

Lunchboxes remind you of soft *rotis* or sandwiches wrapped in crisp aluminium foil. Aluminium got the name 'white metal' due to its resemblance to silver. It came in vogue about 200 years ago and a much time was invested in finding a viable method to process it. As metal is less toxic than other non-ferrous metals, it became a common packaging tool. But a lot of energy is consumed in making aluminium products. Watt about recycling aluminium and reusing



1. MINING - BAUXITE

Aluminium ore is extracted from bauxite mines.

TRANSPORTED TO REFINERIES

2. REFINING: Making alumina, raw material

Bayer's process: Bauxite is washed, ground and dissolved in caustic soda at high pressure and temperature. Alumina forms through precipitation of sodium aluminate and calcinations – removing the chemical water. Residual caustic soda is reused.

7. RECYCLING

The foil is recycled in incinerators to get recycled aluminium metal. Go back to Step 4.

6. USE AND DISPOSAL

Foil is used to wrap food packets. Disposed in landfills.

3. SMELTING

Alumina is dissolved in an electrolytic bath of molten cryolite inside a carbon-lined container, 'pot'. Electric current is passed through the electrolyte, and aluminium is formed at 900°C.

5. PROCESSING: Rolling the foil

Aluminium is heated and passed through a hot rolling mill, reducing the thickness to about 6mm. Transferred to a cold rolling mill and passed between steel rollers. Foil measuring 0.05mm, rolls

4. RECYCLING: Energy Bank

The spare heat is used to melt recycled metal.

High on Energy- Impacts of making aluminium

Electricity - Making primary aluminium is very electricity intensive. One kilogramme (kg) of the metal consumes about 14kilowatt/hour. Over 60 per cent of world's aluminium production is hydroelectric-based and rest is sourced from coal and nuclear power plants.

Emissions – Air emissions mostly occur in the smelting process. CO₂, SO₂, PAH (polyaromatic hydrocarbons) compounds and chloro-fluoride gases are produced in electricity generation and transportation of bauxite. Sample this – about 12045 kgs of CO₂

units alone are produced in making 1000 kgs of aluminium! This leads to a huge amount of toxicity and can cause health hazards.

Water & solid waste – During mining, water is used from underground water resources and it returns wastewater into the mine pits. There are solid waste from bauxite residues and landfill wastes, which are being reused nowadays. Also, about 1.9 kgs of slag and a lot of heat is produced in recycling one kilogramme of aluminium in incinerators.



Recycling

Recycling of aluminium reduces the environmental impact and is also energy-efficient. Recycled aluminium needs 5 per cent of the energy to be needed to make new aluminium. Also, the heat released in recycling aluminium scrap can be reused to make 'new' aluminium. This not only saves energy but also reduces the environmental impact in the process.