25th National Award for

Excellence in Energy Management 2024

10th - 12th september'24

Amara Raja Energy & Mobility Limited, Tirupati

Brief of the Organization

AMARA RAJA
Gotta be a better way

Dr. Ramachandra N. Galla
Founder Chairman

Jayadev Galla
Co-founder

Dec 1985
Foundation stone laid for
Amara Raja Power System Ltd.

Mar 1986
Amara Raja
a small beginning

Mr. Harshavardhana G
Executive Director
Lead Acid Biz.

Mr. Vikramadithya G
Executive Director
New Energy Biz.

7
Companies

16
Businesses

16875
People/Sep'23

$1.5 Bn
Group Revenue/FY22

Amara Raja Media & Entertainment Ltd

Brief of the Organization

AMARA RAJA
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Industry-leading Solutions to keep the World in Motion

Industrial Batteries

ARE&M is a pioneer of VRLA batteries in India and are engineered to provide the best performance, reliability and consistency over the life of the product.

- UPS
- Telecom
- Railways
- Power and Industry
- Motive
- Solar

Automotive Batteries

ARE&M is a leading manufacturer of automotive batteries in India and has established its brands by delivering highest performance standards in the segment.

- Passenger Vehicles
- Commercial Vehicles
- Farm Vehicles
- Home UPS/ Inverter
- 2 and 3 Wheeler Vehicles
- E-rickshaw

Li-ion Batteries

Amara Raja Advanced Cell Technologies offers cells, battery packs and charging solutions in the energy and mobility sector.

- 2 Wheeler Vehicles
- 3 Wheeler Vehicles
- Telecom
- Energy Storage Solutions

Brands

Automotive Batteries


Amaron®


PowerZone®


ELITO

Industrial Batteries


Power Stack®


Amaron Sleek™


Amaron Volt™


Amaron Brute™


Amaron Quanta®


Li-on

Brief of the Organization

AMARA RAJA
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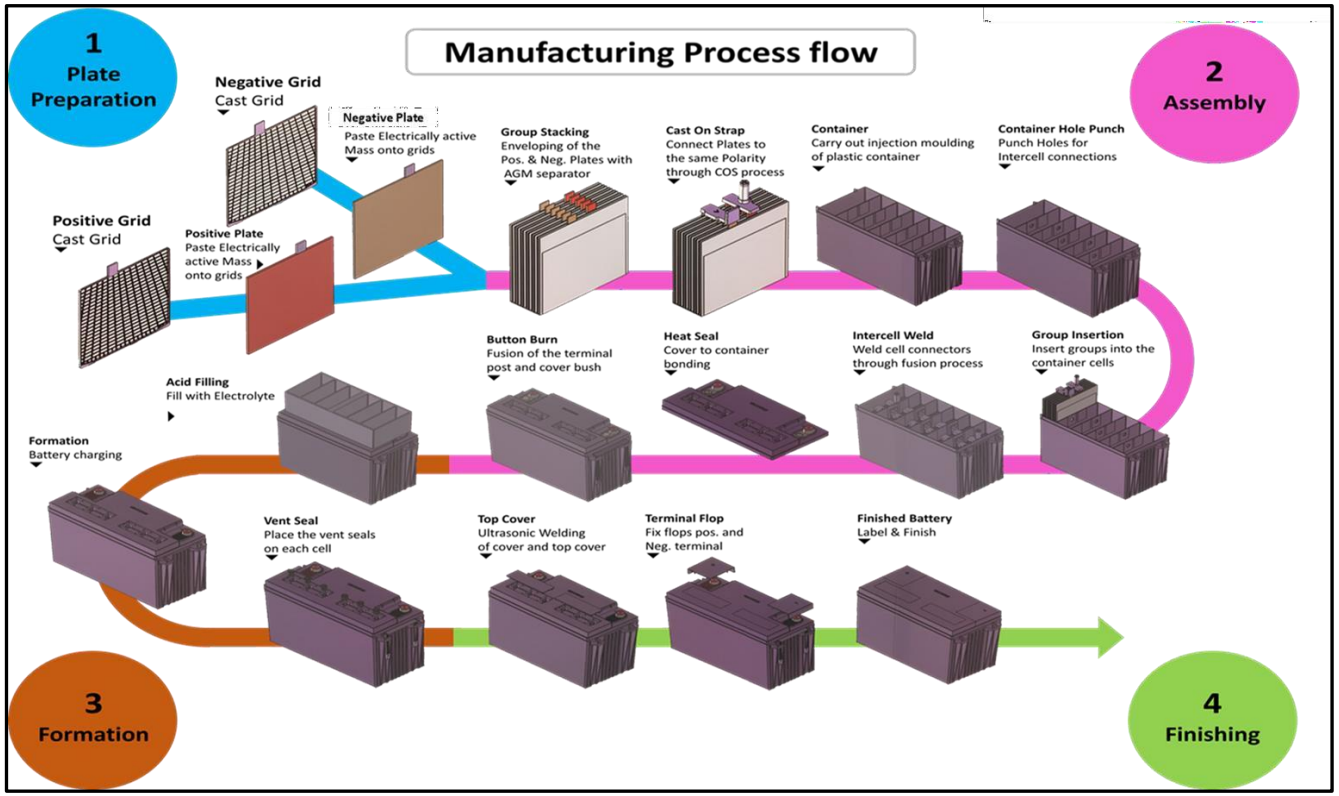
CORE PURPOSE

To **transform** our increasing spheres of influence and to improve the quality of life by building institutions that provide better access to better opportunities to more people. . . **all the time.**

VISION

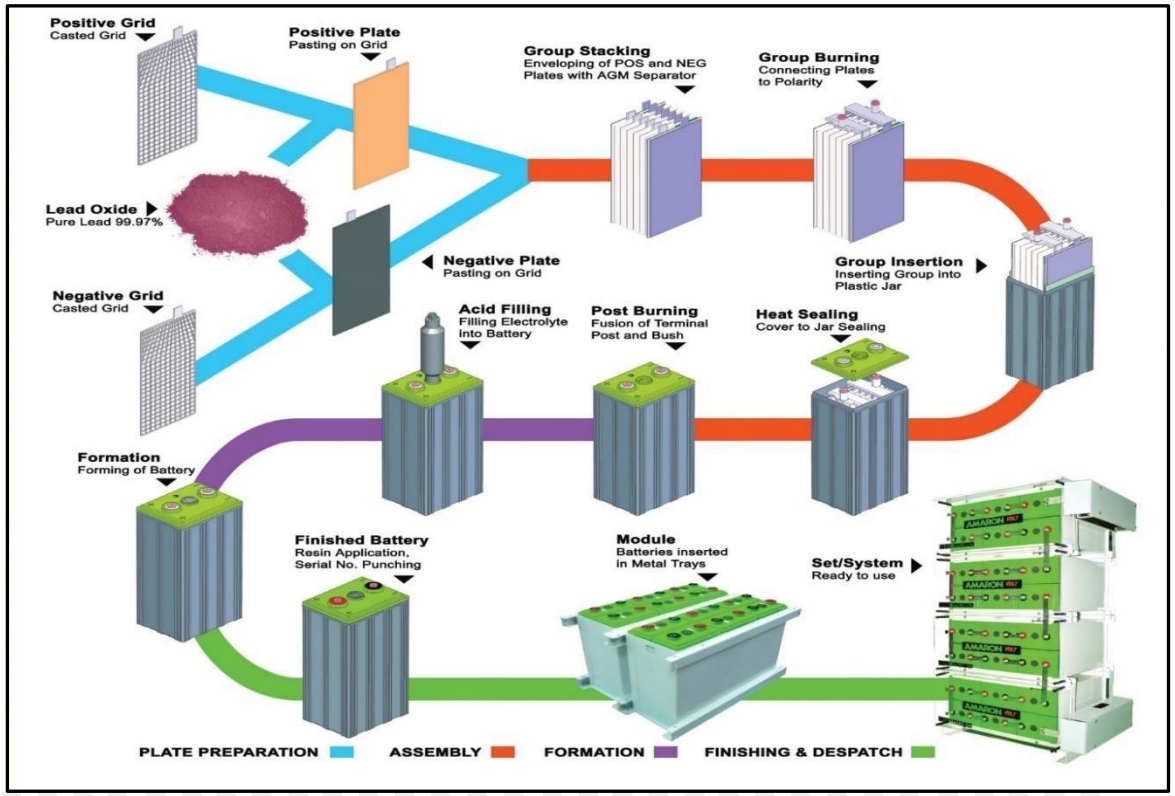
Through The Amara Raja Way and through enduring progressive partnerships we will be a Global Leader in Batteries and Battery Technologies and a dominant player in the Indian Ocean Rim.

Battery Manufacturing Process Flow



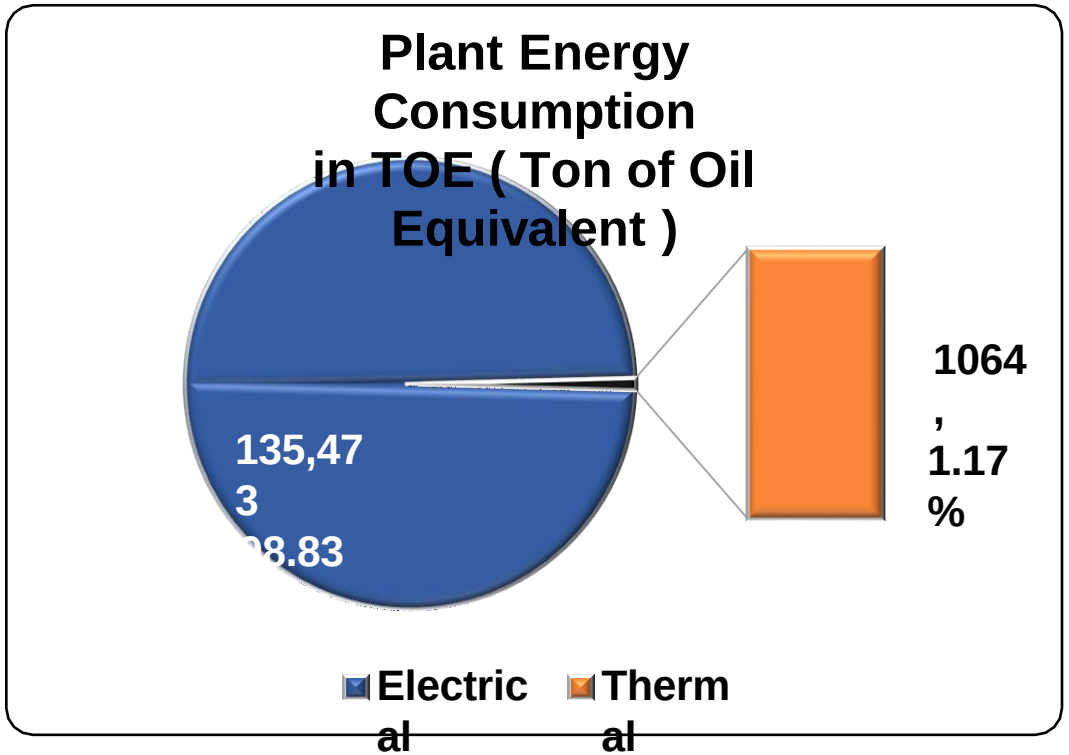
Automotive Battery Process

Industrial Battery Process



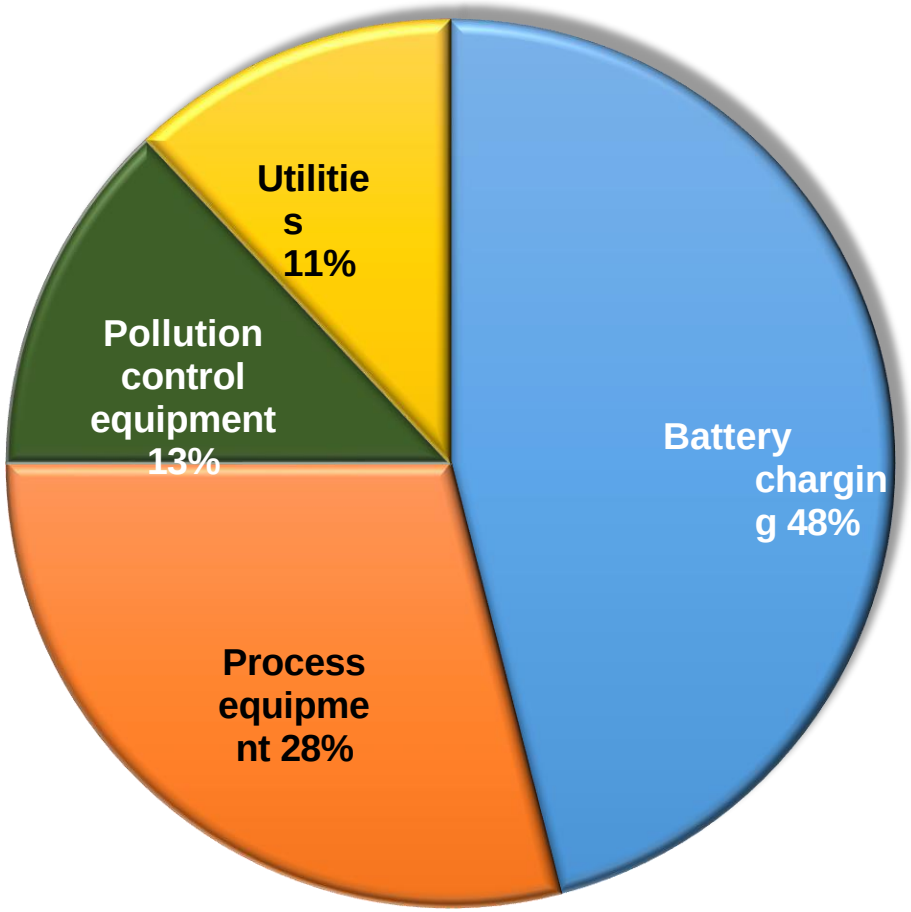
Energy Consumption overview

Energy Sources



Electrical	157.53 Mn Units	135,473TOE
Thermal		1064TOE

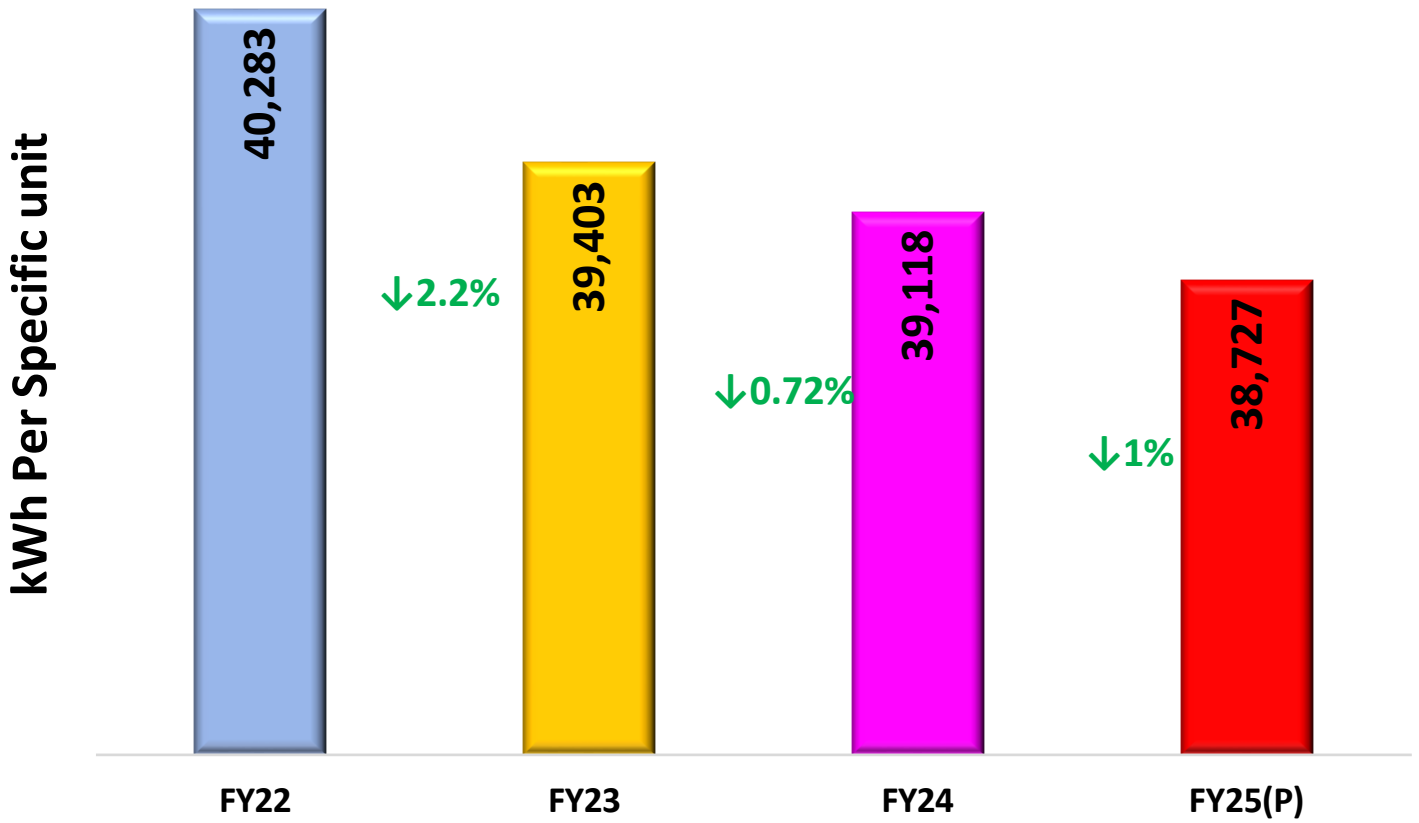
Energy Consumption in Battery Manufacturing



