



GERMER TECHNOLOGIES PVT. LTD

Go Green - Reduce, Reuse, Recycle 

BATTERY REGENERATION

PERSENTED BY:

GERMER TECHNOLOGIES PVT. LTD



At COP 26 Summit, PM Modi said that India will reduce total projected carbon emissions by 1 billion tonnes between now and 2030



**GERMER CAN POSITIVELY CONTRIBUTE TOWARDS ACHIEVING THIS PLEDGE
IN AN ABSOLUTE MEASURABLE WAY**

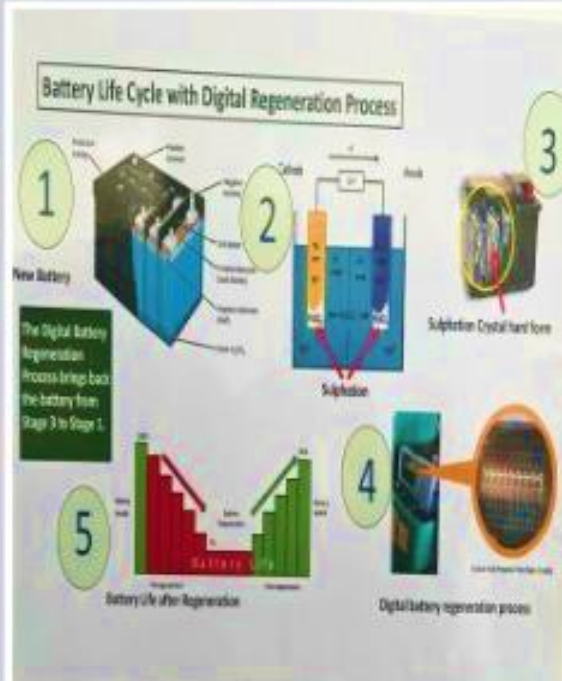
ABOUT US

- **Six Year Young Company, MSME, Start-Up Regd.**
- **Full Fledged VCCS / ATMS Lab at Noida to Support MAFI**
- **Authorized Marketing and Technology Partners of:**
 - **TREX AVIATION US – FOD Detection System**
 - **BHARAT Visibility System**
 - **DUROTEK Solution – Integrated Weapon Simulator**
 - **GERMER Innovation – Battery Regeneration**
 - **Nano Chip – PC Life Extn.**
 - **AR- VR Solutions**
 - **Dichroic Lamps Manufacturing**
 - **HR – Skilled Manpower**

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Digital Battery Regeneration



A Sustainable Solution to Reduce CAPEX and Emissions.

Valve-regulated lead-acid (VRLA) batteries are a type of rechargeable battery that is commonly used in a variety of applications, including telecommunications, transmission control centers, solar power stations, and uninterruptible power supplies (UPS).

Digital Regeneration is a process by which all the sulfate crystals that accumulate on the Terminals and Grids of the batteries over time, are dissolved, resulting in Minimized Internal Resistance.

Restoring the inferior factors inside the cells can maximize the chemical activation of the Sulphuric electrons.

Digital Regeneration process equalizes the states connected cells, thus expanding the energy storage capacity.

Innovative Regeneration Process

01

Smart Software Controlled Regen Process:

AI based software controlled current pulses ensures complete desulphation, achieved through continuous feedback from battery cell

03

Measuring Instruments :

Results in accurate measurement of critical parameters

05

Longer Life Guaranteed:

Battery will need replacement **ONLY** after **8-10 Years** through Germer Maintenance & Regeneration process

02

Accurate Capacity Testing :

Advanced AI controlled machine for accurate measurement of pre and post Regen battery capacity

04

Established Process:

Well laid out process and report generation formats with traceability of each battery post regeneration



Regeneration possible for NICKEL CADMIUM batteries too !

■ REGENERATION TECHNOLOGY APPLICATION



01 FORKLIFT



02 TRAIN



03 TELECOM



04 UPS



05 DEFENSE



06 GOLF BAGGY

07 Traction & Deep Storage

08 Power (Inverter Batteries)



**REGENERATION OF LEAD ACID & NICKEL CADMIUM BATTERIES
AVOIDS DISCARDING THEM AS SCRAP AFTER COMPLETION OF SPECIFIED
STATIC LIFE.**



Why Regeneration?

