LEAD ACID BATTERIES RECYCLING

PROCESS DESCRIPTION

What lead acid battery is and where can be found

Invented in 1859, lead-acid was the first rechargeable battery for commercial use. Despite its age, there are good reasons for its popularity; lead-acid is dependable and inexpensive on a cost-per-watt base.

There are few other batteries that deliver bulk power as cheaply as lead-acid, and this makes the battery cost-effective for

- Automobiles
- Golf cars
- Forklifts
- Marine
- Uninterruptible power supplies (UPS)

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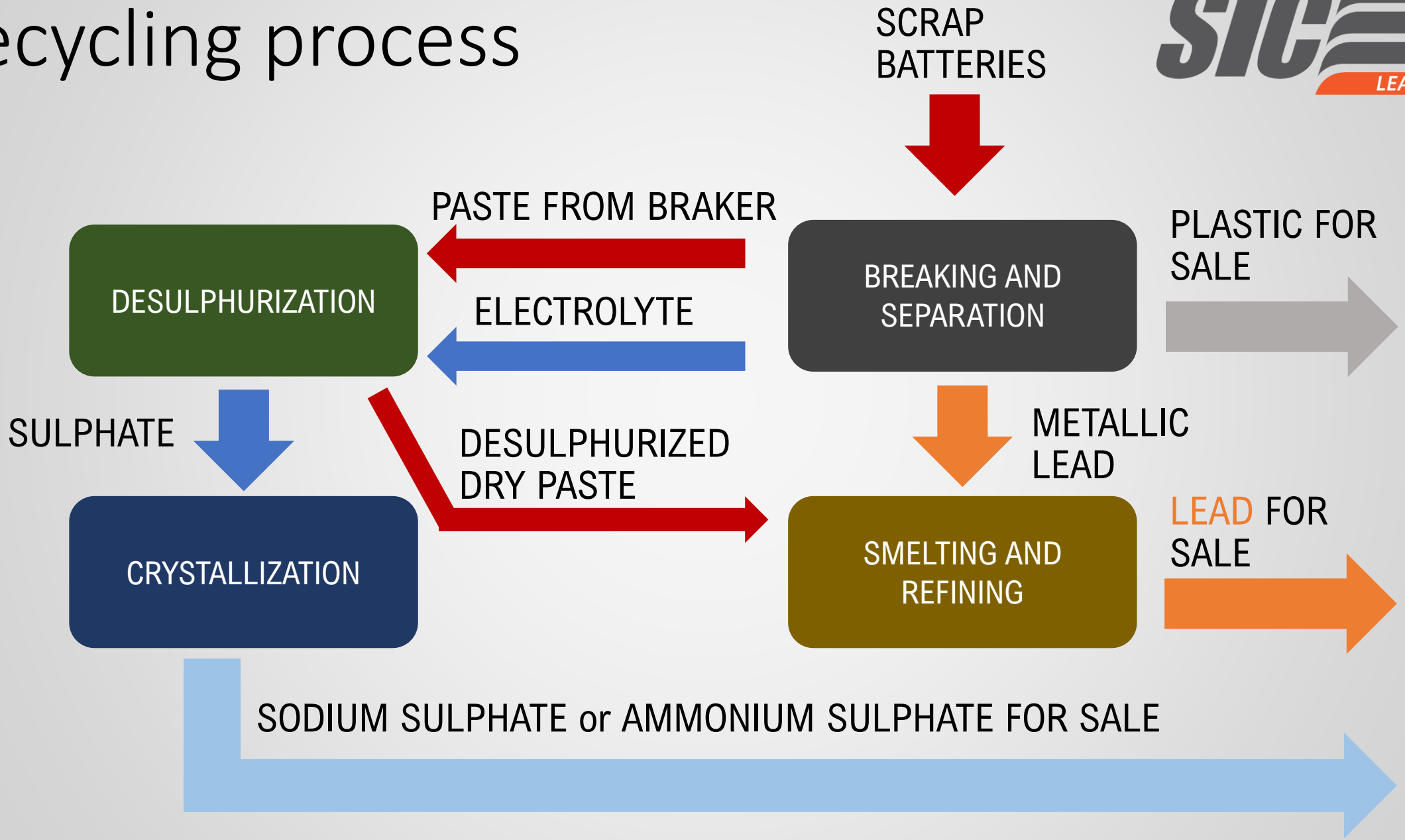
The global lead acid battery market size is USD 41,6 billion (2019) and stands for 80% of global lead consumption (approximately 10 milion metric tons).