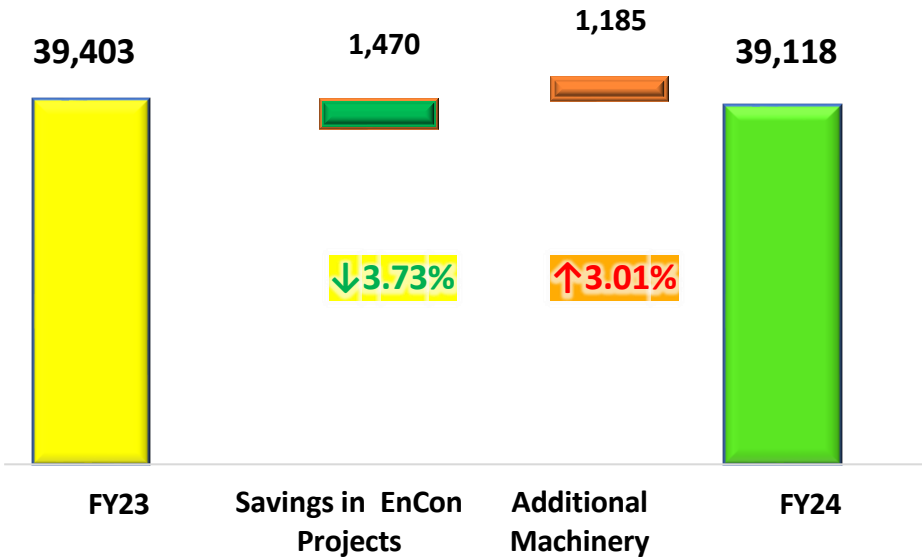
Battery 100% Fully charged in plant only

Specific Energy Consumption

Sp. Energy Consumption per Specific unit



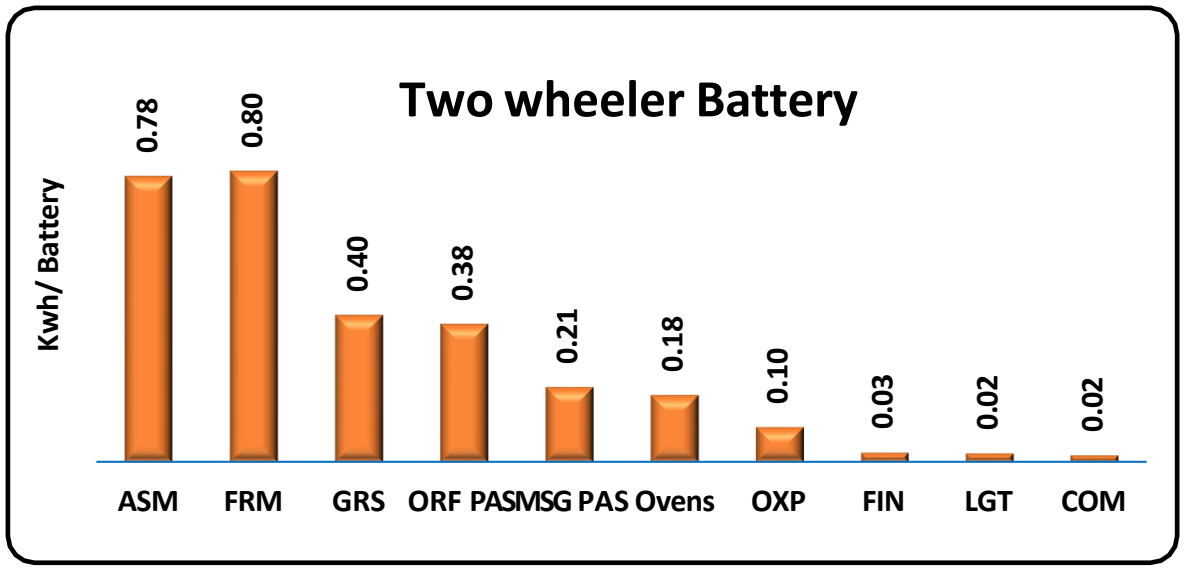
SEC Contribution

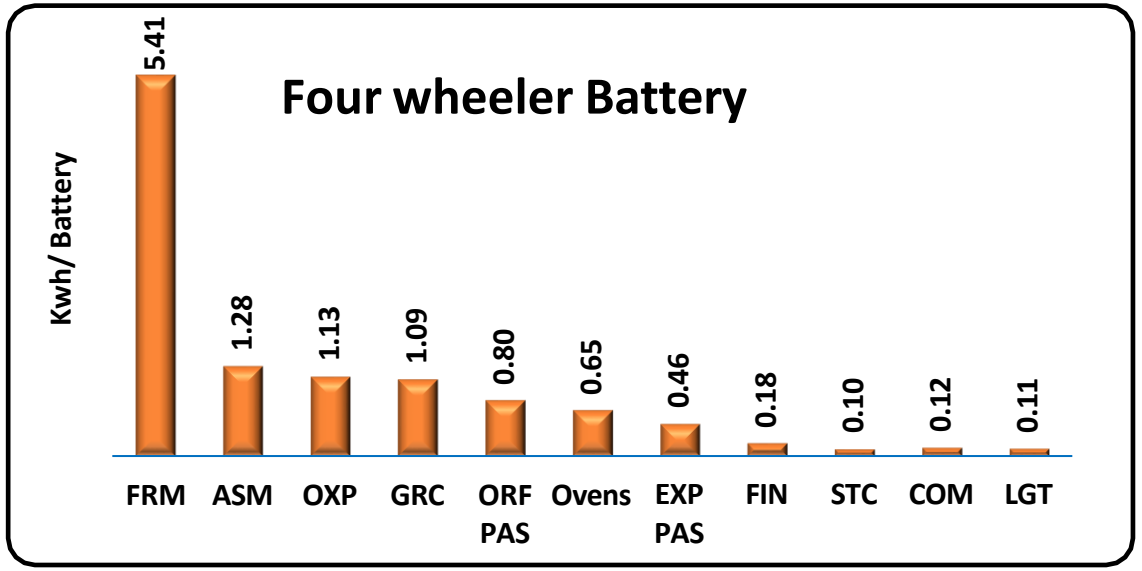


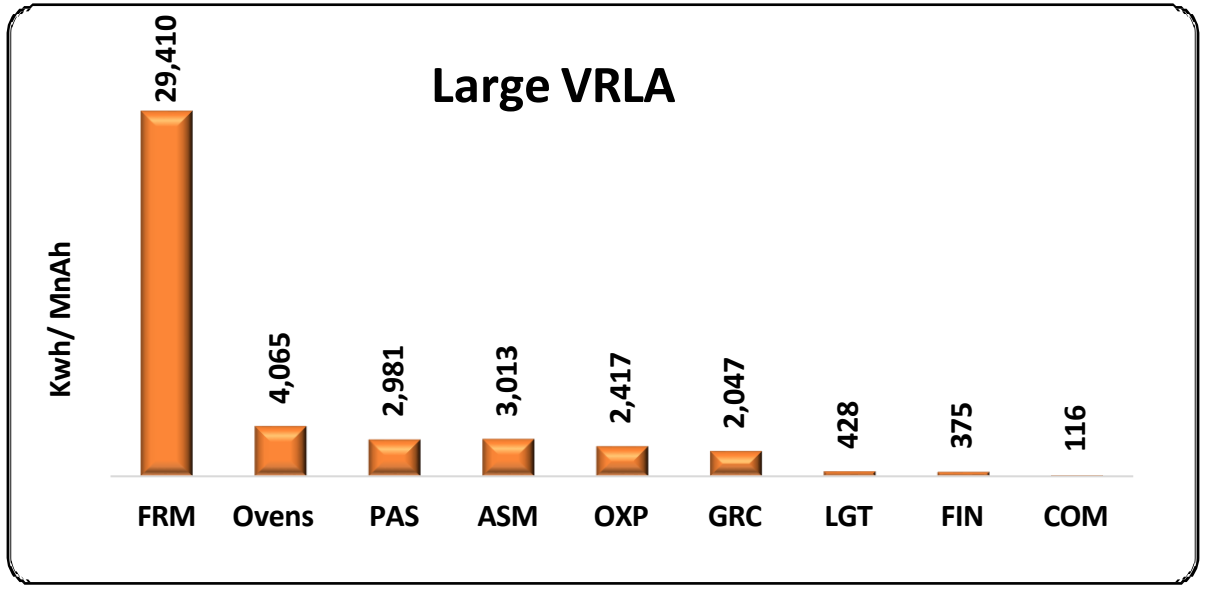
SP. Energy Reduction

FY 22-24 :- 3.9 %

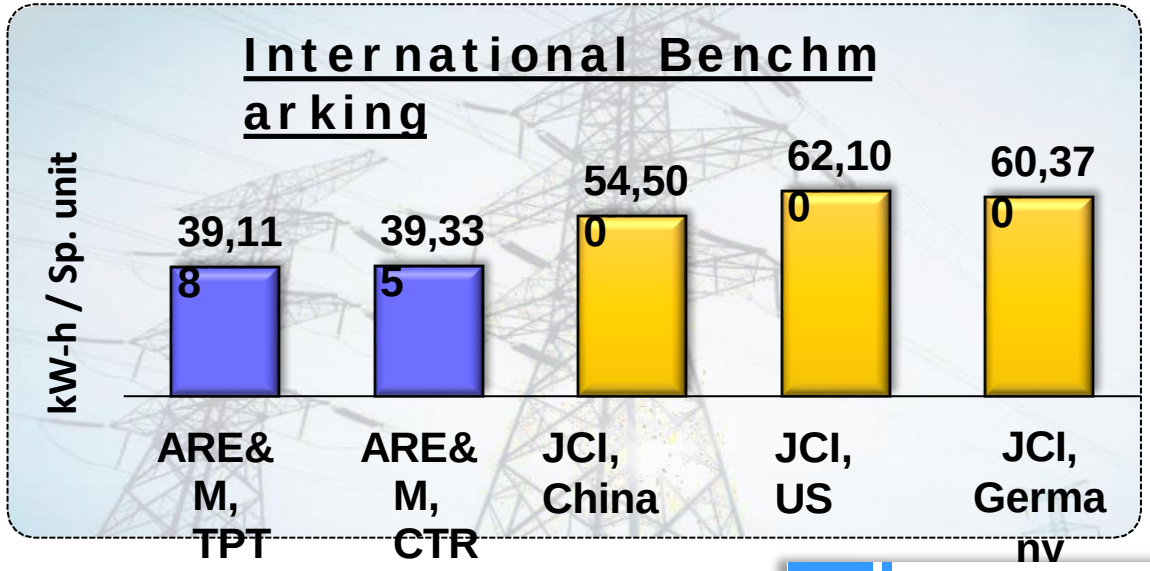
SEC of Significant Energy Use Areas







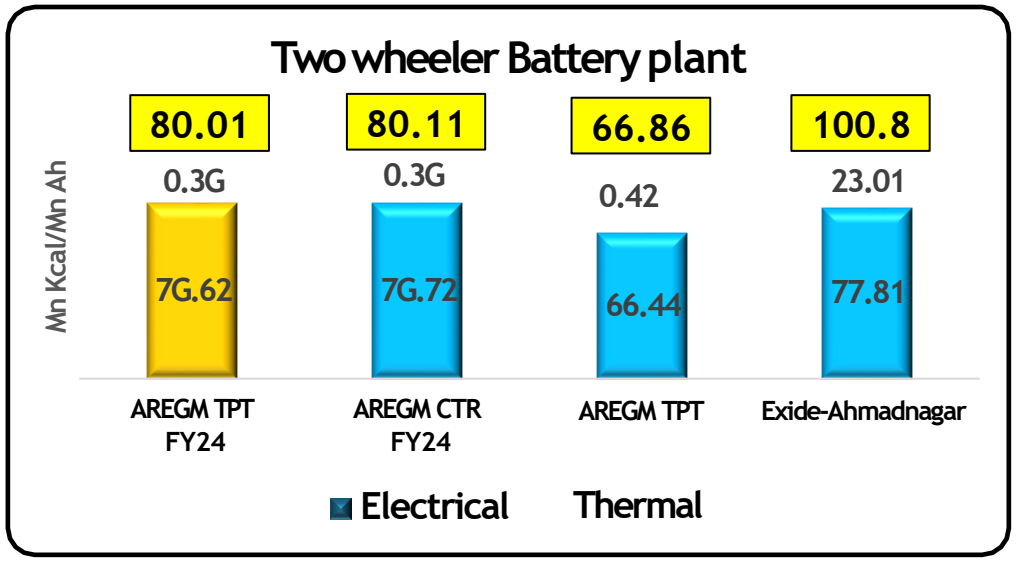
Energy Benchmarking

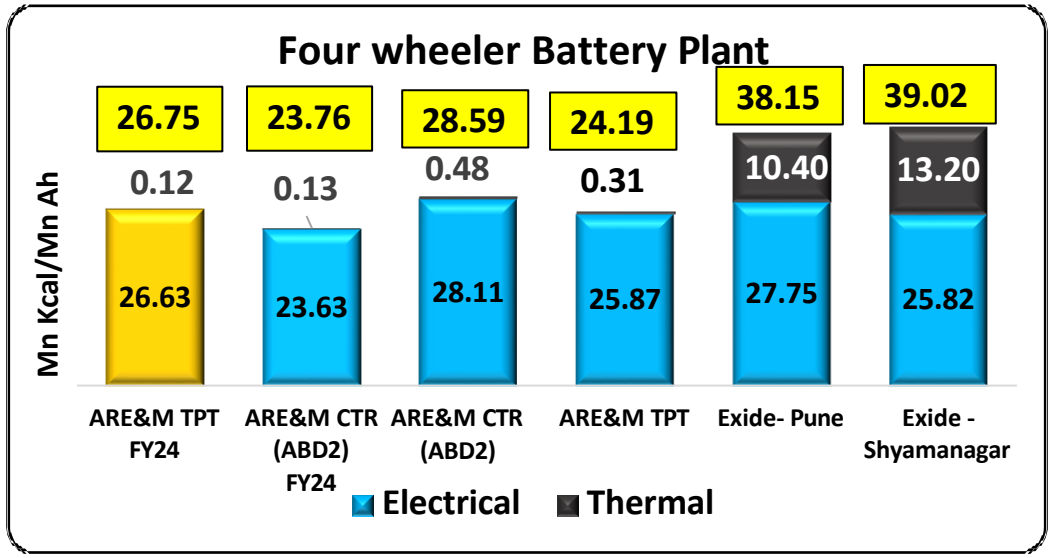


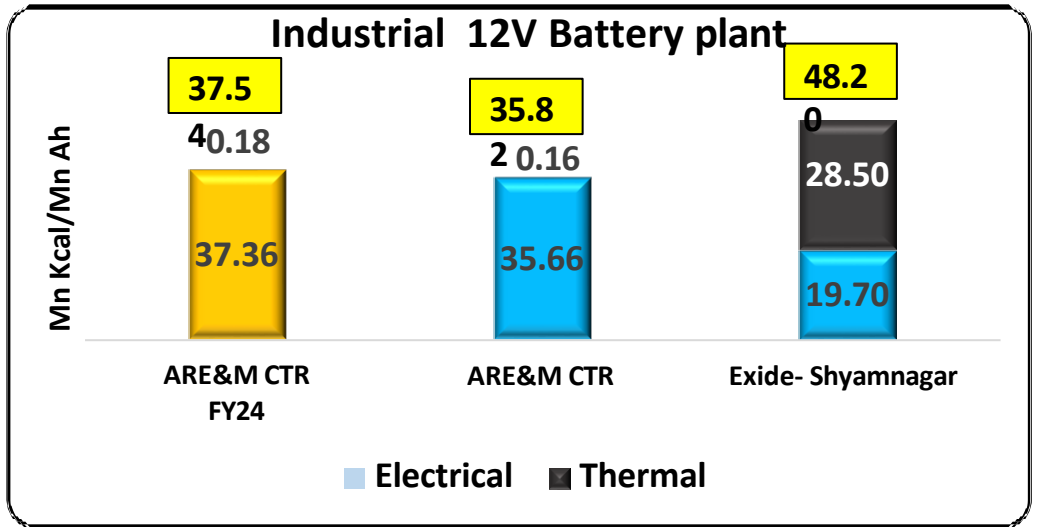
Further Focusing on..