LEAD ACID BATTERIES :

Carbon emission (for a 48V, 600Ah Industrial Battery) is as under (Source : IIT, Mumbai Research Report Dec 2021)

CO2 Emission During New Battery Production (in Kg)	CO2 Emission During Regeneration Process (in Kg)
2.16	0.23



For every 1000 Batteries, 3 Regen Cycles can save 1783 Ton Equivalent Co2 Emissions & Double the Useful Life of Batteries

Advantages of Regeneration

LEAD ACID: PRESENT INDUSTRY SCENARIO

- LEAD IS MOST RECYCLED ALLOY: 90% OF LEAD IS RECYCLED
- BATTERY REPLACED EVERY THREE TO FOUR YEARS
- RECYCLING : ECO UNFRIENDLY
- MOVE TOWARDS LITHIUM ION BATTERIES

PROPOSED SCENARIO : REGENERATION

- TOTALLY NON INVASIVE AUTOMATIC PROCESS
- DOUBLES THE LIFE OF BATTERY FROM 36-48 MONTHS TO 96 MONTHS
- CLEAN AND ENVIRONMENT FRIENDLY
- GIVEN RESOURCE CONSTRAINT UPS/TELECOM/MOTIVE POWER SHOULD USE LEAD ACID BATTERIES WITH REGEN
- SAVES CAPEX BY 40%

ENCOURAGE LEAD ACID BATTERIES WITH REGENERATION FOR

SUPPORT REQUIRED FROM GOVERNMENT

REGULATORY CHANGES TO BE INTRODUCED

- Make it Mandatory for Capacity / Health Checks prior disposal of Lead Acid Batteries used for Industrial Purpose (In Mines / Railways / Closed Warehouses & Manufacturing Units using Battery Operated MHEs)
- Allow Companies Like GERMER to be the Certifying Agencies for Battery Health Check / Capacity Checks followed by Regeneration (Similar To PUC Checks for Motor Vehicles)
- Provide Government Grants for Setting Up Regen / Capacity Check Units across the Country

