71%		
	ISO 45001		75%	Act.- 65%		
	ISO 50001		15%	Act.- 06%		
	ISO 14067			O		
5	Green energy - Direct material suppliers		>10%	Act.- 12%		
6	Water neutral - Direct material suppliers				O	
7	Carbon neutrality (Scope 1+2) - Direct material suppliers			O		

O-Plan

11. EMS System and other requirements

- MMLI Pune Plant certified with ISO 50
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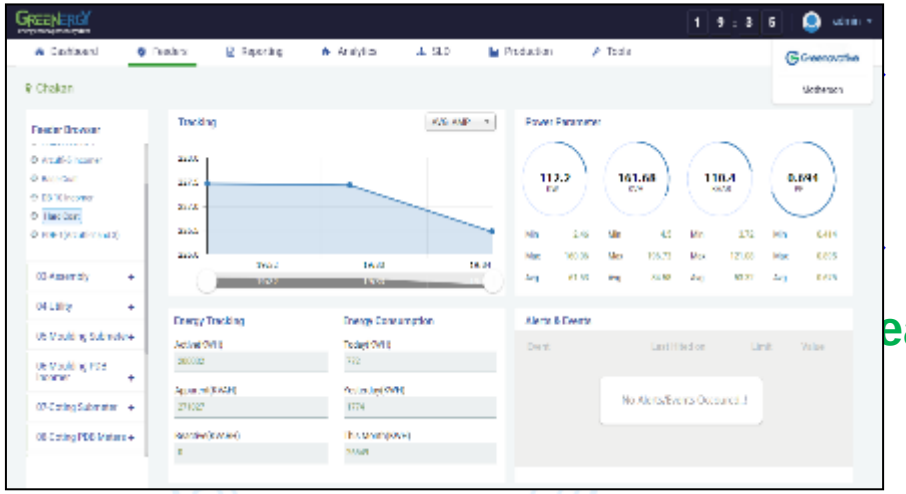
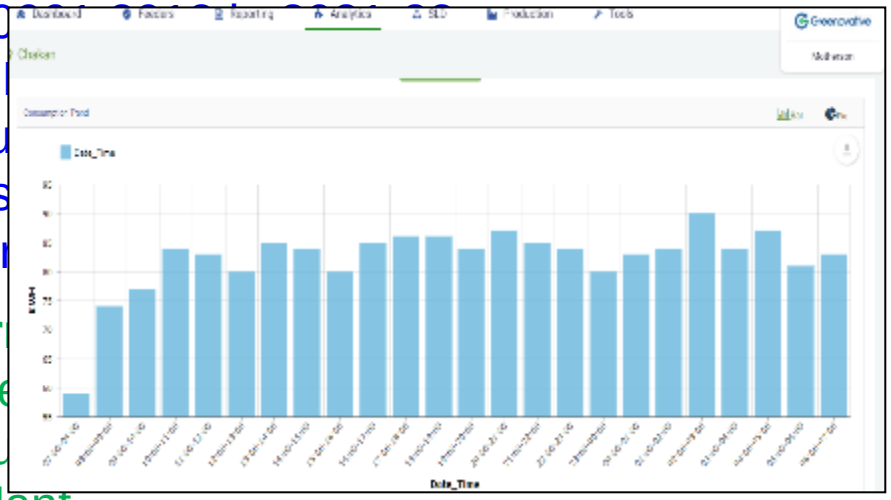
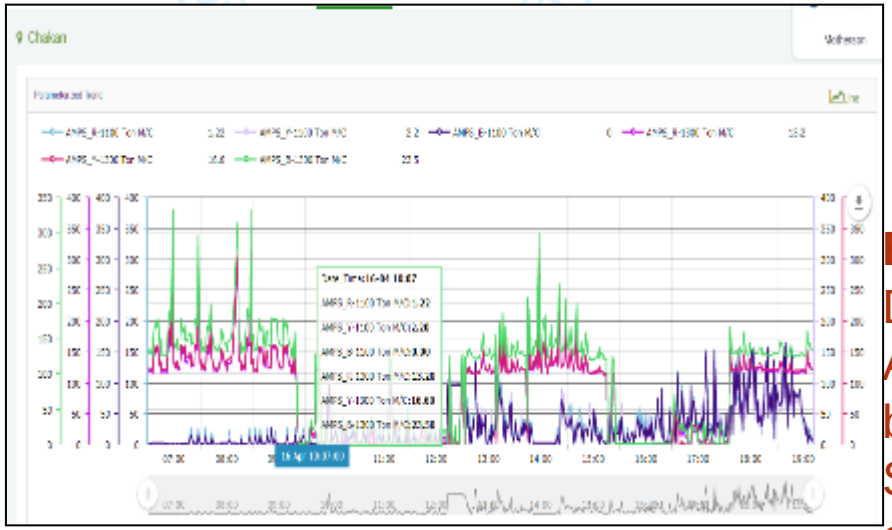