- Addition of renewable energy
- IGBT technology rectifiers
- Heat recovery systems
- Process optimization
- Punch grid technology
- Lead pot design modification
- IIOT 4.0

Product wise Energy Benchmarking







Source : Competitor SEC data taken from CII presentations

Description	ARE&M	Exide
Renewable Energy (RE)	23.46%	20%
Energy intensity	127.69 GJ/Rs Cr	175.89 GJ/Rs Cr
Scope 1&2 Emissions	19.22 t CO2/Rs Cr	23.02 t CO2/Rs Cr

Source : Sustainability Reports from company website

Energy saving Projects implemented in last three years

Year	No of Energy Saving projects	Investment in Mn Rs	Electrical savings in Mn Kwh	Thermal savings in Mn Kcal	Total Savings in Mn Rs	Pay Back period in Months
FY 2021-22	40	32.11	3.07	-	18.48	21
FY 2022-23	31	16.78	3.40	-	20.42	10
FY 2023-24	44	11.48	5.94	-	35.67	04

Energy Saving Projects

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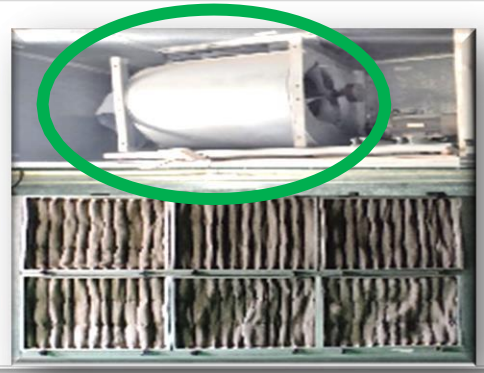
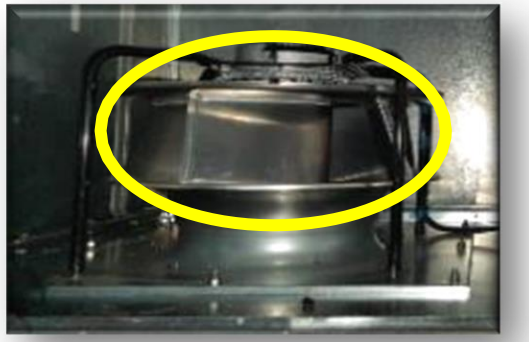
1. Replacement of Centrifugal blower with BLDC fans.
Centrifugal blowers are replaced with BLDC fans in AHUs for energy saving
Energy savings/Annum: 97,712 kwh.

Before



After



2. Reduction of skin temperature.

Skin temperature of lead melting pot is reduced from 120°c to 55°c by provide insulation (Nano gel blanket)

Energy savings/Annum: 1,12,400 Kwh.

3. Elimination of cooling tower fan

Replace the conventional cooling tower with fan less cooling tower.

Energy savings/Annum: 94,500 kwh.

Energy Saving Projects

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4. Adopting latest technology: LED in place of T5 FTL

125 no's of 2X 28W T5 lamps with 36 Watts LED fittings in TBD formation

75 no's of 250w MH lamp fittings with 120W LED fittings in Stores mezzanine floor.

Energy savings/Annum: 38,958 Kwh

Before

After

5. Replacement of Centrifugal blower with BLDC fans.

Centrifugal blowers are replaced with BLDC Motor in Fresh Air systems for energy saving

Energy savings/Annum: 180,136 kwh.

6. Optimization of Compressor air.

Trans vector nozzle in place of air gun, which reduced compressor air consumption by 50%.

Energy savings/Annum: 214,519 Kwh.

Energy Saving Projects

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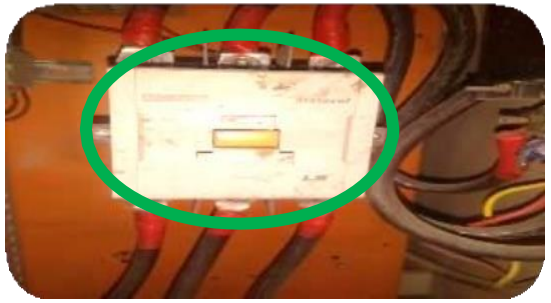
7. Replace contactors, thyristors with Zero cross mode SCR controls

Replace Thyristor voltage control SCR with for Thyristor Zero cross mode control SCR for lead pot heaters.

Energy savings/Annum: 62,000 kwh.

Before



After

8. Replace pneumatic vibrators to electrical vibrators

Replaced pneumatically operated vibrators with electrical vibrators in pasting day tank.

Energy savings/Annum: 44,278 kwh.

9. Oven Thyristor controls to IGBT controls for Heaters.

Replace thyristor controls with IGBT controls for oven heaters panel.

Energy savings/Annum: 2,34,800 kwh.

Ongoing Energy saving projects for FY'25

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List of Ongoing Energy saving projects - FY'2024 - 25						
S No	Title of project	Annual savings in Kwh	Annual savings in Mn Rs	Investment in Mn Rs	Pay back in months	Year
1	Replacement of contactors with SCR (SCR with Zero cross over) for Oxide plant lead pot in SBD1	26,950	0.16	0.20	15	FY'24-25
2	Replacement of contactors with SCR to the Grid casting Common lead pot in SBD1	17,150	0.10	0.20	23	FY'24-25
3	Replacement of contactors with SCR to the Grid casting single lead pot in SBD1	14,700	0.09	0.10	14	FY'24-25
4	High efficiency water pumps with feedback system for water pumps in SBD1	18,900	0.11	0.20	21	FY'24-25
5	Conversion of venturi scrubber-1 V-belt drive to cogged teeth belt drive for 3 nos in SBD1	6,230	0.04	0.03	10	FY'24-25
6	Install direct driven motor (BLDC) for AHUs in place of belt drive in SBD1	39,012	0.23	0.40	21	FY'24-25
7	Replace AODD pumps with energy efficient centrifugal pumps (IE3) in SBD1	52,500	0.32	0.50	19	FY'24-25
8	Auto descaling by Magnet system through ionization in PLP water chillers in SBD1	1,050	0.01	0.01	19	FY'24-25
9	Install direct driven motor for AHUs (BLDC) in place of belt drive in SBD1	30,625	0.18	0.40	26	FY'24-25
10	Install direct driven motor (BLDC) for FA system in place of belt drive in SBD1	136,080	0.82	0.05	1	FY'24-25
11	Replace pnumatically operated vibrators with electrical vibrators in SBD1	19,596	0.12	0.15	15	FY'24-25
12	Conversion of V-belt drive to cogged teeth belt drive in pasting Dust extraction system in SBD1	5,752	0.03	0.03	9	FY'24-25
13	Capacity utilization is increased (plate storage stands 45 to 54) of Curing and drying ovens in SBD1	12,554	0.08	0.00	-	FY'24-25
14	install Fanless cooling tower in Assembly section in SBD1	39,165	0.23	0.30	15	FY'24-25
15	Provide VFD's for Water chiller Primary pumps & process pumps in SBD1	68,040	0.41	0.80	24	FY'24-25
16	Install High efficiency water pumps with feedback system for pumps in SBD1	18,900	0.11	0.20	21	FY'24-25

Ongoing Energy saving projects for FY'25

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List of Ongoing Energy saving projects - FY'2024 - 25						
S No	Title of project	Annual savings in Kwh	Annual savings in Mn Rs	Investment in Mn Rs	Pay back in months	Year
17	Conversion of V-belt drive to cogged teeth belt drive in assembly line 5,6 & 7 Dust extraction systems in SBD1	16,340	0.10	0.07	9	FY'24-25
18	Reduction of skin Temparature in Assembly COS lead pots 2 nos in SBD1	22,050	0.13	0.20	18	FY'24-25
19	Upgradation of washing machine blower IE1 pumps & formation water pumps to IE3 in SBD1	138,096	0.83	0.55	8	FY'24-25
20	Minimise the Compressor air leakages in all sections (PLP,Assembly,Formation,Finishing) in SBD1	33,250	0.20	0.00	-	FY'24-25
21	Ugradation of vaccum pumps for filling machines in SBD1	62,580	0.38	0.55	18	FY'24-25
22	Provide occupancy sensors for Formation tub area, charger room, Utility rooms lighting in SBD1	11,200	0.07	0.03	5	FY'24-25
23	Replacement of 300 Kg/H boiler in LVRLA	82,500	0.50	0.84	20	FY'24-25
24	Replacement of zero energy fan in formation FA System-01 &2n in LVRLA	118,540	0.71	1.64	28	FY'24-25
25	Replacement of Conventional lights with LED Lighting in Stores in LVRLA	82,500	0.50	0.63	15	FY'24-25
26	Replacement of lead pot phase angle SCR's to Zero cross over mode SCR's for Assembly BBC machine 5 nos in LVRLA	7,200	0.04	0.05	14	FY'24-25
27	Replacement of lead pot phase angle SCR's to Zero cross over mode SCR's for oxide plant and Grid casting 5 nos in LVRLA	58,800	0.35	0.46	16	FY'24-25
28	Install fan less cooling towers in Assembly and formation sections in LVRLA	49,348	0.30	0.60	24	FY'24-25
29	Replacement of Induction motor belt drive with Ec fan BLDC direct couling Motor for pasting and ovens sections 3 nos in LVRLA	185,050	1.11	2.63	28	FY'24-25
30	Replacement of formation-3 fresh air system in LVRLA	244,893	1.47	2.63	21	FY'24-25
31	Auto descaling by Magnet system through ionization in water chillers in LVRLA	5,994	0.04	0.01	2	FY'24-25
32	Replacement of Oven control room fresh air system in LVRLA	155,500	0.93	1.79	23	FY'24-25
33	Replace AODD pumps with energy efficient PP centrifugal pumps(IE3) at Acid storage building 3 nos in LVRLA	74,409	0.45	0.84	23	FY'24-25
34	Replacement of snow cool acid chiller in LVRLA	275,125	1.65	5.25	38	FY'24-25

Ongoing Energy saving projects for FY’25

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LPG consumption reduction in Zero Liquid Discharge plant (ZLD)

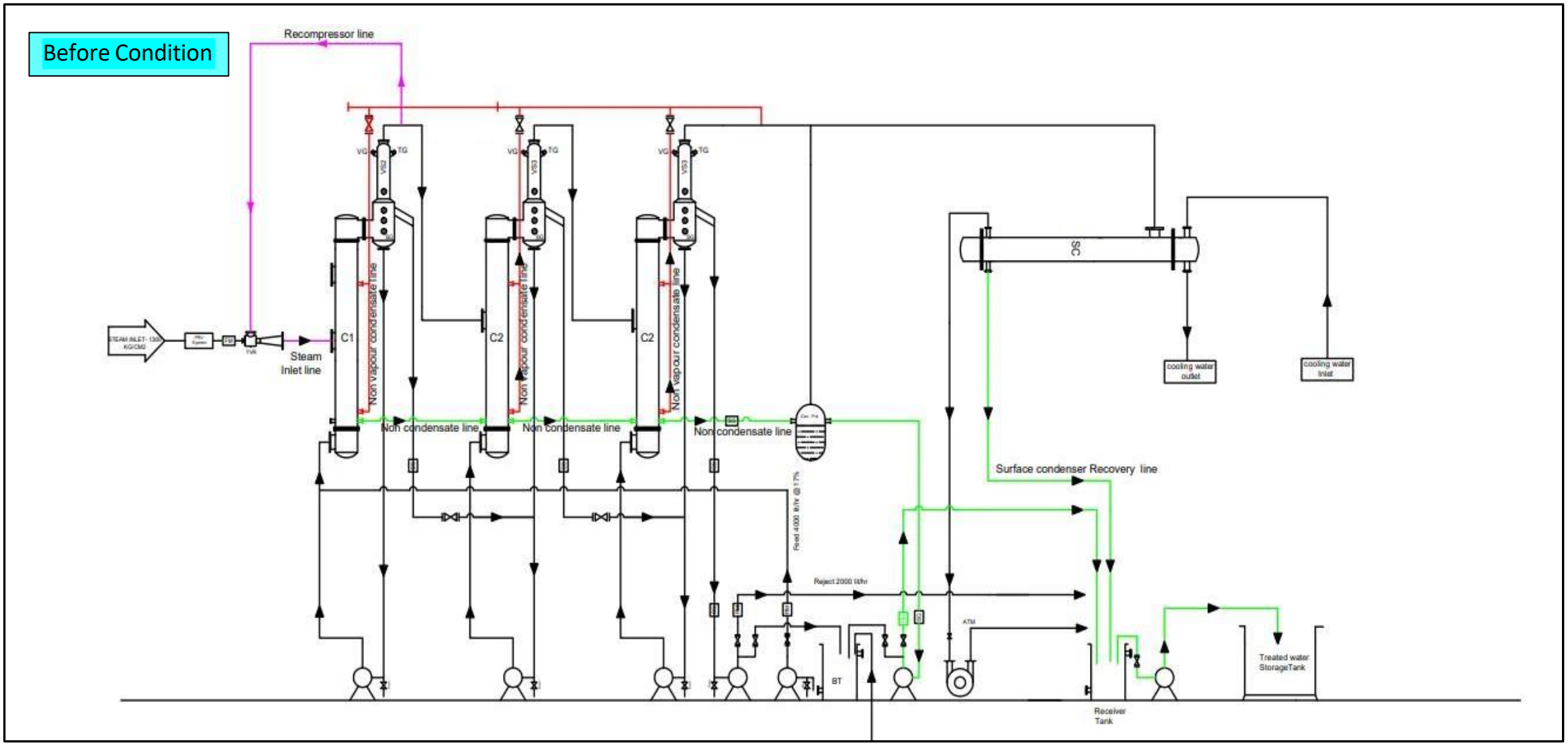
Before Condition:

Amara Raja Energy & Mobility installed Zero Liquid discharge plant (ZLD) with capacity of 280 KLD in Tirupati location to ensure that all the treated effluents are recycled in a process to reduce the water consumption from the bore wells.

