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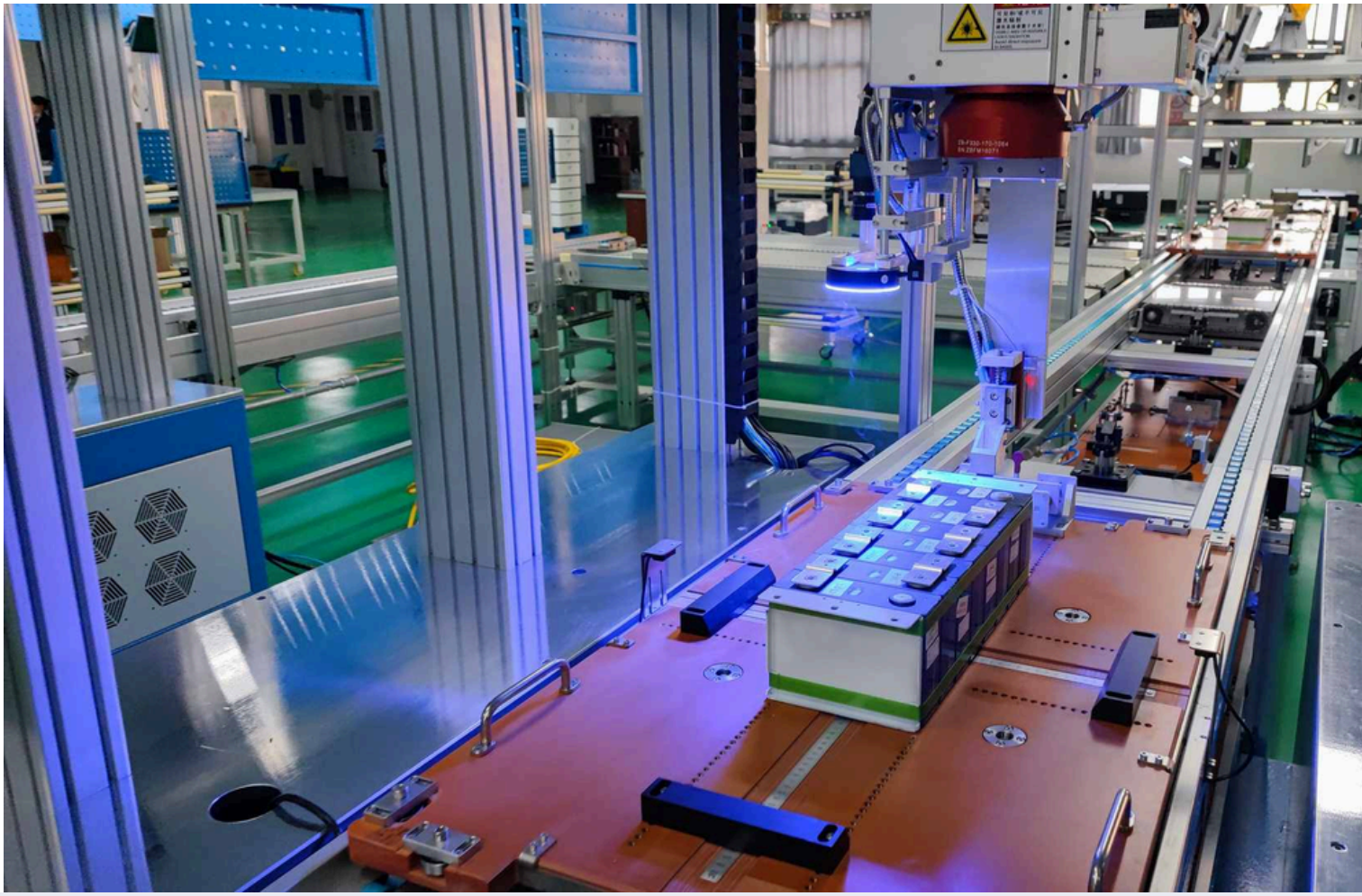
Proposal