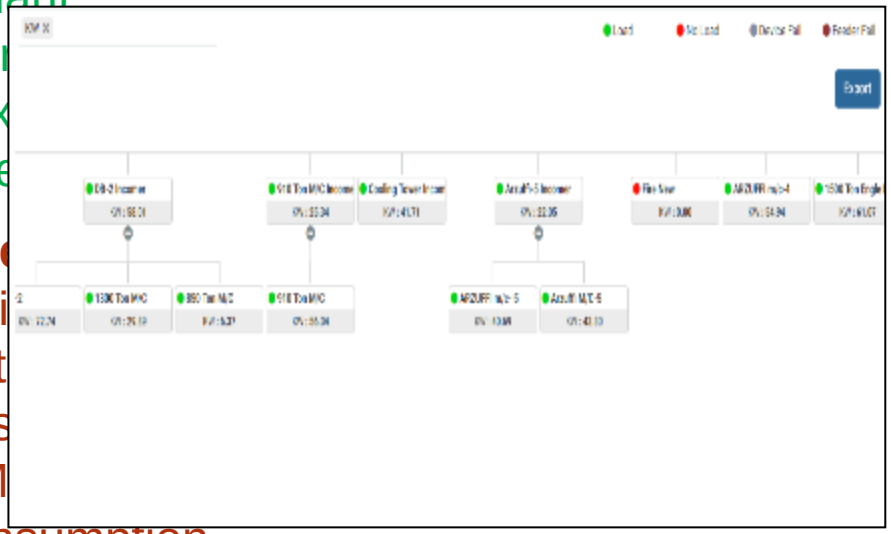
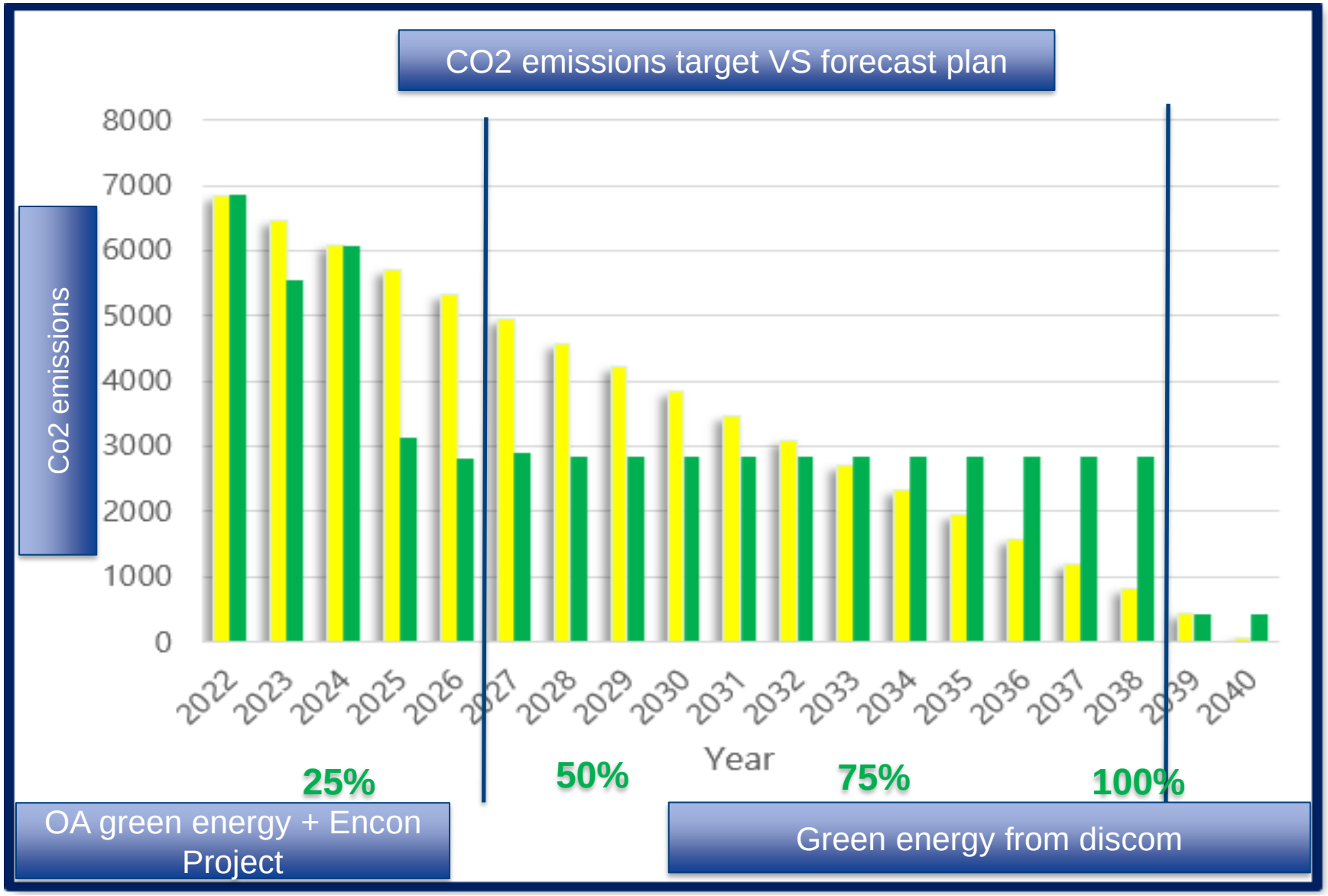








12. Net Zero Roadmap



MMLI - Energy Management Awards & Achievements

MEDA by GoM	CII National Award	Group Sustainability Award	NECA Award GoI –Min. of Power
2017-18- 2nd Prize	2018-19- EEU	2022	2020-21- First Prize
2018-19- 1st Prize	2019-20- EEEU	2023	2021-22- CoM
2019-20- 2nd Prize	2020-21-EEEU		
2020-21-CoM	2021-22- YEL		
2021-22- 2nd Prize	2021-22- EEU		

Presenter's Contact details
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