Boiler is used to produce the steam for evaporation process of effluent. The LPG consumption for the boiler is very huge resulting in huge operation cost.

Innovative Project

LPG consumption reduction in Zero Liquid Discharge plant



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LPG consumption reduction in Zero Liquid Discharge plant

After Condition:

Action taken:

- **RO-3 reject water diverted to Collection tank for recycling process to reduce the MEE feed , MEE and Boiler running hours & LPG consumption.**
- **MEE plant Surface Condensate line extend to Boiler feed water tank**
- **MEE CIP process by Caustic Soda and Nitric Acid with proper schedule.**

Innovative Project

LPG consumption reduction in Zero Liquid Discharge plant

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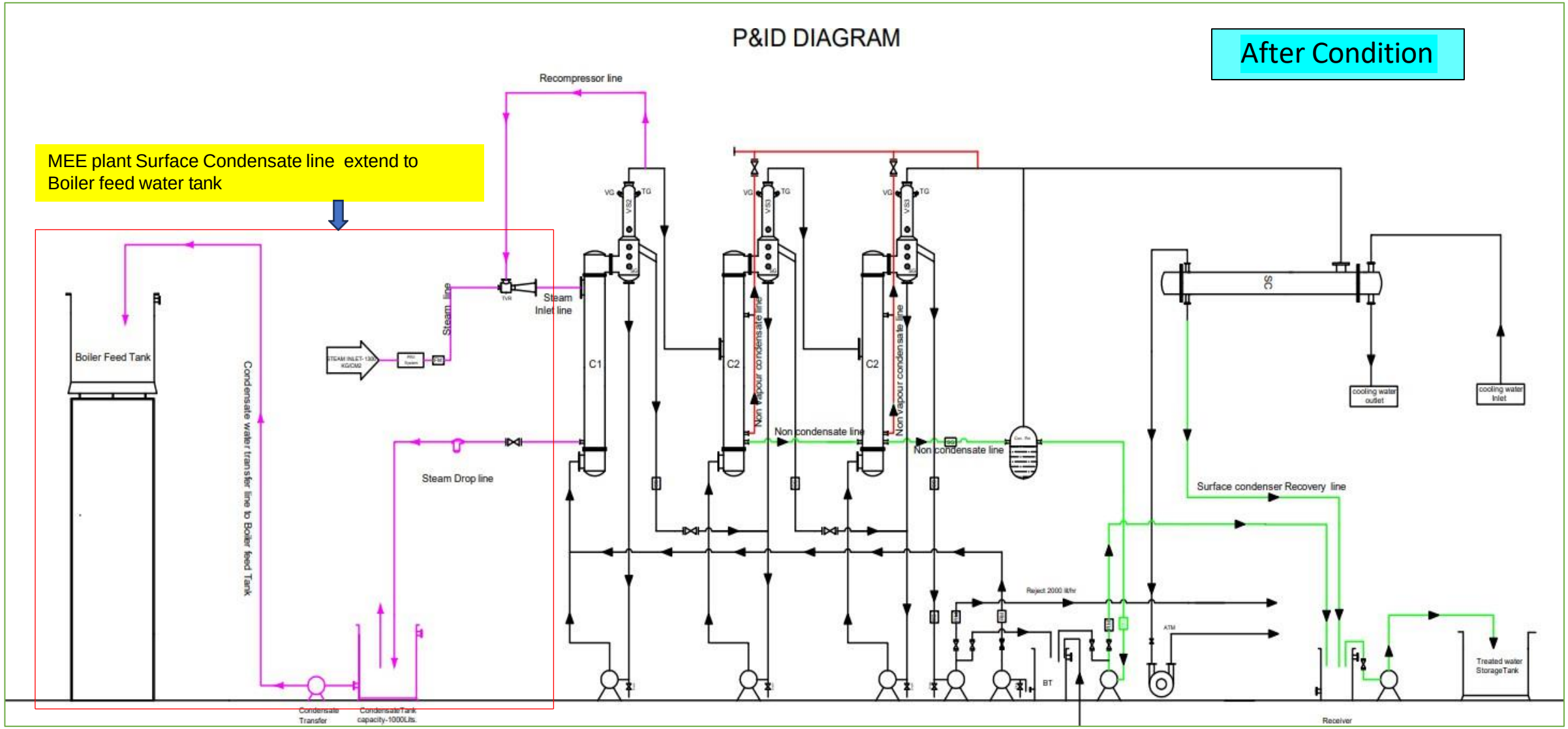

Innovative Project

AMARA RAJA
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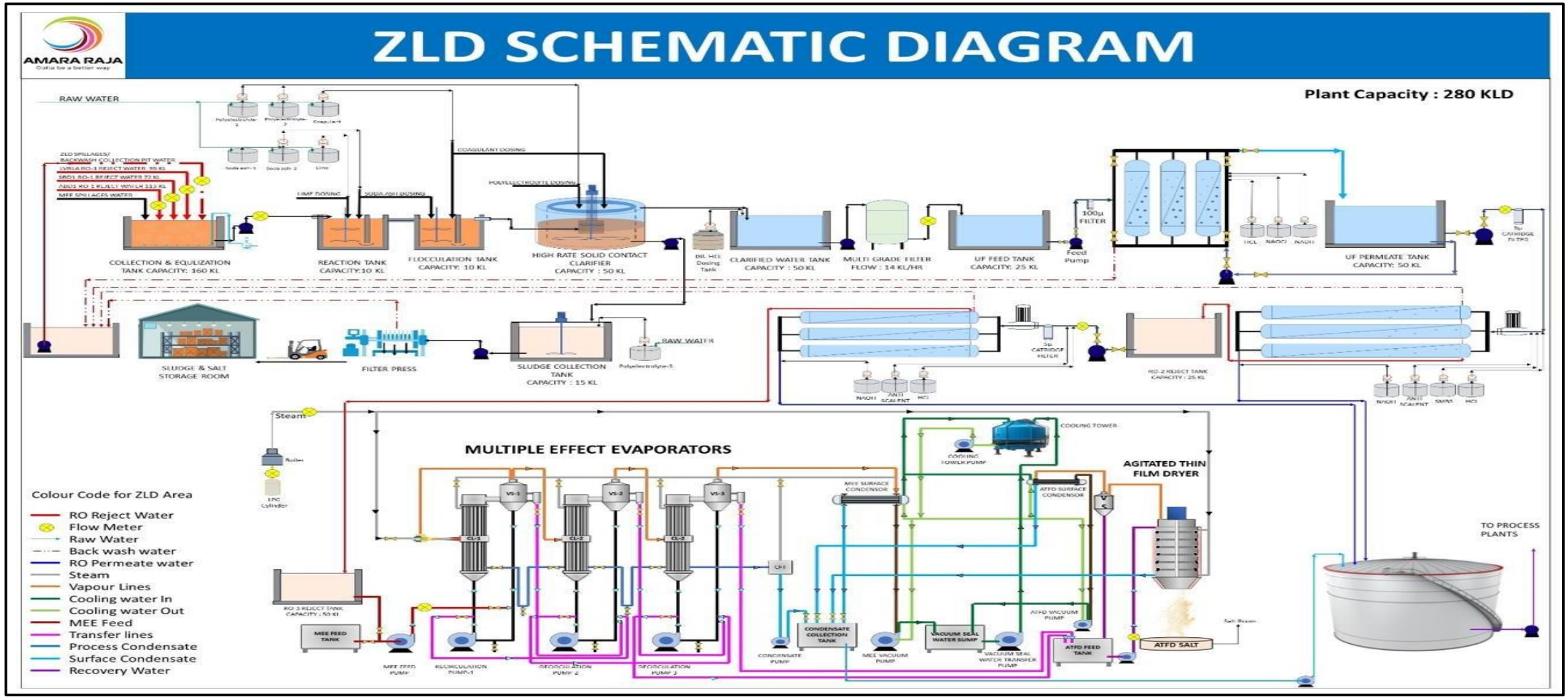
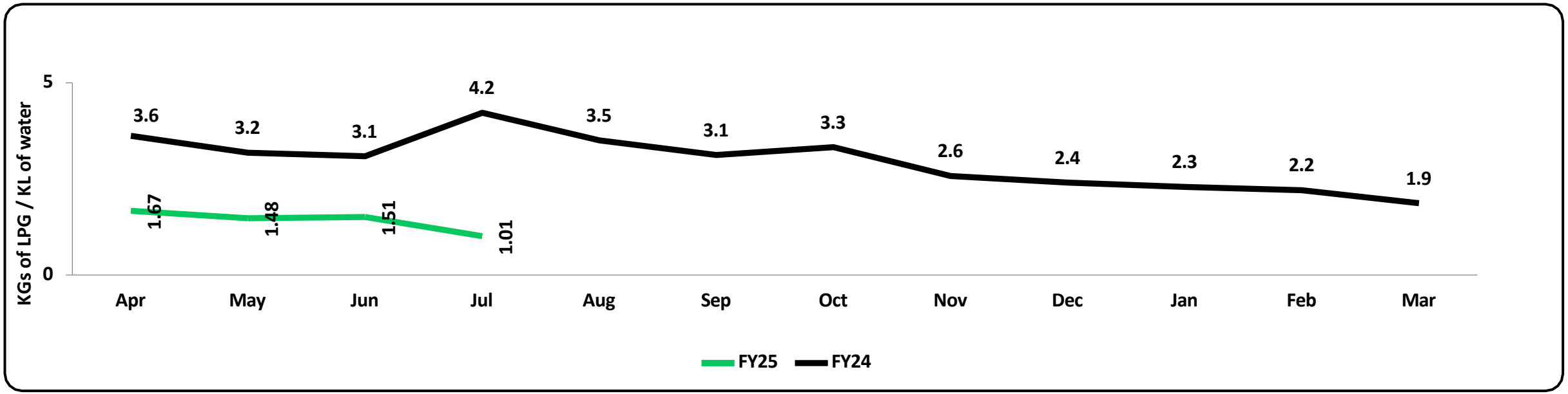
LPG consumption reduction in Zero Liquid Discharge plant