Setting up a Second-Life Lithium-Ion Battery Manufacturing Line



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Agenda

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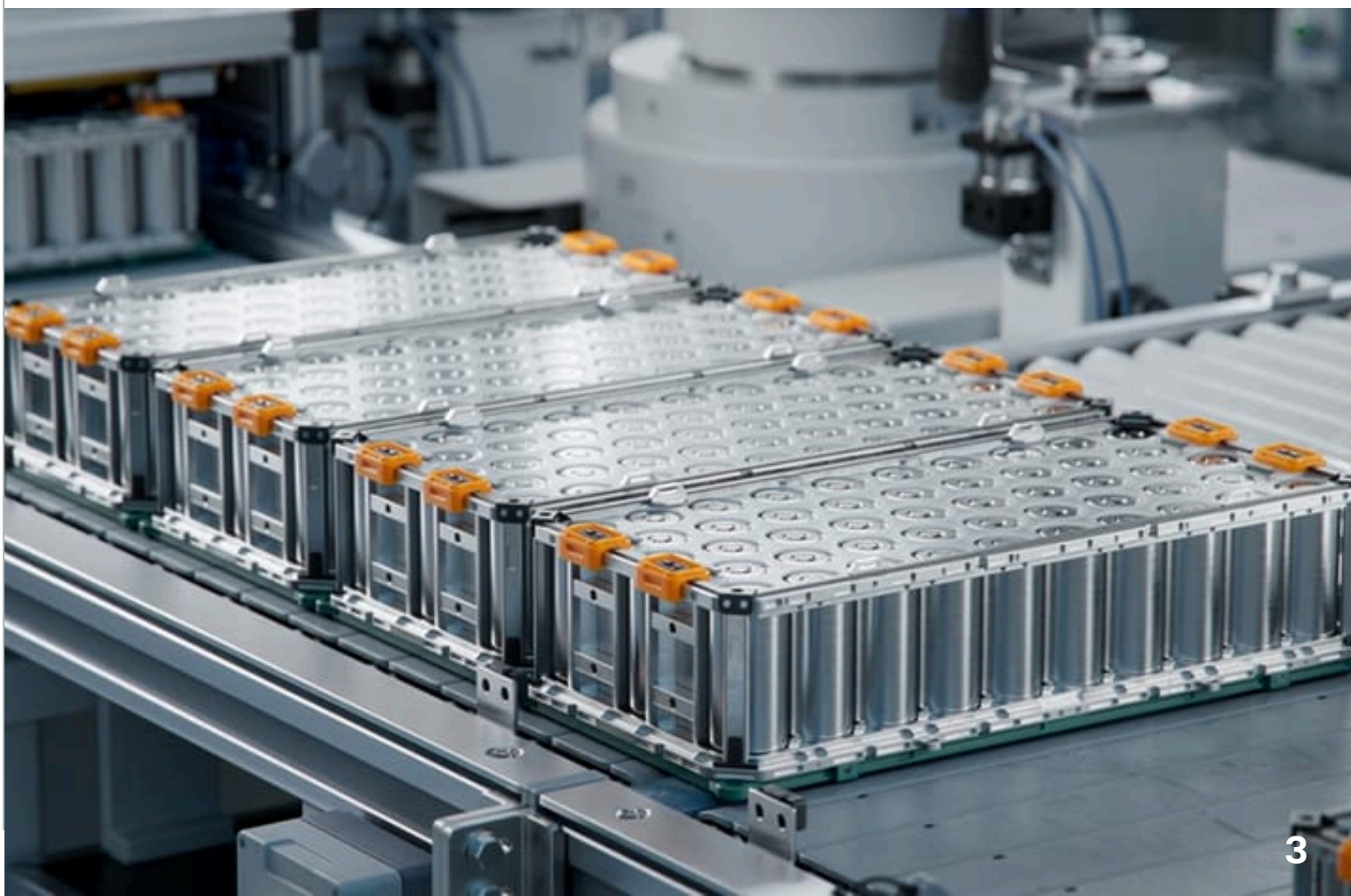
Executive Summary

The age of new energy is here

With the rapid acceleration of electric vehicle (EV) adoption and energy storage systems, the world is facing a parallel rise in EV battery retirement. Although these batteries are no longer suitable for vehicle propulsion, they often retain 70–80% of their original capacity, making them ideal candidates for second-life applications.