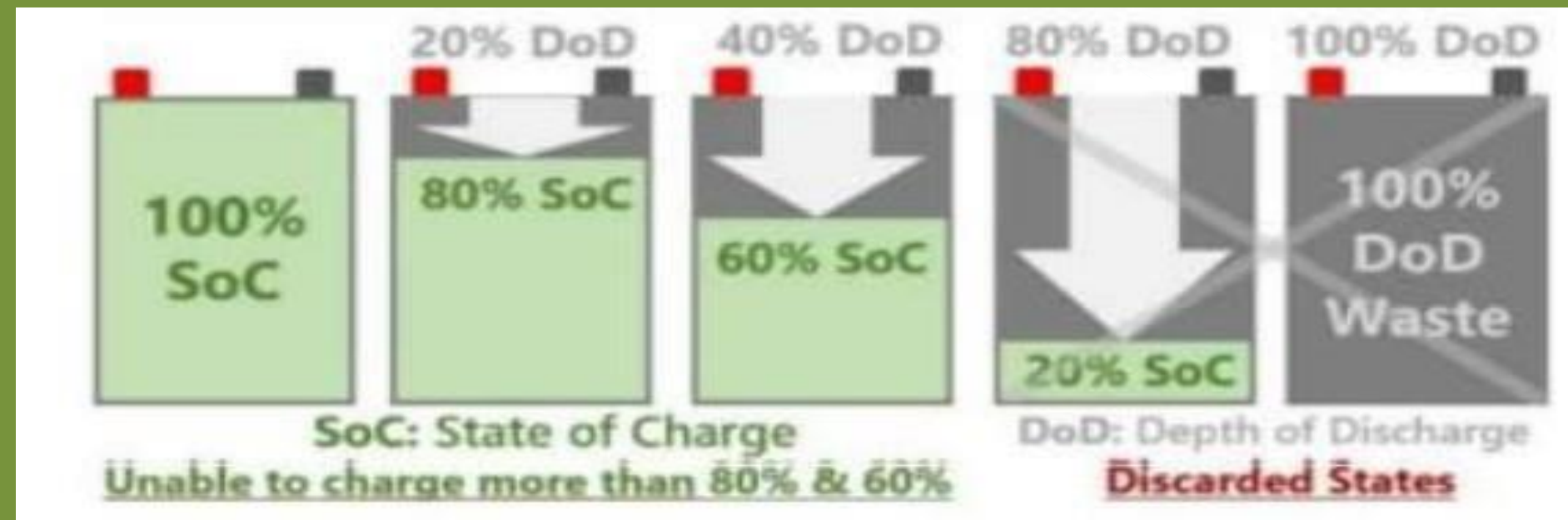
ADVANTAGES

- Generates Employment / Encourages Entrepreneurs across the Country for Setting Up Regen / Capacity Check Units
- Ensures CO2 Equivalent Reduction in an absolute measurable way - Aiding Government commitment of reducing Carbon Emission by 1 Billion Tonnes by 2030