Innovative Project

LPG consumption reduction in Zero Liquid Discharge plant

ZLD EnPI Trend - LPG per KL of Water treated



Investment: Rs 7,00,000/-

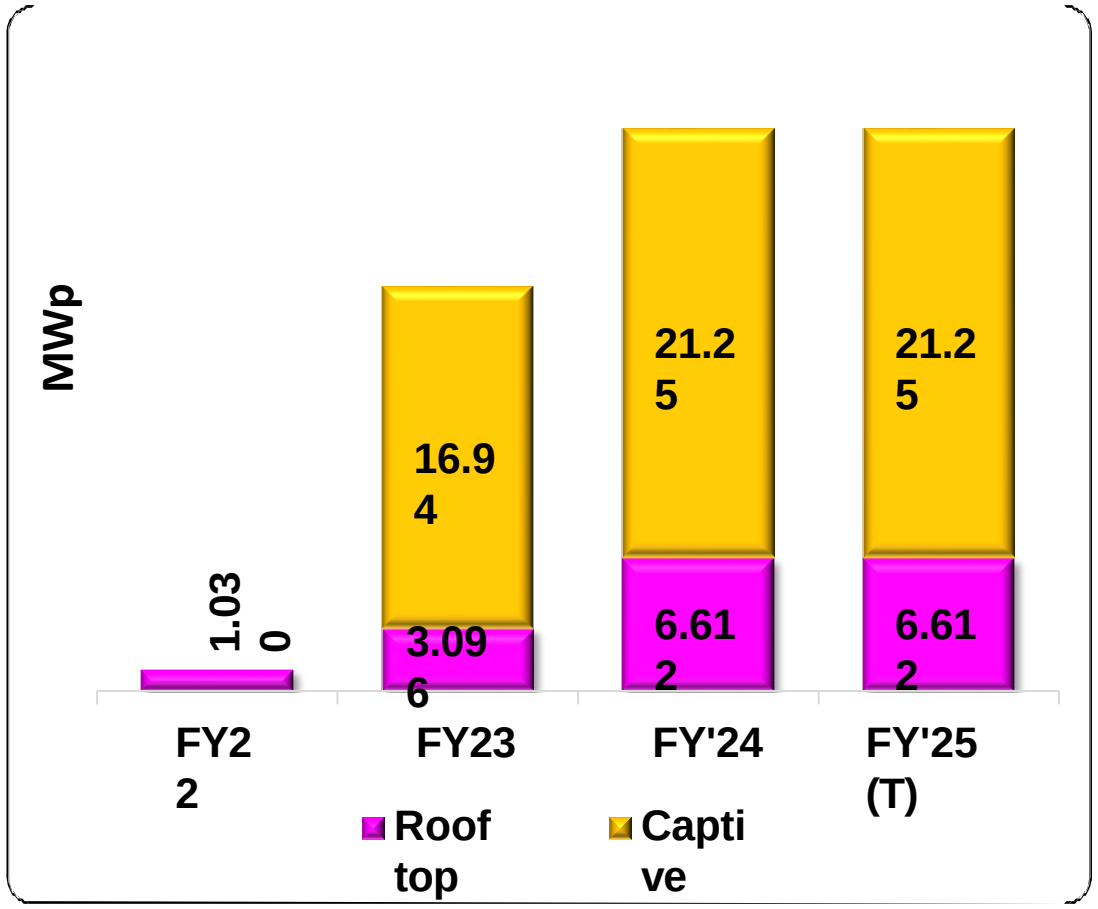
Saving : 35% LPG consumption reduced

Cost Saving : Rs 29 Mn per Year

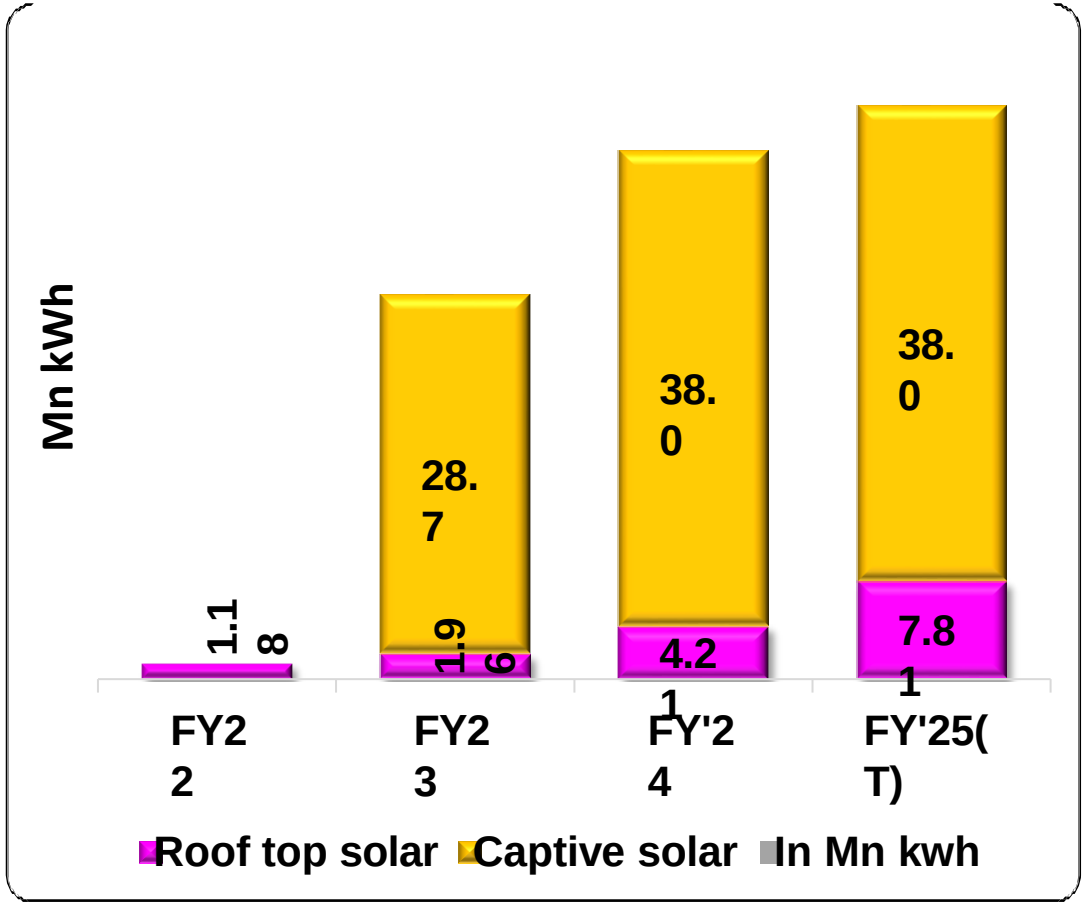
CO2 emissions avoided : 858 tons / Year

Renewable Energy Roof Top & Captive Solar

Installed Capacity



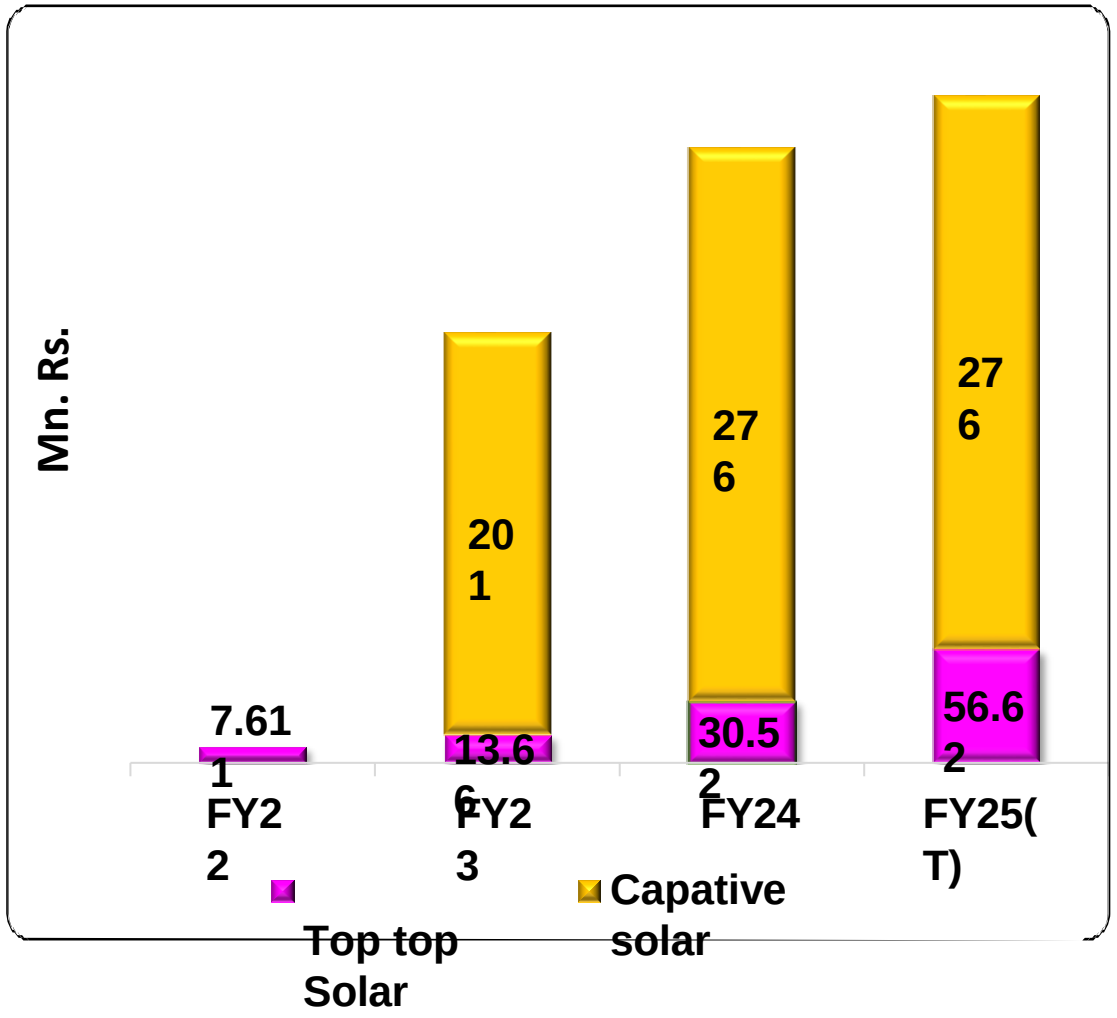
Power Generation



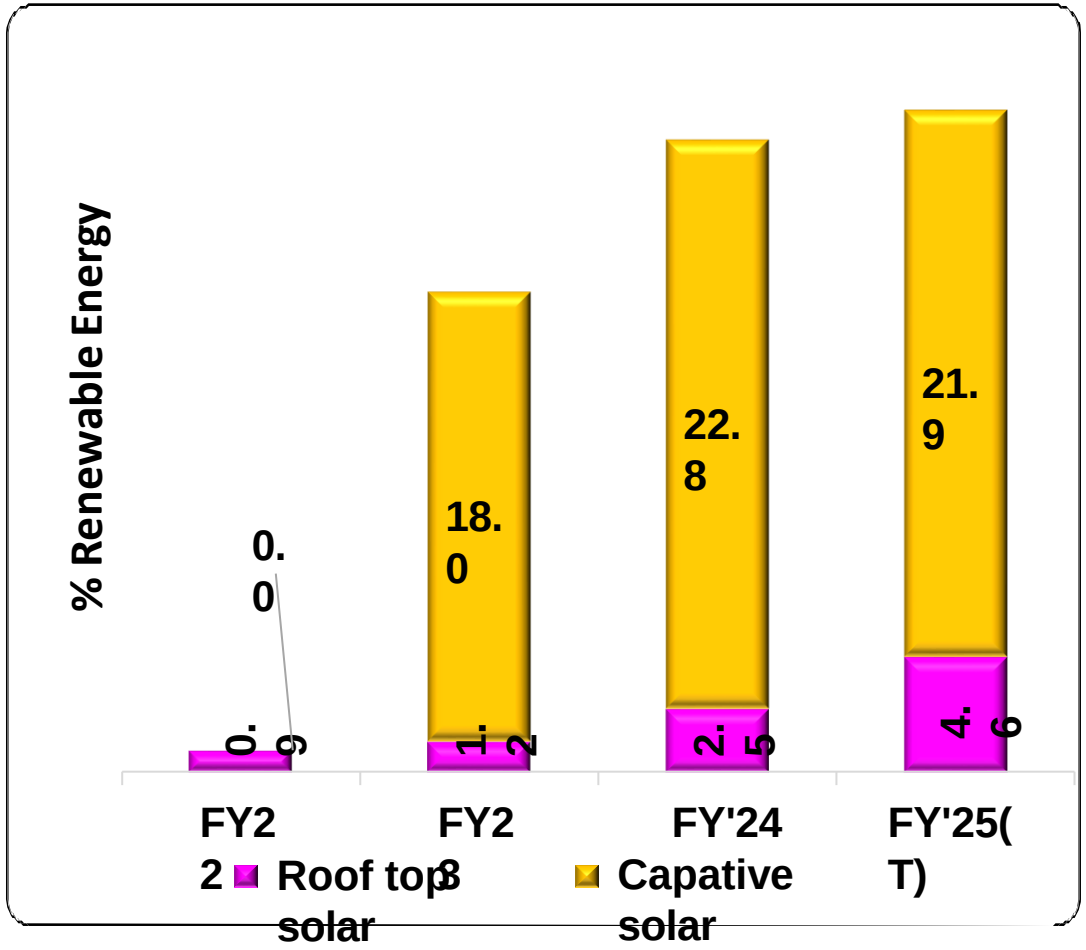
Note : ABD1 Roof top Solar plant added from Mar'24 (2.5 MWp)

Renewable Energy Roof Top & Captive Solar

Cumulative Renewable Energy Savings



Cumulative Renewable Energy share in Overall Energy



Renewable Energy Captive & Roof top Solar

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Roof top Solar details

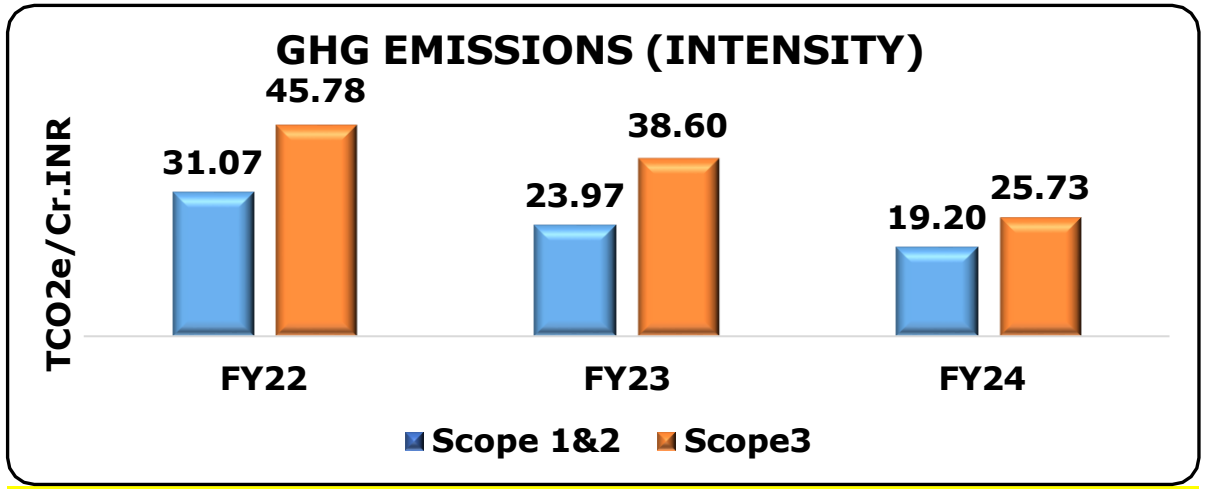
Plant capacity	2.57MWp
SPV module capacity	390Wp
Tilt \ Azimuth	
- Plane-1	6 / 0°
- Plane-2	6 / 180°
Solar panel installed Area	13610 Sq. meters
Total plant Area	22500 Sq. meters

Plant capacity	2.065MWp
SPV module capacity	385Wp
Tilt \ Azimuth	
- Plane-1	6 / 0°
- Plane-2	6 / 180°
Solar panel installed Area	10730 Sq. meters
Total plant Area	16500 Sq. meters

ARBD1 Roof Top Solar

SBD1 Roof Top Solar

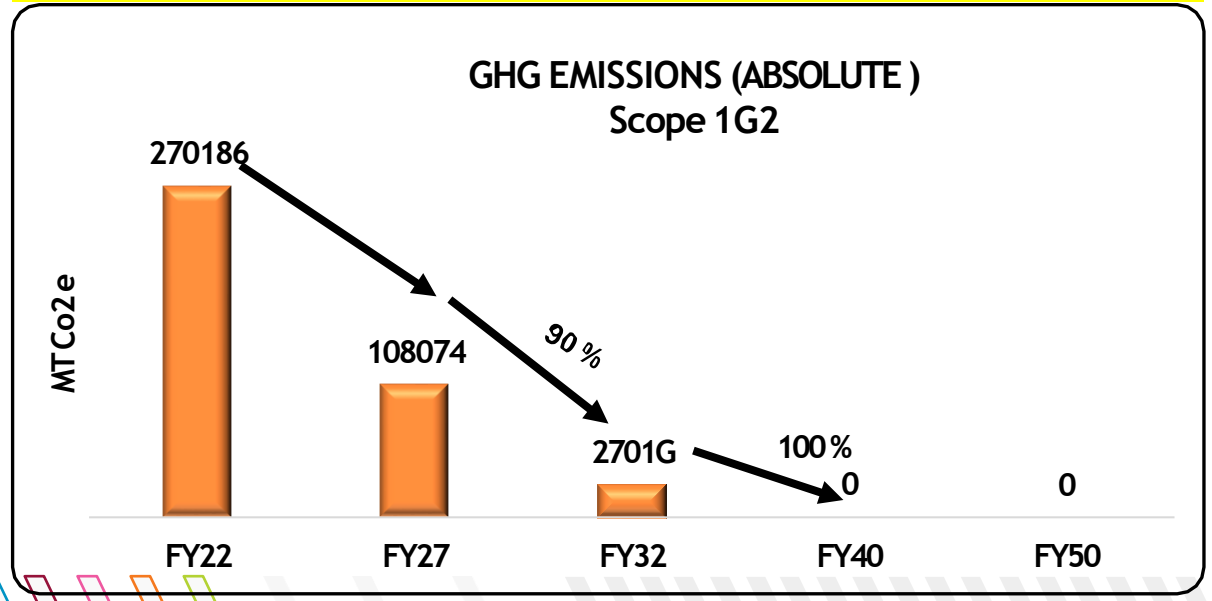
Green House Gas (GHG) Inventorization

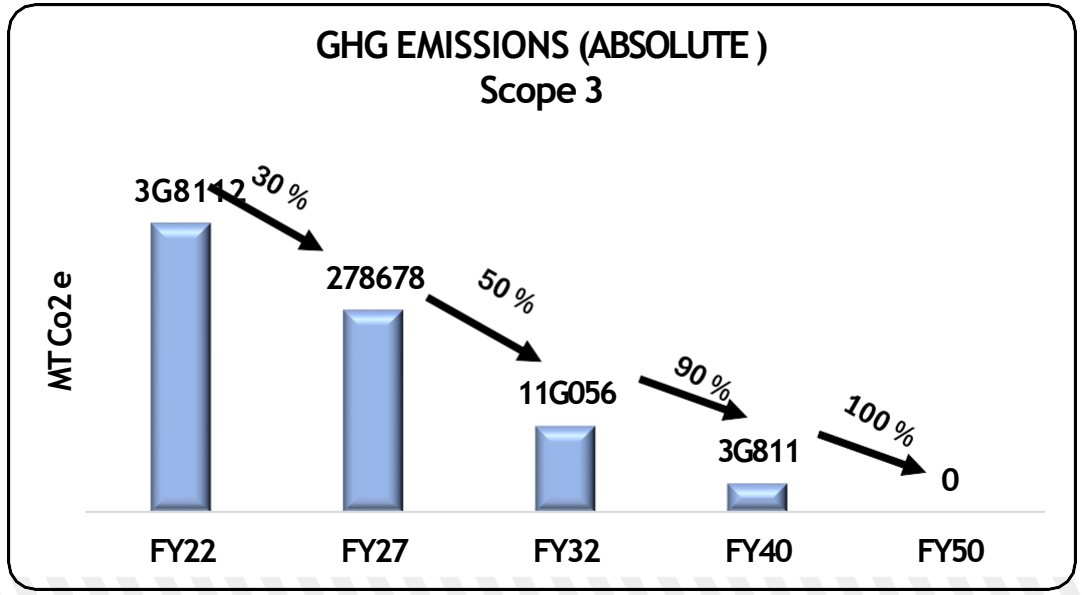


Reduction achieved:
Scope 1&2 Emissions - 38% ; Scope 3 Emissions - 44%

Description	ARE&M	Exide
Renewable Energy (RE)	23.46%	20%
Energy intensity	127.69 GJ/Rs Cr	175.89 GJ/Rs Cr
Scope 1&2 Emissions	19.2 t CO2/Rs Cr	23.02 t CO2/Rs Cr

Source : Sustainability Reports from company website





Environmental monitoring - Air Pollution Control

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Effluent treatment plant

Effluent treatment plants provided at each unit to treat the process effluents. The treated effluent water is being monitored regularly and verifying the compliance as per APPCB standards.

Sewage treatment plant

Sewage treatment plants are provided to treat the domestic effluent sand to ensure that the domestic sewage is treated before letting out.

Dust extraction system

- Dust extraction systems with bag filters provided to collect lead dust at source to ensure lead in air is controlled both at workplace as well as atmosphere.

