

Rechargeable Batteries

Battery is a term commonly used to denote an **electro chemical cell**. They are storage devices for chemical energy that can be converted to electricity.

An electrochemical cell is composed to two compartments or **half-cells**, each composed of an electrode dipped in a solution of electrolyte. One electrode is ready to donate electrons and the other is ready to accept electrons. Whenever there is a conductive path, electrons flow between the cell's two electrodes.

The current (flow of electrons) stops when the potential chemical energy is used up.

Cells are classified in to two categories:

Primary cells or batteries, which are used once, then discarded

Secondary cells or batteries, which can be recharged many times. Rechargeable cells operate on the same principle, except that the electrode and electrolyte materials used are suitable for reversible reaction. When connected to an appropriate charger, the chemical reaction that occurs is reversed and the cells convert electrical energy back into potential chemical energy. The process is repeated every time the cell is discharged and recharged.

The electronic revolution has resulted in exponential growth in demand for small size rechargeable cells. They are extensively used in mobile phones cordless phones, cameras, camcorders, and laptops. They are also used in many cord-less power tools.

Larger size rechargeable cells are used in automobiles, emergency lighting and power back up. There are numerous applications in military, railways, ships and industries.

Type of rechargeable cells

- Sealed lead acid
- Nickel-cadmium (NiCad)
- Nickel metal hydride (NiMH)
- Rechargeable alkaline manganese
- Lithium ion
- Li-polymer

Each type has merits and demerits. Criteria like weight, time between each recharge, capacity, and cost determine which type is used where.

Proposal

Coming decades are going to see shift from liquid fuels to electricity as the main energy source in all walks of life. The main change is expected in the automobile industry. Hybrid cars are becoming popular in the US. In India electric two wheelers are likely to substitute the petrol ones.

It is an opportune time to get into the rechargeable battery business.

There are many "Niches" in this market.

A start up can begin with marketing the products by getting them made in China.

Another route is to identify a small end use involving high technology and cater to the needs

Product mix

Indian market for rechargeable batteries for electronic appliances is not large enough to set up single line high volume production facility for Nickel metal hydride or Lithium ion type batteries.

A judicious mix of products to meet consumer and industrial needs based on bought out parts and assembly operations have to be identified based on market survey.

Market

The global battery market is about US \$50 billion, of which roughly \$5.5 billion is allocated to rechargeable (consumer) batteries. The growth is estimated at 6% annually. China, India, Brazil, the Czech Republic and South Korea will record some of the strongest market gains.

In India EIL (Eveready) controls 40-45 per cent of the 7-million unit rechargeable (consumer) battery market. They also import and market these products.

The automobile and industrial / defense sectors are catered to by companies like Exide, Amar raja.

The main growth is in the mobile phone, electric vehicle segments

Manufacturing process

Materials play major role in battery manufacture. The electrode materials, electrolytes, casing material sealants, all are specially made. For a start up the main task is sourcing the materials. What follows is assembly and quality control.

Technology

Technology for manufacture of some types of batteries for industrial application is available from Indian research institutions. Technology can also be sourced from abroad

Plant and Machinery

Machinery used for part fabrication from polymer materials or metals, moulds jigs, fixtures are the main equipment

Raw materials

Polymers, metals in sheet form, chemicals are the raw materials required

Utilities

Power is the main utility

Project cost

Capital outlay can start from Rs. 10 crores

Turnover and profitability

10 to 12 % net profit margins can be expected

Suggested location

Any urban center with good infrastructure facilities will suit.

Entrepreneur profile

Technocrat or market savvy persons having strong financial back up will be well suited

Apitco's consultancy

Market survey
Technology sourcing
Project planning