- Reduces Capex of Companies by 40% by Carrying out Regeneration instead of Procuring New Batteries



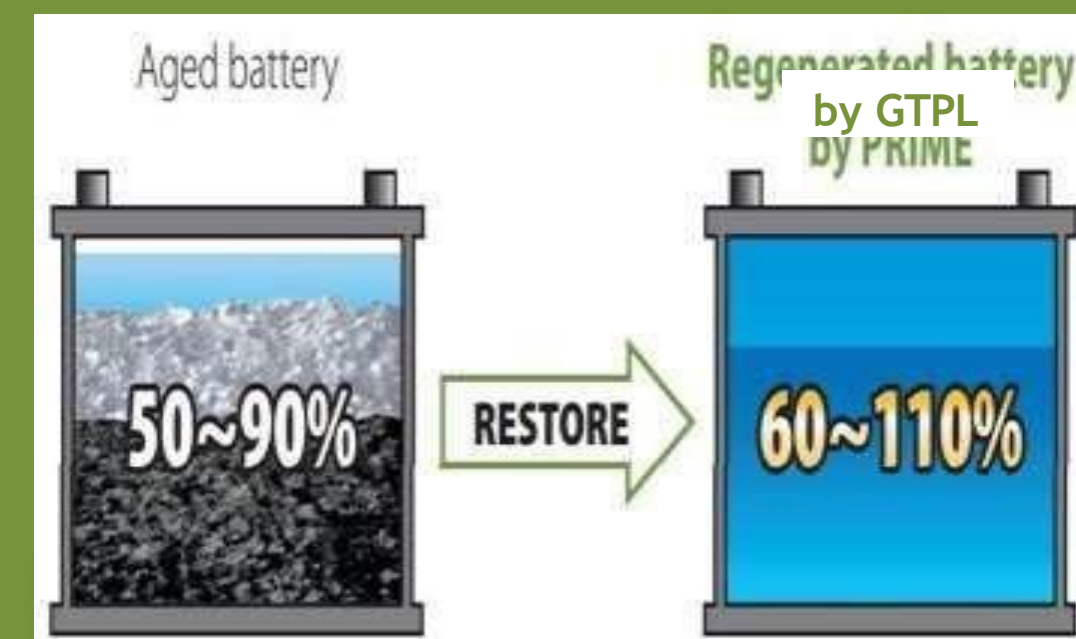
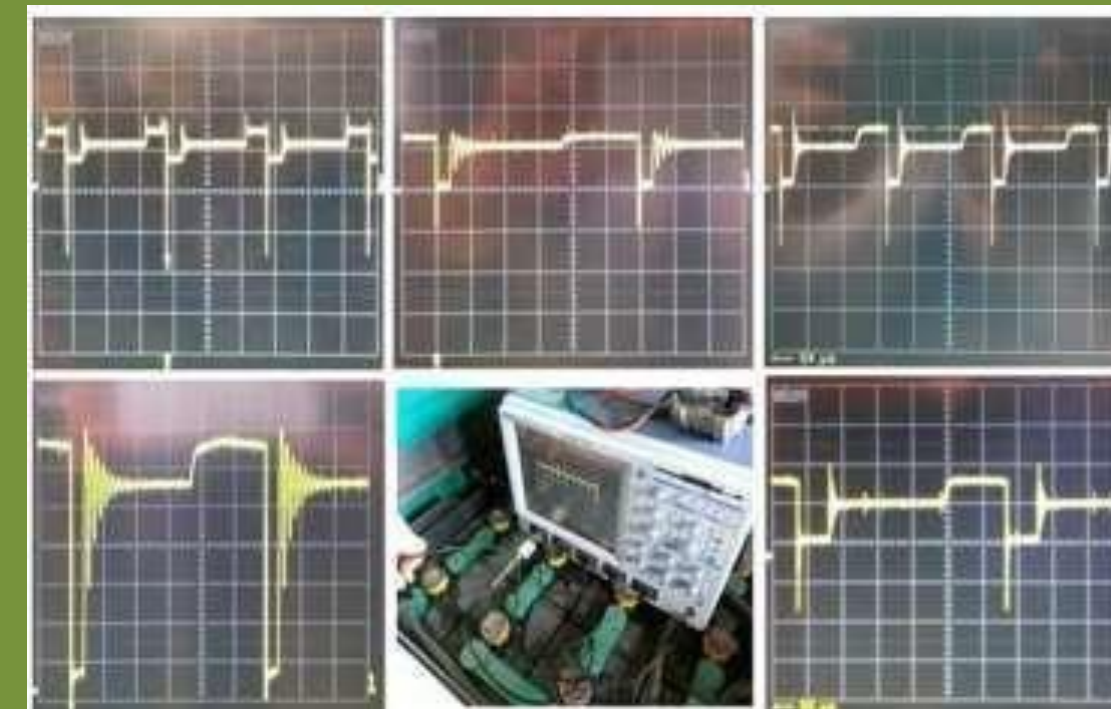
Illustration of Batteries Life Cycle and Degradation