Fume extraction system

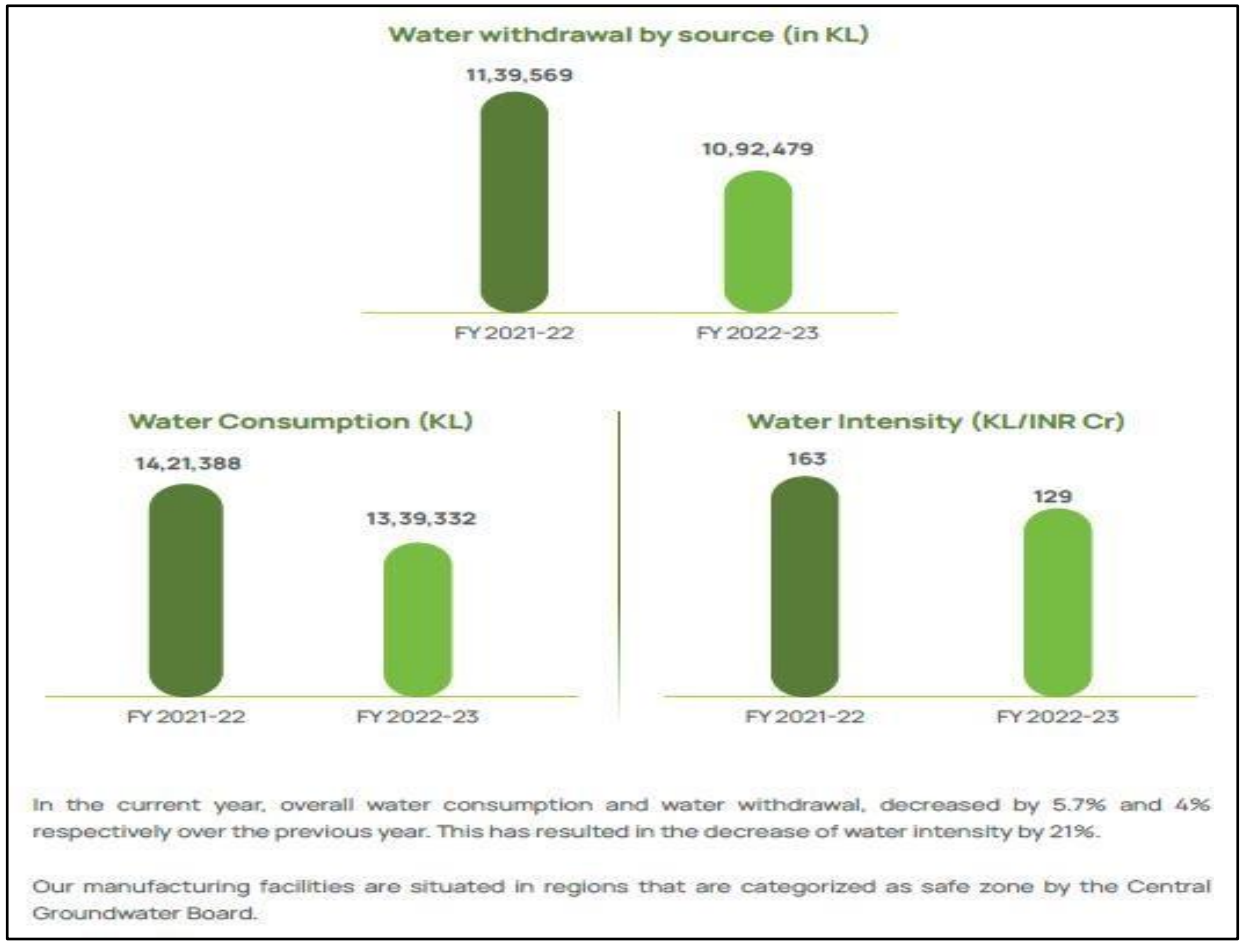
- Fume extraction systems with wet scrubber provided to ensure that the workplace is free from lead/acid fumes.

Green House Gas (GHG) Inventorization

Green belt development

- 250 Acres of barren hillock Adopted for greenery development at Paramita village.
- 30 acres purchased and donated to Government.
- Planted 65,000 saplings as on date...

Water Management



In the current year, overall water consumption and water withdrawal, decreased by 5.7% and 4% respectively over the previous year. This has resulted in the decrease of water intensity by 21%.

Our manufacturing facilities are situated in regions that are categorized as safe zone by the Central Groundwater Board.

Environmental systems

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Conservation of Natural Resources

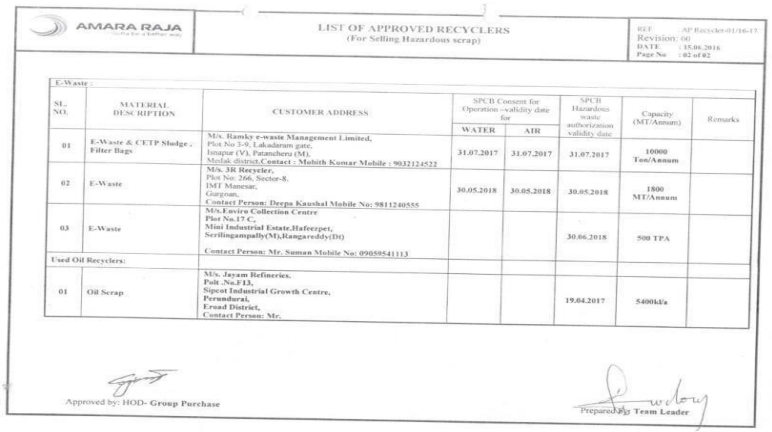
Reservoir 70,000 m^3 developed for the purpose of rain water harvesting and to recharge the ground water levels across the group

30 Minutes rain water storage pond capacity of 6500 KL

WISE

WISER

Waste Storage area



AMARA RAJA

LIST OF APPROVED RECYCLERS
(For Selling Hazardous scrap)

REF: AP Recycler-01/16-17
Revision: 00
DATE: 15.06.2016
Page No: 02 of 02

E-Waste :

SL. NO.	MATERIAL DESCRIPTION	CUSTOMER ADDRESS	SPCB Consent for Operation - validity date for		SPCB Hazardous waste authorization validity date	Capacity (MT/Annum)	Remarks
			WATER	AIR			
01	E-Waste & CETP Sludge ; Filter Bags	M/s. Ramky e-waste Management Limited, Plot No 3-9, Ladadaram gate, Jinapur (V), Patancheru (M), Medak district.Contact : Mohith Komar Mobile : 9032124522	31.07.2017	31.07.2017	31.07.2017	10000 Ton/Annum	
02	E-Waste	M/s. 3R Recycler, Plot No: 266, Sector-8, IMT Manesar, Gurgoan, Contact Person: Deepa Kaushal Mobile No: 9811240555	30.05.2018	30.05.2018	30.05.2018	1800 MT/Annum	
03	E-Waste	M/s.Enviro Collection Centre Plot No.17 C, Mini Industrial Estate,Hafeerpet, Serilingampally(M),Rangareddy(Dt) Contact Person: Mr. Suman Mobile No: 09059541113			30.06.2018	500 TPA	
Used Oil Recyclers:							
01	Oil Scrap	M/s. Jayam Refineries, Polt .No.F13, Sipcot Industrial Growth Centre, Perundurai, Eroad District, Contact Person: Mr.			19.04.2017	5400kl/a	

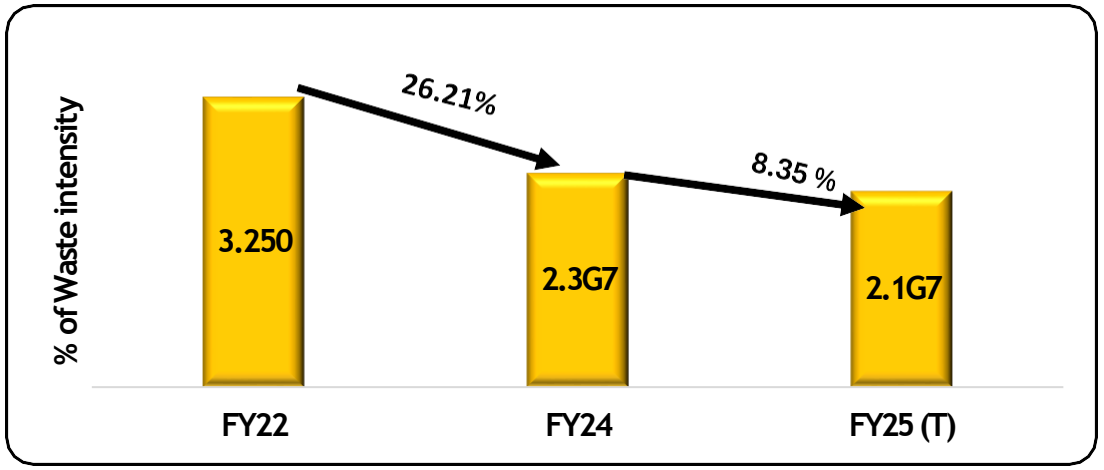
Approved by: HOD- Group Purchase

Prepared by: Team Leader

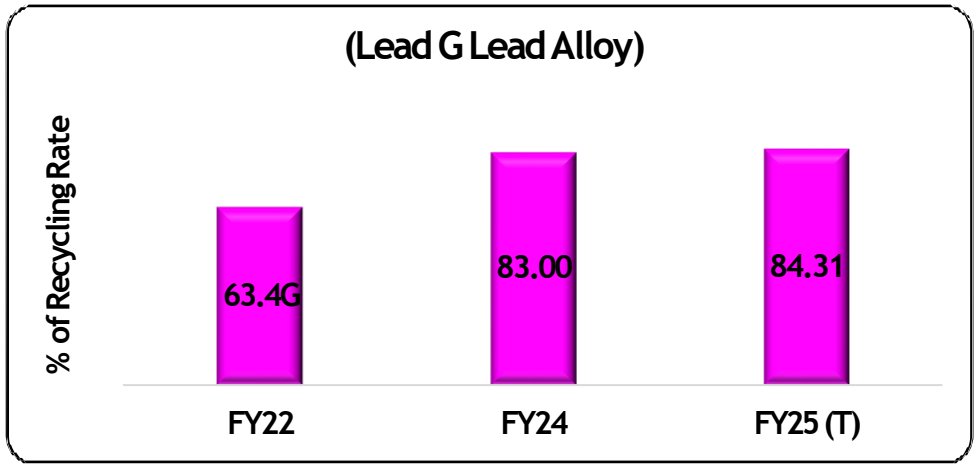
We store all the hazardous wastes in a closed shed before the disposal takes place. We are having a separate covered shed and open area shed where in necessary required flooring is provided to ensure that the land pollution is not taking place.

Waste Utilization and Management

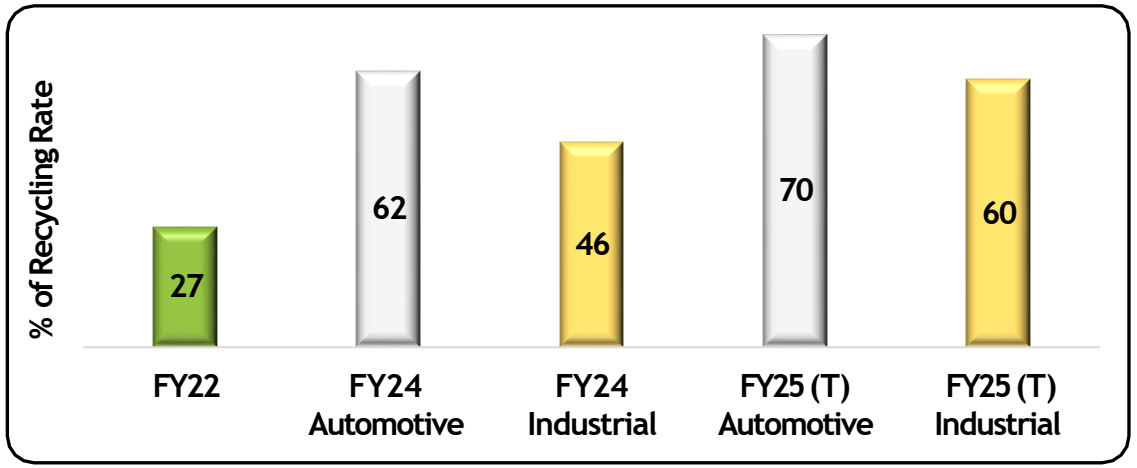
Waste intensity



Recycling input material



Battery recycling rate



Circular Economy

- Reduce waste intensity by **8.35%.**
- Increase recycled Lead & Lead Alloys in production to **84.31%.**
- Increase recycled Polypropylene Copolymer in production to **20%+.**
- Improve battery recycling collection rate to **70%** for Automotive and 60%
- for Industrial Batteries as per BWMR 2022.

Waste Utilization and management

Waste

A significant portion of our waste production stems from battery waste, which is an inherent by-product of our battery manufacturing operations. Our waste includes hazardous items like lead, battery scrap, as well as non-hazardous materials such as metals and cables. We have a designated area for solid waste storage, and our team follows procedures to collect and classify waste into bins. The waste thus collected is disposed or recycled through authorized vendors.

We have seen reduction in waste intensity by 14% during the year.

Parameter	FY 2021-22	FY 2022-23
E-Waste	1.67	2.6
Bio-Medical waste	0.22	0.25
Battery waste	5,126.77	5,095.8
Other Hazardous waste	17,090.99	16,508
Other Non-hazardous waste	6,069.52	7,545.2
Total Waste generated	**28,289**	**29,151**
Waste Intensity per Crore of turnover (MT/INR Cr)	**3.25**	**2.80**

Table: Total Waste Generated (in metric tons)

We recycled 27,823 MT of waste, accounting for 96% of our total waste. We are working towards reducing our waste to landfills.

From Biodegradable Waste to Manure

The ARE&ML manufacturing campuses produce around 2,062 kg of organic waste each day, supplied primarily by our industrial kitchens and gardens.

Our recently installed saw dust machine is being utilized to convert wood waste into saw dust. This is combined with organic food waste in our organic waste converter and transformed into manure, which is used for gardening purposes. This initiative has enabled us to manage our organic waste while advancing circularity.

Impacts:

Manure used for gardening purposes

Waste diverted from landfills

Cafeteria Food & Garden Waste management

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OWC (Organic Waste Convert)

Canteen food waste

Composting Machine

Compost Curing

Ready for Plantation use

Saw Dust Machine

ARE&M Green Supply Chain management

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Supplier Engagement

We have formulated a systematic, step wise process for responsible supplier management. This process pivots on digitalization, collaboration and incentivizing our supply partners to make their businesses more sustainable. Through this program, we aim to enhance the sustainability of our supply chain.

Supplier Sustainability Summit at Tirupati

Step 1 — **ESG Data and Targets:** Online data collection via ESG data portal

Step 2 — **Capability Building:** Training suppliers on ESG metrics, data collection and submission

Step 3 — **Collaboration:** Agreeing on joint projects in Water, Energy, Carbon and Safety Improvements; subsequently supporting suppliers to identify gaps in their systems and draw up action plans in the focus areas

Step 4 — **Assessments:** Supplier evaluation based on ARIBA and periodic re-assessment based on ESG criteria. This process includes physical audits for critical suppliers

Step 5 — **Rewards and Recognition:** Supplier Sustainability Index and annual rewards for supplier sustainability

ARE&M Green Supply Chain management

Responsible Supply Chain

We source our primary raw materials such as lead and separators from reputable and reliable suppliers, both globally and domestically. Our Supplier Code of Conduct aligns with statutory requirements relating to environmental protection, minimum wages, child labor, anti-bribery, anti-corruption, and health and safety. It also addresses the principles laid out in international standards such as the Core Conventions of the International Labour Organization (ILO), among others.

In FY 2022-23, 32% of resources were directly procured from MSMEs/small producers. Additionally, 43% resources were sourced within the district and neighboring districts.