Average lead acid battery life is 3 years. Usually shorter in hot climate and when fully discharged frequently.

After disposal, lead acid batteries are treated as hazardous waste and cannot be exported. In most countries batteries are collected and sold to recyclers.

Lead acid batteries can be recycled to obtain lead, polypropylene and electrolyte to be converted into sodium sulphate with no hazard to the environment.

Recycling process



General Plant View

Batteries to recycle

Battery breaker

Desulphurization & Crystallization

Smelting & Refining

Plant Specifications

- Requires approximately 50 000 m^2 of land &
  18 000 m^2 of industrial building
- Plant capacity is 72 000 tons of scrap batteries annually or 15 tons per hour
- Plant can produce:
  - Up to 41 000 tons of refined lead
  - Up to 10 000 tons of Sodium Sulphate
  - Up to 3 600 tons of Polypropylene (PP) chips
- Operating 16 hours/day
  300 days/year
- Work force 65 people
- Power consumption:
  - Electricity ~ 2,5 -3 Mwh
  - Natural gas ~ 1000 m^2/hour

PROFIT AND LOSS ESTIMATION

Item	Ton per year	€ per ton	Total € annually
Lead	41 041	1 750,00	71 820 000,00
Sodium Sulphate	10 080	80, 00	806 400,00
Polypropylene	3 600	500,00	1 800 000,00
		Total Revenues	**74 426 400,00**
Scrap Battery	72 000	-680,00	-48 960 000,00
Slag disposal	4 925	-500,00	-2 462 400,00
Separators disposal	2 880	-500,00	-1 440 000,00
Total utilities and chemicals cost	41 040	-148, 00	-6 073 920,00
Total maintenance	41 040	-21,00	850 000,00
Overhead & management	41 040	-21,00	850 000,00
Total workforce	41 040	-71,00	2 925 000,00
		Total OPEX	**-63 561 320,00**
		EBITDA	**10 865 080,00**

Financial projections

OPEX estimation		
Scrap Battery price	€ 680,00	Per ton
Total utilities and chemicals cost	€ 148,00	Per ton of lead
Total labor, maintenance and overhead	€ 71,00	Per ton of lead
Maintenance costs	€ 20,00	Per ton of lead

CAPEX estimation	
Machinery	€ 13 500 000,00
Civil works, foundations and buildings	€ 6 000 000,00
Engineering, piping, electrical, firefigting system	€ 3 000 000,00
Total	€ 22 500 000,00

Financial Statistics	
EBITDA	€ 10 865 080,00
Depreciation (10 years)	€ -2 400 000,00
Profit (GROSS)	€ 8 465 080,00
Tax 20%	€ -1 693 016,00
After tax and depreciation	€ 6 772 064,00
Cash flow	€ 9 172 060,00

Return of Investment	2,7 years

Market details & Key points

- The main revenue-generating product is lead. Pure lead is traded on London Metal Exchange (LME).
- Additional added value can be obtained if lead alloys are produced and sold directly to the consumers (mostly lead-acid battery manufacturers).
- It is crucial to secure a constant supply of scrap lead-acid batteries to guarantee uninterrupted plant functioning.
- Most countries regulate lead-acid batteries recycling and need to obtain special licenses

Contact us

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Thank you for your attention