- ▶ **GERMER TECHNOLOGIES PVT. LTD. Regenerator regenerates the batteries, which are at 80% to 90% SoC, to its Original Condition. While the battery's capacity may go up by only 10~20%, its actual lifespan increases by 40%.**
- ▶ **Between 80% to 60% SoC, the condition of the batteries before regeneration are in somewhat physically deteriorated states. However, if the electrolytes have not yet evaporated significantly, the batteries can be brought back to almost new condition.**
- ▶ **With significant electrolyte evaporation, batteries between 60% to 40% SoC are already physically oxidized and corroded before regeneration. Even after regeneration, the battery's life will still be short compared to early regeneration of batteries at 90% SOC.**



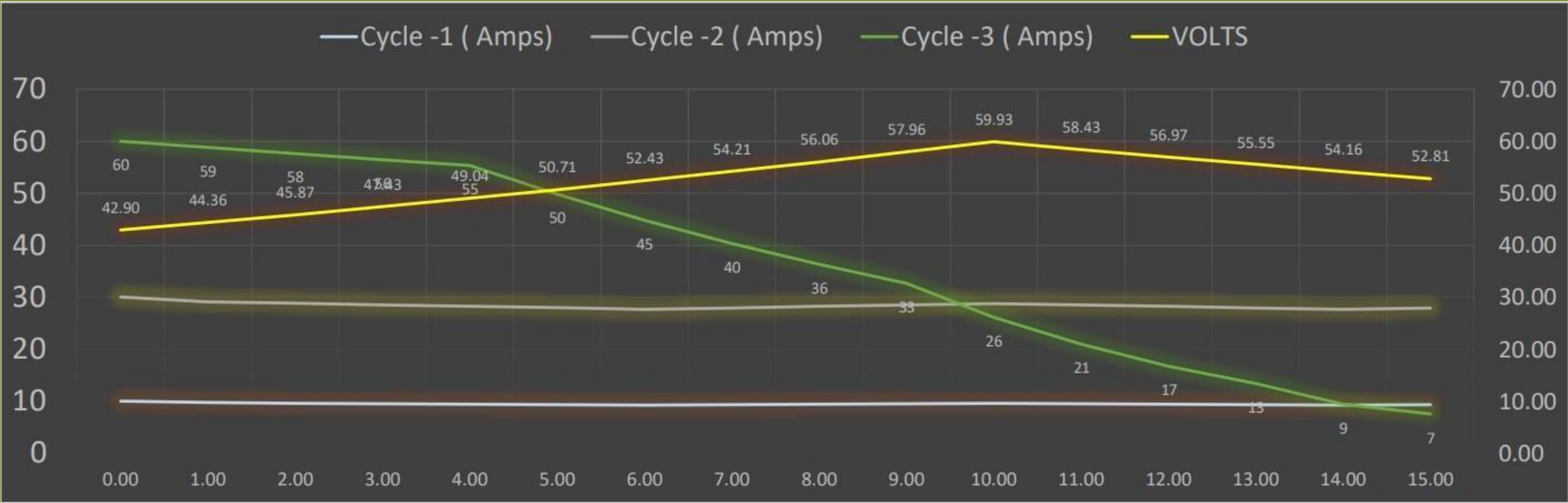
BATTERY REGENERATOR PROCESS

- Proprietary Intelligent Minicomputer Control System that uses Optimized High-Frequency Pulse through advanced Algorithms that is developed in-house.
- The DE sulfation Process works on a stable and adequate current supply to the battery. Stable Voltage and High-Frequency Pulse based on battery type and regeneration curve pattern helps to sustain proper chemical reactions during regeneration and charging process.
- High-Frequency Pulse Technology and Optimized Regeneration Algorithm ensures NIL cell damage. An integral RMS manages the process by crossing positive and negative high-frequency pulse waves, similar to how Ultrasonic cleaners use high-frequency pulses to remove contaminants from inorganic objects. Batteries react to high-frequency pulses, emitting a high peak pulse voltage instantly when supplied with high-frequency electricity.
- Regeneration Machine has an Adjustable Charging Voltage (0-96V) and Current (0- 100A), thus have unlimited options to charge the battery as per sulphation level to reduce the generation of high temperature.
- Regeneration process is also used to improve the Electromotive Force of Used Batteries. The restoration function activates the electromotive force by increasing cells' equalization and specific gravity inside the battery.