Enhanced Secondary Lead as Input Material

We are setting up Amara Raja Circular Solutions, a state-of-the-art battery recycling plant at Cheyyar, Tamil Nadu. Focused on recycling lead and plastics, this automated facility shall have India's largest green-field smelting and refining capacities up to 150,000 MT per annum at a single location.

This initiative bolsters our efforts to procure increasing quantities of secondary lead each year, in line with the mandates of the Battery Waste Management Rules (BWMR) 2022.

Enabling Circular Economy

Lead is one of the most recyclable and recycled material. As ARE&ML's manufacturing relies on lead as a primary material, we have embraced a holistic lead management approach that spans procurement, processing, waste, and recovery. Our closed-loop system optimizes lead use and recycling, and we manage batteries responsibly through Extended Producer Responsibility (EPR) while ensuring compliance with the applicable waste management rules for batteries and plastic.

Demonstrating active engagement in product stewardship activities, we implement a robust system for collecting used batteries at collection centers across the country and implement mechanisms for refurbishing and reusing them. Our input raw material encompasses various components, including pure lead, lead alloy, copper, and polypropylene materials. We have made significant progress in the input of recycled materials in our production processes.

~ 70% for recycled lead

~ 22% for recycled wooden pallets

We have recycled 79,747 metric tons of hazardous waste from used products and packaging material in FY 2022-23. We aim to increase this proportion by establishing more battery collection mechanisms and creating our own infrastructure for lead recycling in our operating areas.

Impacts:

- Reduced CO_2 emissions
- Decrease in primary acquisition from mining operations
- Lower levels of sulfur oxide (SOx) and nitrogen oxide (NOx) emitted

ARE&M Green Supply Chain management

Logistics Optimization

Following initiatives were implemented:

- Use of Multi Model Logistics (Road-Train- Sea)
- Deployment of higher tonnage vehicles
- Route optimization
- Training drivers on safety and fuel saving efficient driving
- Engagement with fleet owners for better service & delivery
- Installation of GPS

Impacts:

- 2% CO_2 reduction
- 25% Transit damages reduction
- Better customer satisfaction

Credit Ratings

CRISIL reaffirmed our strong credit profile with a **'CRISIL AA+/Stable/CRISIL A1+'** rating on its bank facilities. This reflects our leading position in lead-acid batteries (2nd largest), diverse product portfolio, robust distribution network, and negligible debt on the balance sheet.

CRISIL
An S&P Global Company

CRISIL AA+/Stable (Reaffirmed)
Long Term Rating

CRISIL A1+ (Reaffirmed)
Short Term Rating

Source - ARE&M Credit Rating, Crisil Ratings

Online Energy monitoring system

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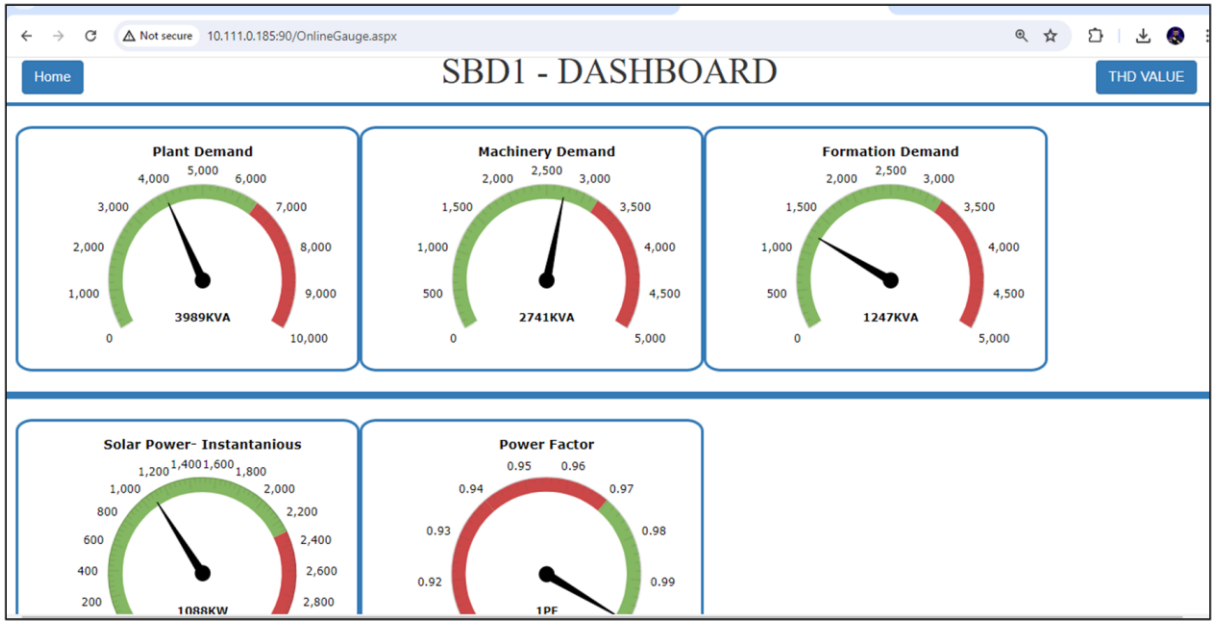

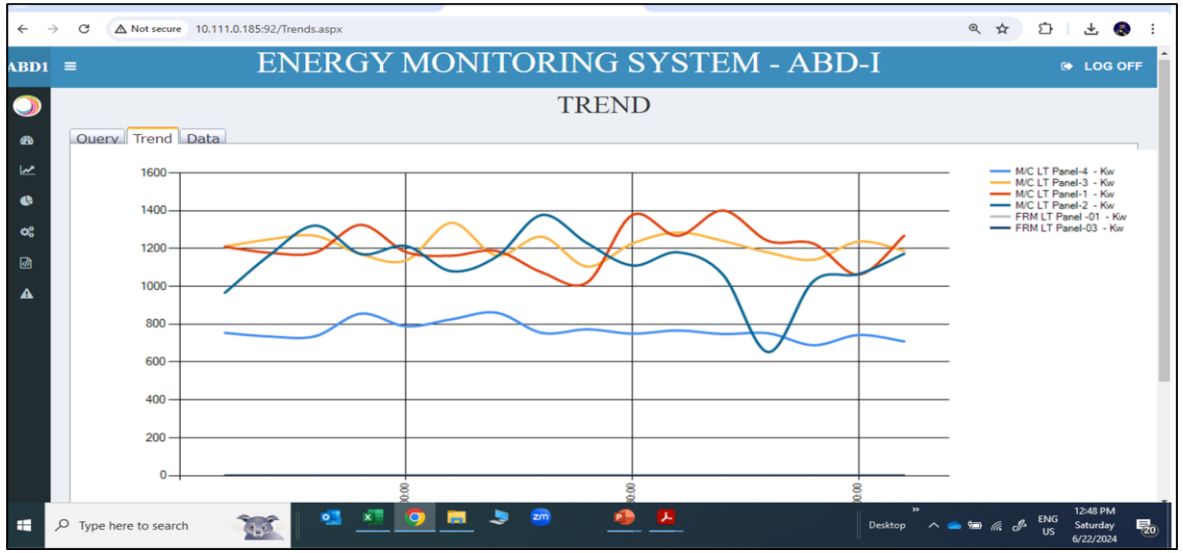

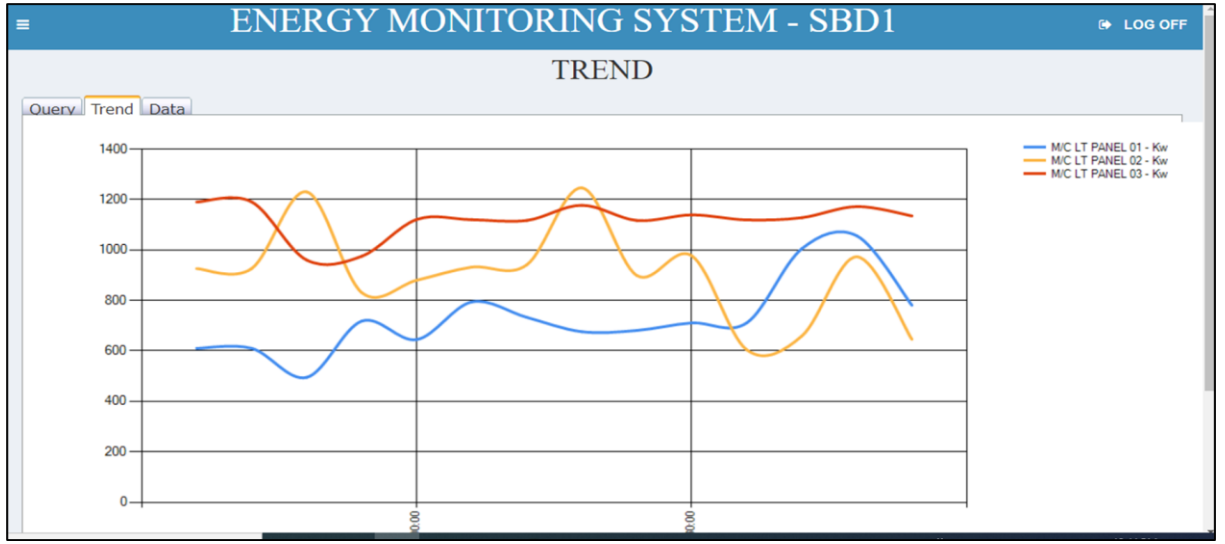

Energy, HSE, TPM, Quality, & SH Policies

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ENERGY POLICY

We are committed to improve the energy performance year on year to sustain our business and to reduce the impact on the environment by complying to all necessary statutory and regulatory requirements and by,

Conducting our operations in a diligent and responsible manner, focusing on:

- Building the culture of energy consciousness across the organization.
- Energy efficiency during product design, process design, equipment selection, upkeep and services.
- Energy waste reduction programs in all our operations
- Providing a structure to set energy objectives and targets and adequate resources to achieve them.
- Determine needs and expectations of internal / external interested parties
- Using renewable / alternate sources of energy, wherever possible.
- Continual improvements in improving the efficiency of the existing infrastructure.

Harshavardhana Gourineni
Executive Director
Amara Raja Energy & Mobility Limited.

Date: 01.01.2024

HEALTH, SAFETY & ENVIRONMENTAL POLICY

Amara Raja is committed to protecting our people and the communities in which we operate through driving environmental, Occupational health, and safety ("EHS") excellence. Our commitment to EHS applies to everything we do. We, being a responsible corporate citizen recognize the importance of managing EHS matters effectively as an integral part of its business activities.

Our leaders and management are accountable for ensuring regulatory compliance, adherence to company requirements, and implementation of this policy.

- Amara Raja strives for continuous improvement in our environmental, occupational health, and safety management systems and in the environmental quality of our products, processes, and services.
- Manage EHS risk and performance effectively, actively seeking and acting upon meaningful opportunities to reduce risk and improve our EHS performance.
- Fulfilling the compliance obligations and ensuring the protection of the environment and prevention of pollution at all levels of operations.
- Aim to zero work-related injury and illness by providing a safe and healthy working environment for our employees, contract workmen, visitors, and other stakeholders by eliminating hazards and reducing occupational health and safety risks.
- Record and investigate all incidents, share and implement the learning within the company with the objective of preventing re-occurrence, and maintaining appropriate emergency response plans.
- Operate our facilities and continue conservation efforts to reduce our environmental footprint and adhere to our environmental (Energy, Water, and Climate Change) policies.
- Adopting energy conservation, reduction of waste through recovery, recycling, and reuse, mitigation of climate change risks and threats to biodiversity and ecosystems in all process operations, thereby integrating sustainability into our business operations.
- Conserve natural resources through responsible and efficient use of all our operations.
- Consultation and participation of workers for developing, planning, implementation, performance evaluation, and actions for improvement of the OH&S management system.

We will continuously create awareness on environmental protection, occupational health & workplace safety for bringing value amongst our interested parties.

The policy shall be periodically reviewed and appropriately revised.

C Narasimhulu Naidu
Chief Operating Officer
Amara Raja Energy & Mobility Limited

Rev.5, Dated:31.10.2023

TPM POLICY

TPM

Total Productive Maintenance

Theme: "Excellence as a way of Life"

We at AMARA RAJA BATTERIES, are committed to implement TPM methodology to achieve and sustain a safe and clean work place, operational excellence by enhancing skills of employees and the capability, reliability and productivity of the people and equipment for delighting all our stake holders.

Date: 15th Oct 2022
Revision: 01

C. Narasimhulu Naidu
Chief Operations Officer - ARBL

5S POLICY

Our aim is to improve the work place environment by using 5'S' technique which is:

A systematic and rational approach to workplace organization and methodical housekeeping with a sense of purpose, consisting of the following five elements

SEIRI --- Sorting Out

SEITON --- Systematic Arrangement

SEISO --- Spic and Span

SEIKETSU --- Serene Atmosphere / Standardization

SHITSUKE --- Self Discipline

We propose to accomplish this by:
. Training the people and creating awareness on 5'S'
. Motivating and changing the behavior patterns of the people
. Establishing standards / procedures for the implementation of each element of 5'S'

We believe that effective implementation of 5'S' technique will result in:
. Consistent and better Quality product . Higher productivity
. Lesser Accidents . Higher Employee Morale

Date: 11.12.2013

Jayadev Galla

QUALITY POLICY

Through the Amara Raja way, our aim is to exceed our customers' expectations through collective commitment to design, manufacture and market best in class energy storage products and allied solutions.

To accomplish the above, we will focus on,

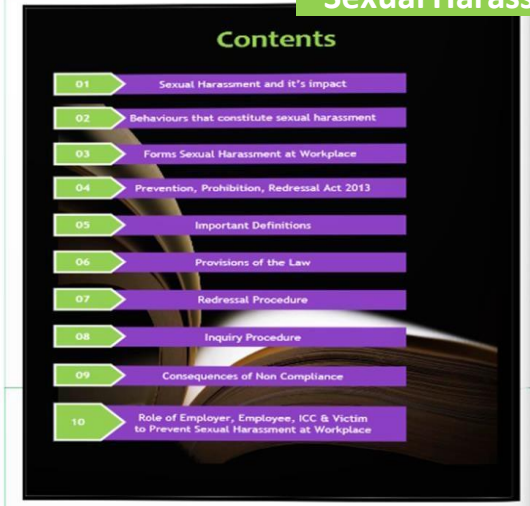
- Agile business strategies anticipating future trends.
- Contemporary technologies and robust design principles.
- Continual enhancement of our individual engagement, development and performance.
- Business excellence through continual improvements and application of digital technologies.

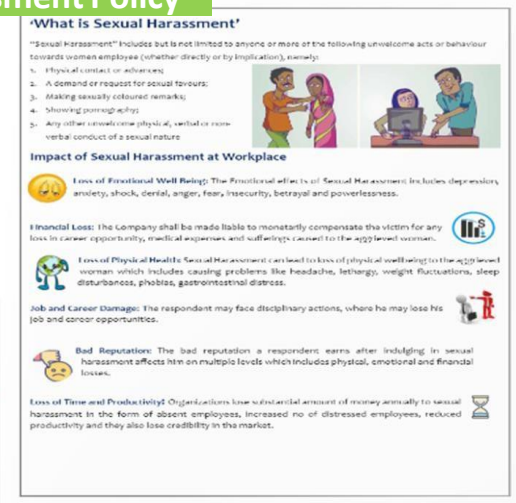
This commitment to quality will be demonstrated by effective implementation of our Quality Management System by adopting global best practices across the organization.

Date: 09.10.2023

Harshavardhana Gourineni
Executive Director
Amara Raja Energy & Mobility Limited.