This proposal outlines a strategic plan to establish a semi-automated Second-Life Lithium-Ion Battery Manufacturing Plant. The facility will refurbish used EV batteries into new, high-utility battery packs for applications such as telecom tower backups, solar energy storage, and Battery Energy Storage Systems (BESS).



Towards Green future

Global Market Opportunity

- **EV Battery Waste Volume:** Over 11 million tons of lithium-ion battery waste anticipated globally by 2030.
- **India's Battery waste Share:** 2 million tonnes expected from India alone.
- **Reuse Potential:** Second-life batteries retain significant value; reusing them can reduce storage costs by up to 50%.
- **Policy Backing:** Extended Producer Responsibility (**EPR**) mandates and sustainability commitments are encouraging reuse.

Applications for Second-Life Batteries:

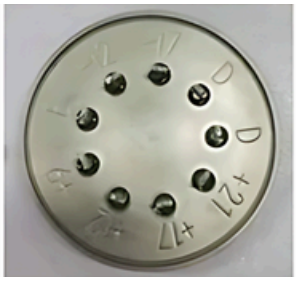
- **Telecom Towers:** Reliable and economical power backup solutions.
- **Solar Energy Storage:** Affordable storage for rooftop and off-grid systems.
- **BESS:** Load balancing and energy arbitrage in grid networks.
- **E-Rickshaws & Light EVs:** Lower-cost energy sources.
- **Rural Microgrids:** Powering remote villages with affordable energy.

Step-by-Step Manufacturing Process

1. Cell Cleaning

Purpose: Remove welded nickel strips and terminal debris from used cells.

Process: Manual or semi-automated tools used for detaching metal remnants. Ensures safe handling and prepares cells for testing.


2. Cell Capacity Grading

Purpose: Identify reusable cells based on retained capacity.

Process:

- Cells are connected to grading machines.
- Charged/discharged in controlled cycles.
- Capacity, voltage, and internal resistance recorded.
- Cells below 70% discarded.


Step-by-Step Manufacturing Process

3. Cell Sorting

Purpose: Group cells with similar capacity and voltage profiles.

Process:

- Cells are sorted using automated sorting systems.
- Ensures consistency within each pack.
- Enhances battery performance and lifespan.

4. Module Preparation Station

Purpose: Arrange cells in Series and Parallel configurations.

Process:

- Cells placed in plastic trays.
- Configured as per required voltage and capacity.
- Mechanically fixed to avoid vibration-induced damage.

Step-by-Step Manufacturing Process

5. Spot Welding

Purpose: Electrically connect cells using nickel strips.

Process:

- Spot welding machine welds nickel strips onto terminals.
- Multiple modules combined with separators between them.
- Final module is scaled to desired pack capacity.

6. BMS Soldering

Purpose: Integrate Battery Management System (BMS) for monitoring.

Process:

- BMS connected across each series node.
- Ensures control over voltage, temperature, and current.
- Smart BMS systems allow remote diagnostics.

Step-by-Step Manufacturing Process

7. Battery Testing and Ageing

Purpose: Assess full battery pack performance and reliability.

Process:

- Battery pack undergoes charge discharge cycles.
- Capacity & temperature performance logged.
- Faulty packs are rejected or sent for rework.

8. Heat Shrinking with PPE Plastic

Purpose: Provide insulation and durability.

Process:

- Battery wrapped in PPE shrink film.
- Heat gun used to tightly seal the wrap.
- Protects from dust, moisture, and minor impacts.

Step-by-Step Manufacturing Process

9. Final Packaging in Metal Boxes

Purpose: Safeguard battery packs during transit and usage.