Battery Regeneration Process to enhance the Battery life



Set Volt	48V
Set Time	15:00:00
Set Battery Capacity (Total AH)	600.0A

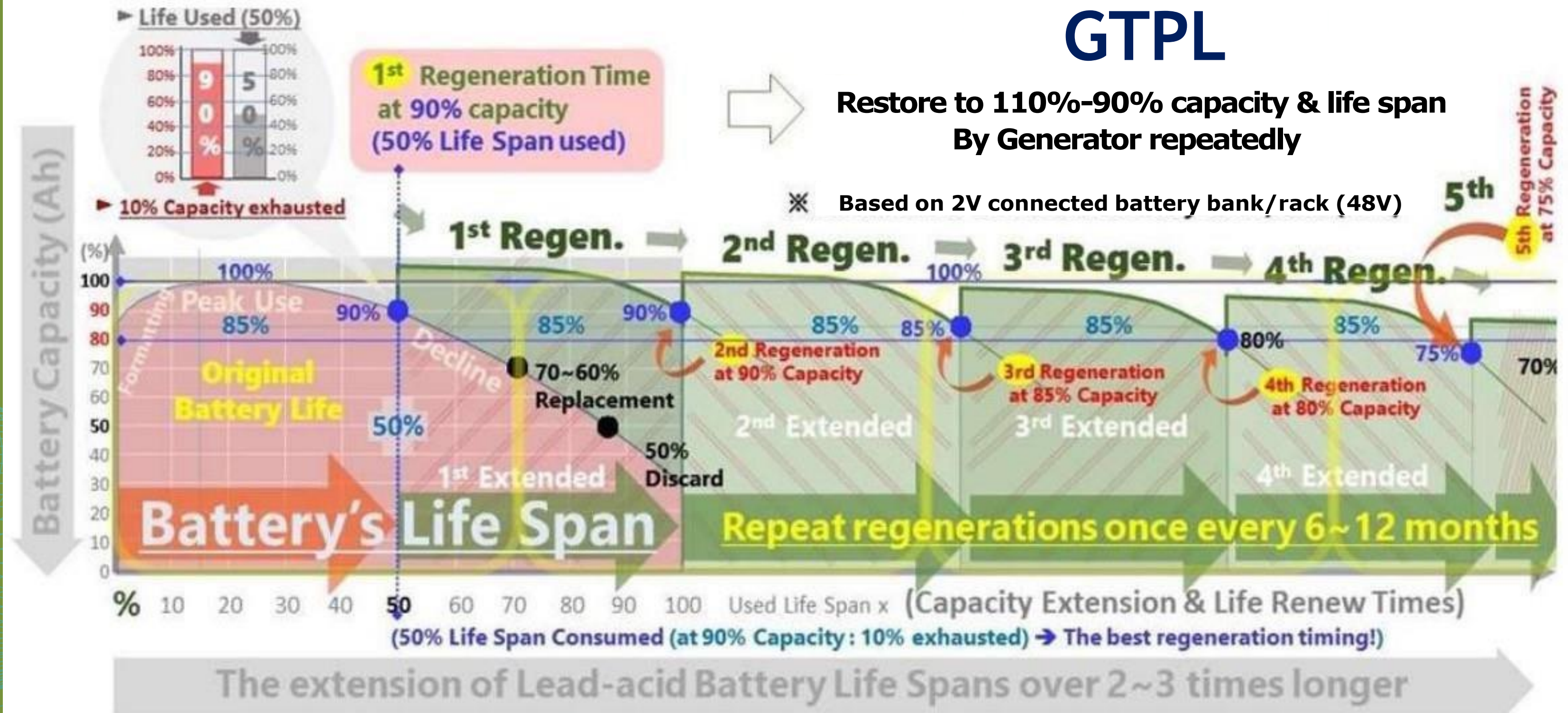
Regeneration Run Time	14.59.59	
Starting Battery Voltage	42.9 V	Battery Starting voltage before regeneration
Final voltage - Post Regeneration (After 15 min of regeneration)	52.81 V	Minimum regenerating current during the Battery Charging
Maximum Charging current in 1st Cycle of regeneration	10 Amps	Maximum charging current during 1st time regeneration for 15 hrs
Maximum Charging current in 2nd Cycle of regeneration	30 Amps	Maximum charging current during 2nd time regeneration for 15 hrs
Maximum Charging current in 3rd Cycle of regeneration	59.93 Amps	Maximum charging current during 3rd time regeneration for 15 hrs