Sexual Harassment Policy

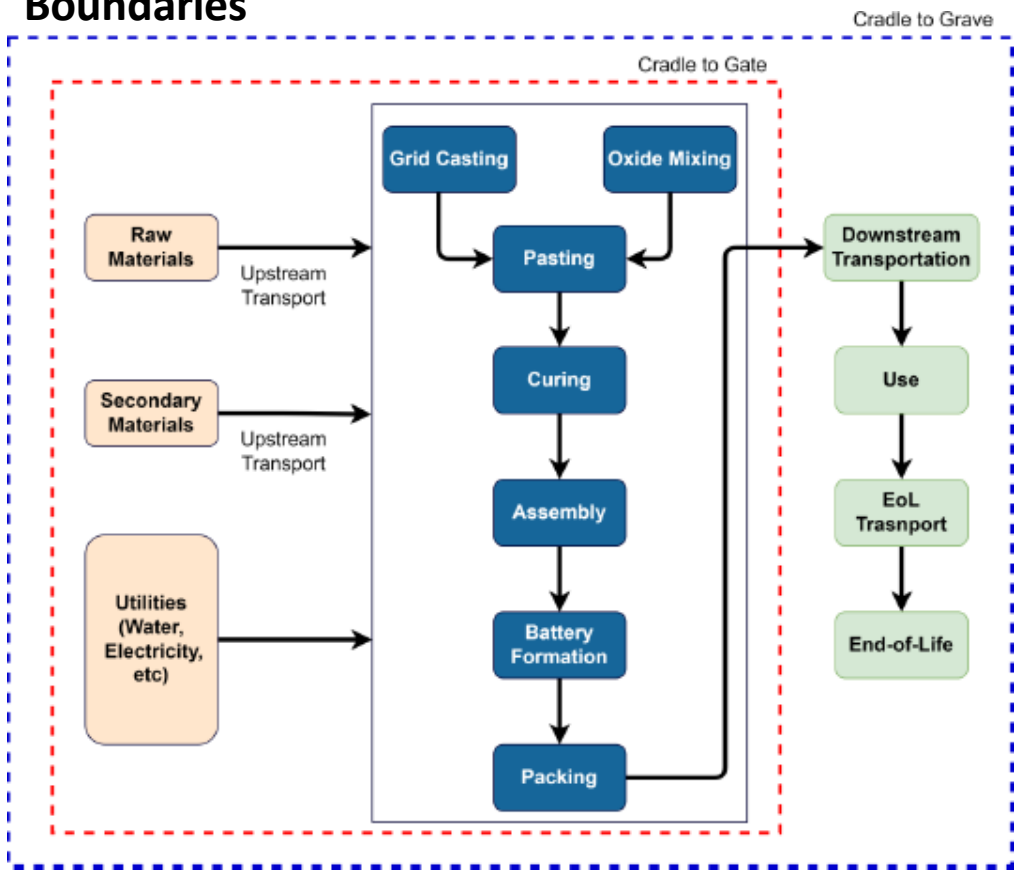




LCA – Boundaries & Conclusions

Life Cycle Analysis is carried out for two products, one Automotive product and one Industrial product.

Boundaries



Major conclusions

	Automotive 12v-35Ah	Industrial 2V-600Ah
GHG emissions (kgCO2)	35.783	1789.2
Reduction in GHG with 100% RE	40%	27%
Reduction in GHG with increase of service life from 4years to 6 years	20%	NA
Reduction of GHG emissions by Localizing Raw Materials – 100%	6.3%	2.5%

Learning from CII

- CNG vehicles for Goods transportation
- Compressor air leakage checking at defined frequency
- Gravity roller conveyor
- Static transfer switch during power change over
- Robot for solar panel cleaning
- MY place – My pride Ownership among teams
- Ductless Air conditioners
- Semi fixed and semi variable loads identification
- Pneumatic tools replaced with Battery operated.
- Office AC accumulator
- Six Sigma project for Energy target setting
- Hybrid heat pump
- Classification of energy based on fixed and variable loads

Digitalisation

- **In view of change in preferences of internal as well as external stake holders, speed & agility in operations – Digitalisation in mfg. is witnessing it's importance.**

- **Digitalisation in manufacturing is started with an objective of bringing transformation in mfg. operations to address challenges viz.:**

  - **Deskilling critical mfg. process, leveraging AI/ML technologies,**
  - **Optimisation of productivity by building real time mfg. intelligence in production operations,**
  - **Accuracy of process to have self-explanatory & self driven operations.**
  - **Enhancement of safety of people and equipment.**
  - **Optimisation of cost by use of optimum resources.**
  - **Visibility of shop floor like WIP, material, resources, etc.**
  - **Elimination of time & effort in RCA, traceability and genealogy.**

In a nutshell - This initiative is targeted to have a support system in shopfloor on real time reducing loss-time & wastage

Net Zero Plan

Our Net Zero Plan

Aligning with our aim of powering transition to a sustainable tomorrow, we aspire to be Net Zero by 2050. To achieve this, we are following a comprehensive Net Zero Road Map, that encompasses phased decarbonization approaches and industry best practices. We have established specific SBTi-aligned Net Zero Targets for reductions, delineating our intentions for the short, medium and long terms

Base year Emissions (2022)

Scope 1 & 2:
2,70,186 $MtCO_2e$

Scope 3:
3,98,112 $MtCO_2e$

Transition to Cleaner Energy

Energy efficiency projects(1.5% YOY reduction)

187 MW RE

50% EV (Internal logistics)

Fuel switchover HSD to Gas

Refrigerant change to low GWP

Plantation of 100,000 trees

Inhouse efficient lead recycling

Vendor engagement and target setting

2027

Accelerating

Energy efficiency projects delivering 1.5% Y-o-Y reduction

Additional 70 MW RE

100% EV for employee and internal logistics

Tree plantation 1,00,000

Part procurement from Net Zero committed supplier

RE for secondary lead smelters

Logistics decarbonisation (ship/train)

Nature based solutions

2032

Scope 1 & 2
90%
reduction from base Year

Scope 3
50%

Scaling Up

100% firm 24x7 renewable electricity with energy storage

100% shift towards electric or hydrogen driven vehicles

100% recycled RM

Tree plantation

Decarbonization of secondary lead smelters

Prefer supply chain partners with Net Zero Commitments

2040

Fulfilling Commitment – Goal '0'

100% RE and 100% EV

Hydrogen and biomass for 100% fuel application

Tree plantation

Carbon sequestration and offsetting for remaining

Engage with supply chain partners with Net Zero Commitments and demonstrable progress

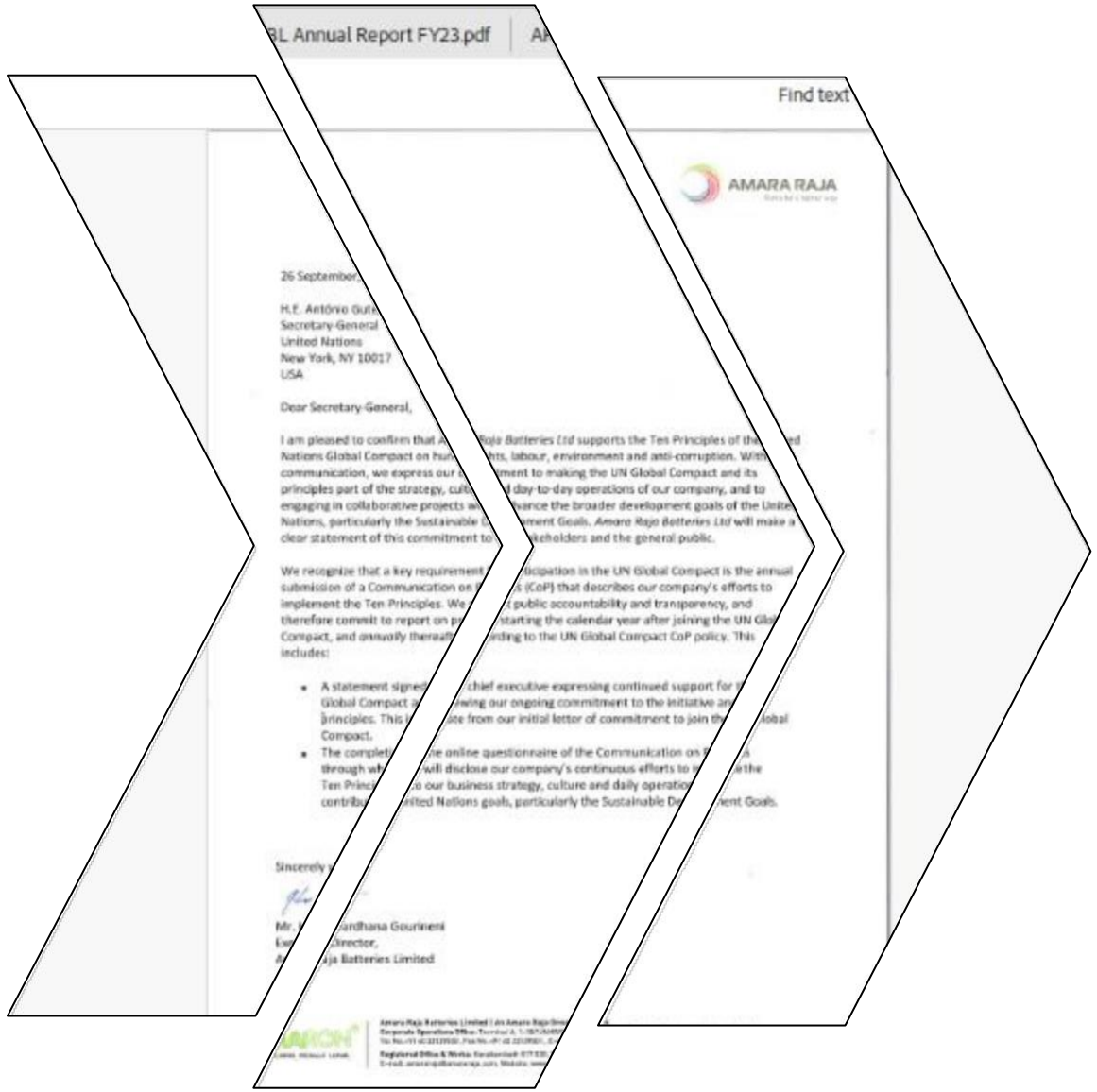
2050

Net Zero

Net Zero Plan

Sign off with UNGC on Environment

Mr.Harshavardhana Gourineni, Executive Director signing the document to confirm Amara Raja Energy & Mobility Ltd., will support the principles of the United Nations Global Compact on human rights, labour, environment and anti-corruption.



Beyond Business (CSR Activities)

- Amara Raja Junior College, Pettamitta
  - 3 schools & 1 Junior College
  - 3200 plus students
  - Affordable Quality education
  - State 3rd Rank in College Results for Academic year 2016

- Amara Raja Skill Development Centre Petamitta
- Fully integrated residential skill development centre for rural youth
- 5 acres of land
- Capacity for 800 students per year

- Water conservation
- Number of projects taken up : Check dams 23, tanks distilled 3
- Benefit reached to :12 panchayats, covering 60 villages

- Social Forestry
- 250 Hectare of barren hillock Adopted
- Planted 50,000 trees as on date

- Amara Raja Vidyalayam at Karakambadi

Amara Raja Vidyalayam at Diguvamagham.

- 30 bed primary health centre under PPP Program (Public Private Partnership Program)

5S Culture & QCC Culture

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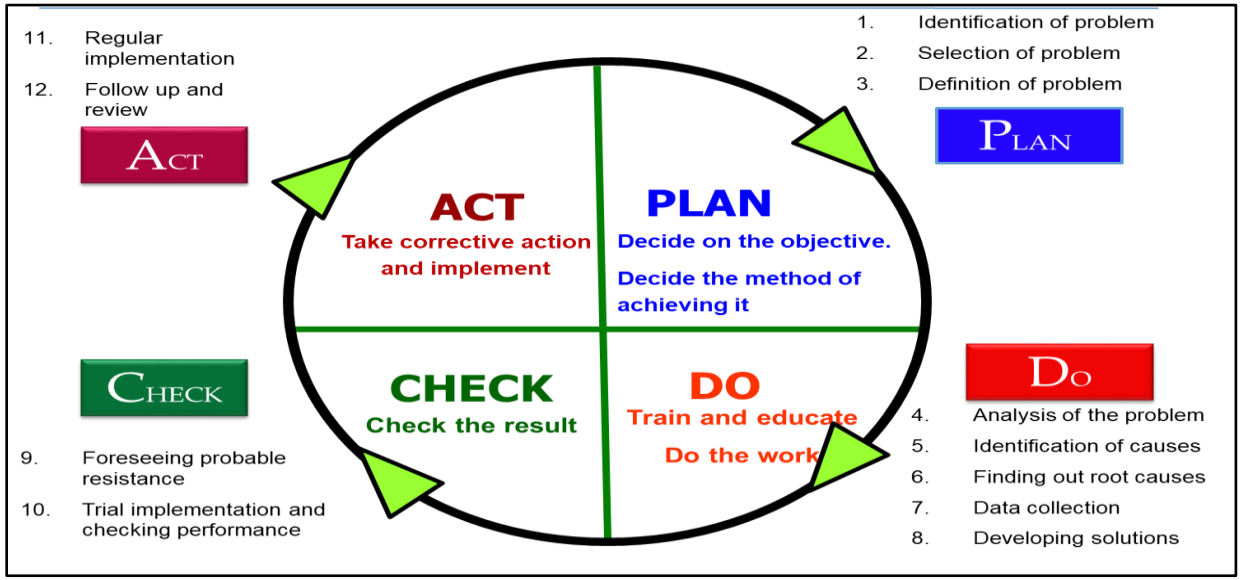
5S is Work Place Management which is practiced by every employee at their working areas to ensure a better and safe work environment

Quality Control Circles (QCC) are for Employee Involvement with Enthusiasm in Quality Circles for Self and Mutual development, and Organizational growth



Trainings & Workshops

Quarterly External Audits & Recognitions

ICQCC Competition – 2021, India

ICQCC Competition – 2018, Singapore

Awards & Recognitions

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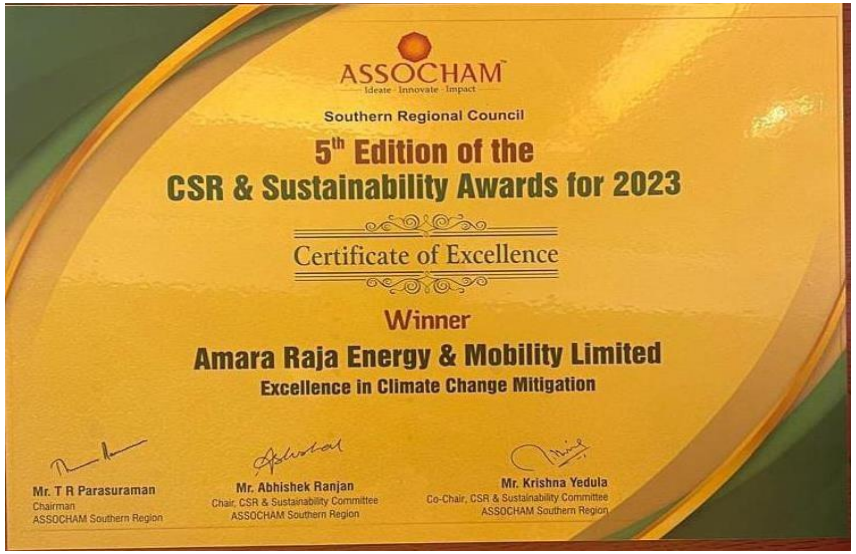
CSR & Sustainability award



Achieving AROGYA healthy workplace award

Excellence in climate change mitigation

Environment Award

Best future ready organization

Awards & Recognitions

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Excellence category in TPM

Achieved JIPM TPM 'Excellence, Category A Award' for LVRLA and MVRLA Plants

Achieved JIPM Excellence in 'Consistent TPM Commitment Award' for ABD1 and SBD1 Plants

Achieved ABK AOTS DOSAKAI '5S SUSTENANCE LEVEL 2' Award

Excellence in Lead safety & hygiene

Conducted LEADCON conference with Lead Industry experts to spread awareness on Lead safety and hygiene through best-in-class initiatives

Best Overall Sustainable Performance 2023 by Transformance Forums

Excellence in Water Management by CII Competition 2023

Great place to work award 2023

IESW Company of the FY 2022-23

Amara Raja believes in .....

Gotta be a Better Way