Process:

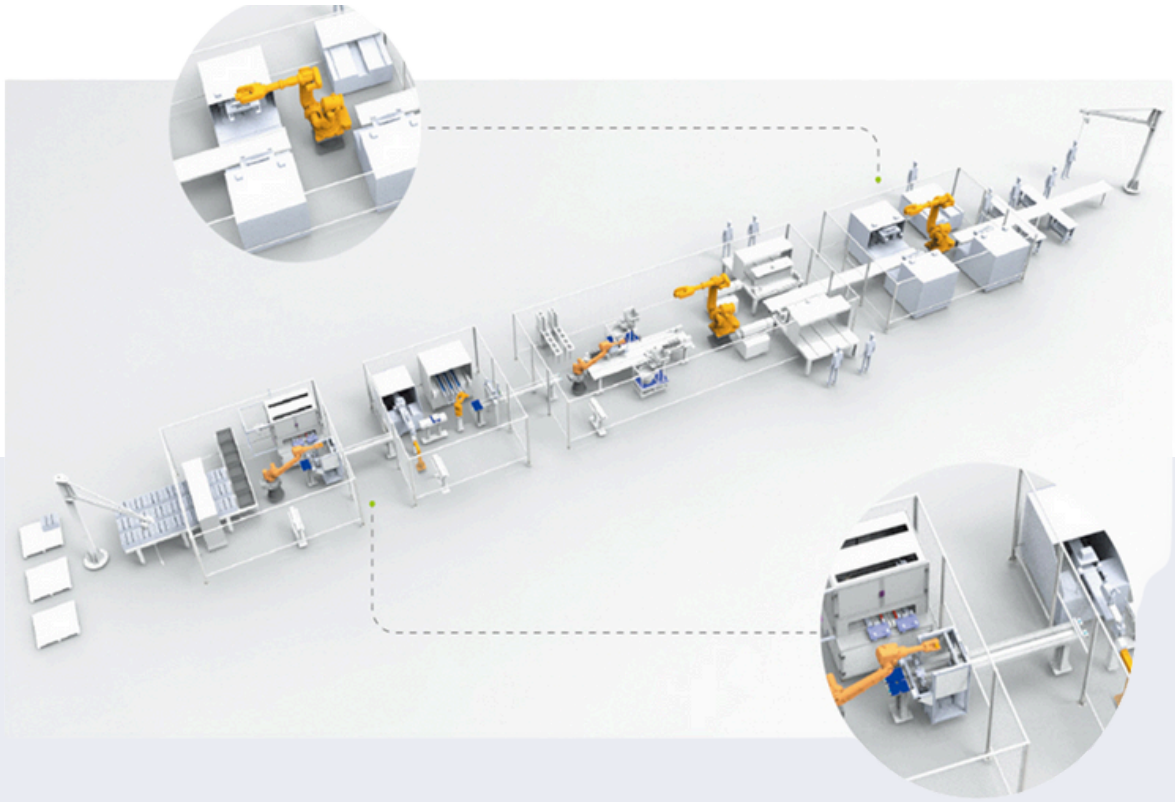
- Tested and wrapped batteries are enclosed in custom-designed metal casings.
- Foam and rubber cushioning is added internally to prevent vibration.
- Each metal box is labeled with safety warnings, QR code for traceability, and technical specs.
- The metal enclosure adds a layer of fire resistance and structural safety, especially for industrial uses.

Proposal

We proposes the setup of a turnkey second-life lithium-ion battery manufacturing plant designed for an output of 1.5-2 MW/month. This proposal includes:

Core Equipment:

- 512-Channel Cell Grading Machines (Cylindrical): 2 Units
- Prismatic Cell Grading Machines: 2 Units
- 9-Channel Cell Sorting Machines: 2 Units
- Spot Welding Machines (Pneumatic): 4 Units
- 16-Channel Battery Ageing Machines: 1 Units
- Module Preparation Workstations: 2 Units
- BMS Soldering Stations: 2 Units
- Heat Shrinking Stations: 2 Industrial Heat Guns + Table
- Metal Box Packaging Station: 2 Units



Proposal

Conveyors & Handling:

- Material Flow Conveyor Belts:
- Trolleys & Cell Transport Carts: Multiple
- Component Storage Racks and Stackable Trays

Accessories & Safety Systems:

- Fume Extraction & Ventilation System
- Label Printers and Traceability Tools

Total Estimated Investment:

- INR 1.5 Crores
  - All-inclusive: Equipment, Setup, Installation, Accessories, and Training
  - Excluding of tax and duties

This plant will enable high-throughput production, efficient repurposing of EV battery waste, and a rapid return on investment while contributing to India's circular economy and clean-tech future.

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Together, let's energize the future, sustainably.