OPTIMIZING BATTERY CAPACITY & LIFE

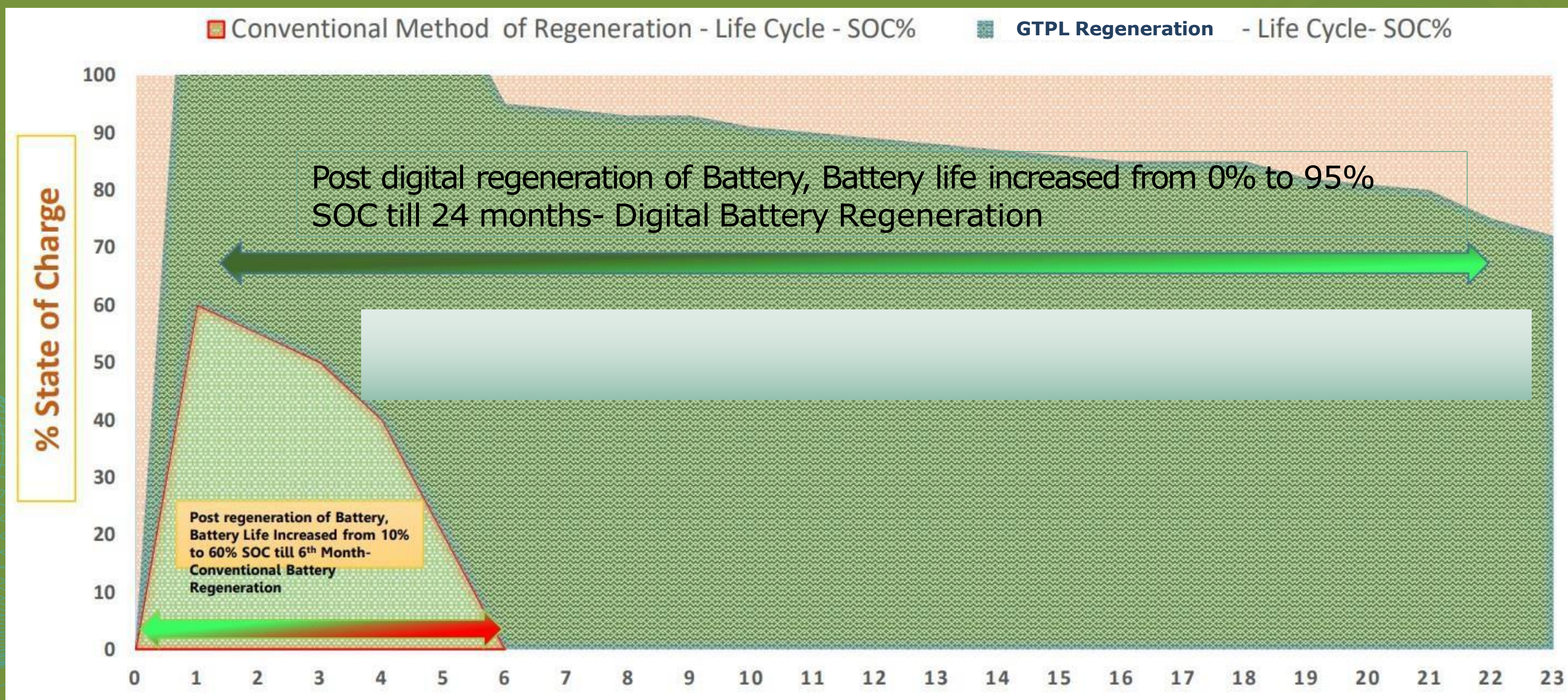
GTPL

Restore to 110%-90% capacity & life span
By Generator repeatedly

※ Based on 2V connected battery bank/rack (48V)



Comparison of Conventional Method & GTPL Digital method of Battery Regeneration



Carbon Emission Calculation – By IIT, Mumbai

(CO ₂ emissions comparison calculator)					
Input Parameters					
Regeneration Inputs (Power & time)	Regenerations steps	Power consumption (W)	Time (h)	Average CO ₂ emissions per kg of battery regenerated (in kg)	Average CO ₂ emissions per kg of battery manufactured (in kg)
	Fully charge battery	6000	10		
	Initial Discharge	250	5	0.23	2.16
	Regeneration of the Battery	1330	72		For more info please see Tab 1 - detailed calculations
	Fully charge battery	6000	10		
	Final Discharge	250	5		
	Final Charge of the Battery	6000	10	Battery life (months)	36
				Battery weight (kg)	700
CO ₂ emissions comparison					
The average emissions from procuring 1 new battery is		9.42	Times higher than regenerating existing battery		
Time (months)	Total No. of regeneration cycles	No. of new LaBs required (if disposed off after use)*	CO ₂ emissions for regeneration (kg)	CO ₂ emissions if a new battery is procured (kg)	Savings in CO ₂ emissions due to regeneration instead of replacement (kg)
18	1	0.5	160.16	754.54	594.39
36	2	1	320.31	1509.09	188.77
54	3	1.5	480.47	2263.63	1783.16
72	4	2	640.63	3018.18	2377.55
90	5	2.5	800.79	3772.72	2971.94
* Fraction of batteries does not exist in reality, is only used for illustrative purposes					

Acknowledgement

from

IIT Guwahati



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Guwahati 781039, Assam, India

Date: 10/08/2023

Certificate of Completion

This is to certify that the Proof of Concept (POC) for Battery Regeneration, conducted in collaboration with M/S Motivus Innovation Pvt. Ltd., G-9, II-35, Sector-63, Noida, Gautam Budh Nagar- 201301 has been successfully completed. The POC was undertaken under the purview of the Chemical Engineering Department at the Indian Institute of Technology (IIT) Guwahati.

The POC aimed to assess the viability of regenerating aging batteries, focusing on batteries approximately 5 years old. We are pleased to announce that the outcomes of this endeavor have been exceptionally positive. A total of 16 SMF batteries (12 V, 26 AH) were subjected to the regeneration process, yielding impressive results:

- **Successful Regeneration:** All 16 SMF batteries (12 V, 26AH) have undergone the regeneration process and have been restored to a level where they exhibit significantly improved operational characteristics.
- **Enhanced Backup Capacity:** The regenerated batteries now boast a backup capacity of more than 5 hours on C10 load, surpassing the anticipated performance metrics.
- **Integration with HPCC Server:** The regenerated batteries seamlessly integrated with the High-Performance Computing Cluster (HPCC) server, demonstrating their compatibility and robustness in a real-world operational setting.

We extend our heartfelt appreciation to all individuals involved in this project for their expertise, diligence, and contributions. The successful completion of this POC stands as a testament to the capabilities of both institutions to tackle intricate challenges and deliver tangible outcomes.

In recognition of the successful completion of the Battery Regeneration Proof of Concept, we hereby present this certificate to M/S Motivus Innovation Pvt. Ltd.

We anticipate that this accomplishment will serve as a foundation for future collaborations and advancements in our mutual pursuit of cutting-edge technological solutions.

Sincerely,


10/08

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POC : 13 BRD AF

Battery Type & Make: Exide Power Safe Plus
Year of Manufacturing: 2017-18.
Pre-battery regeneration Battery: **Scrap**
Post Regeneration : 5 Hrs. @ 11.95 Volt
: 7Hrs.@ 11.65 Volt.



Motivus Innovation Private Limited

1 BATTERY FOR GERMER TECHNOLOGIES PVT. LTD.

TIME	CURRENT(AMP)	VOLTAGE(V)
11:40AM	4.41	12.6
12:40PM	4.29	12.5
1:10PM	4.4	12.41
1:40PM	4.25	12.34
2:10PM	4.23	12.28
2:40PM	4.39	12.22
3:10PM	4.33	12.16
3:40PM	4.26	12.09
4:10PM	4.25	12.02
4:40PM	4.25	11.95
5:10PM	4.11	11.89
5:40PM	4.13	11.81
6:10PM	4.07	11.73
6:40PM	4.03	11.65



Battery regeneration success status

BATTERY REGENERATION POC UPDATE						
Customer Name	Mfg Year	Number of battery cells received	Number of battery cells regenerated	Battery Cells regeneration percentage	Physical damage	SPOC person Name & Contact no
BSNL Meerut	2012-13	54	42	78%	12	Md. Imran 9368664237
V CON Towers Chandigarh	2018-19	66	59	89%	7	Mr. Deepak Khanna 9810127283
Airtel Guwahati	2017-18	72	68	94%	4	Mr. Manjoor Ahmed 8254972777
Indus Towers Guwahati	2018-19	48	43	90%	5	Mr. Surajiv 7002715048
IIT Guwahati	2012-13	21	17	81%	4	Mr. Jayanta Mout 6901622374
Sterlite Telangana	2016-17	53	42	79%	11	Mr. Jitendra 8756000713
Electricity Board-Agartala	2017-18	4	4	100%	0	-
E- Rickshaw - Agartala	2019-20	3	3	100%	0	-
13 BRD AF	2017-18	2	1	-	1	



THANK YOU



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