

Recycling Lead-acid batteries in Ghana: Regulatory Framework and Activities

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Introduction

- Regulatory Framework
- Existing Facilities & methods of Recycling
- ULAB Inventory
- Upgrading of Existing Facilities
- Collection Centres and
- Take-back Scheme

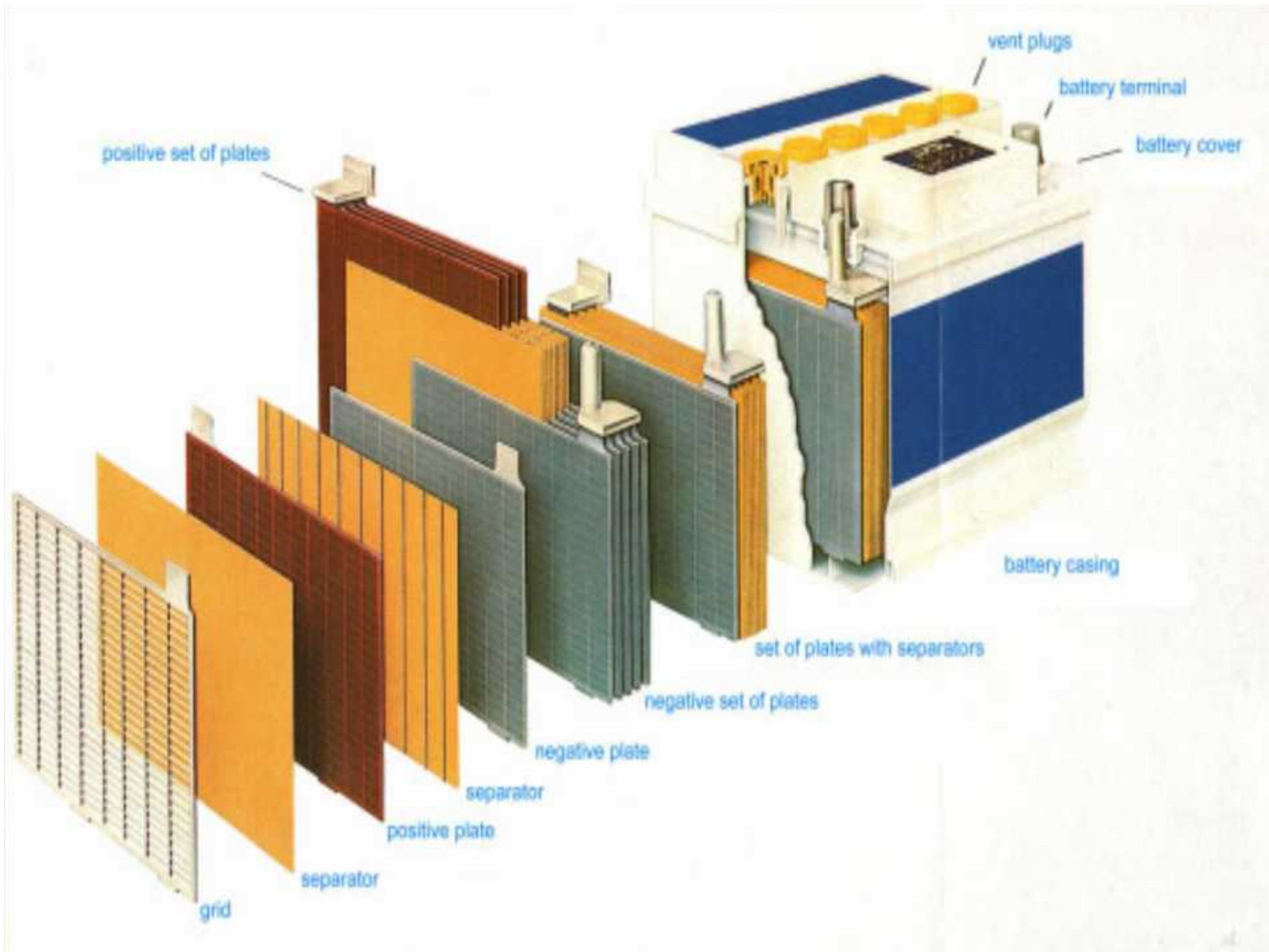
What is in the normal Pb-acid Battery?

A modern Pb-acid battery basically consists of

1. Polypropylene (PP) casing,
2. Plates (grids and paste,
3. Connectors/poles, bridges,
4. Sulphuric acid [H_2SO_4] and
5. PP-separators as insulators between plates.
6. **Abnormal separators- glass for weight - solar**

An average battery weighs between 13-24kg and for heavy duty; 50kg.

- The metal from the grids, terminals and bridges contain about 44% Pb and antimony
- The paste comprises of about 56% Pb oxide and lead SO_4 .



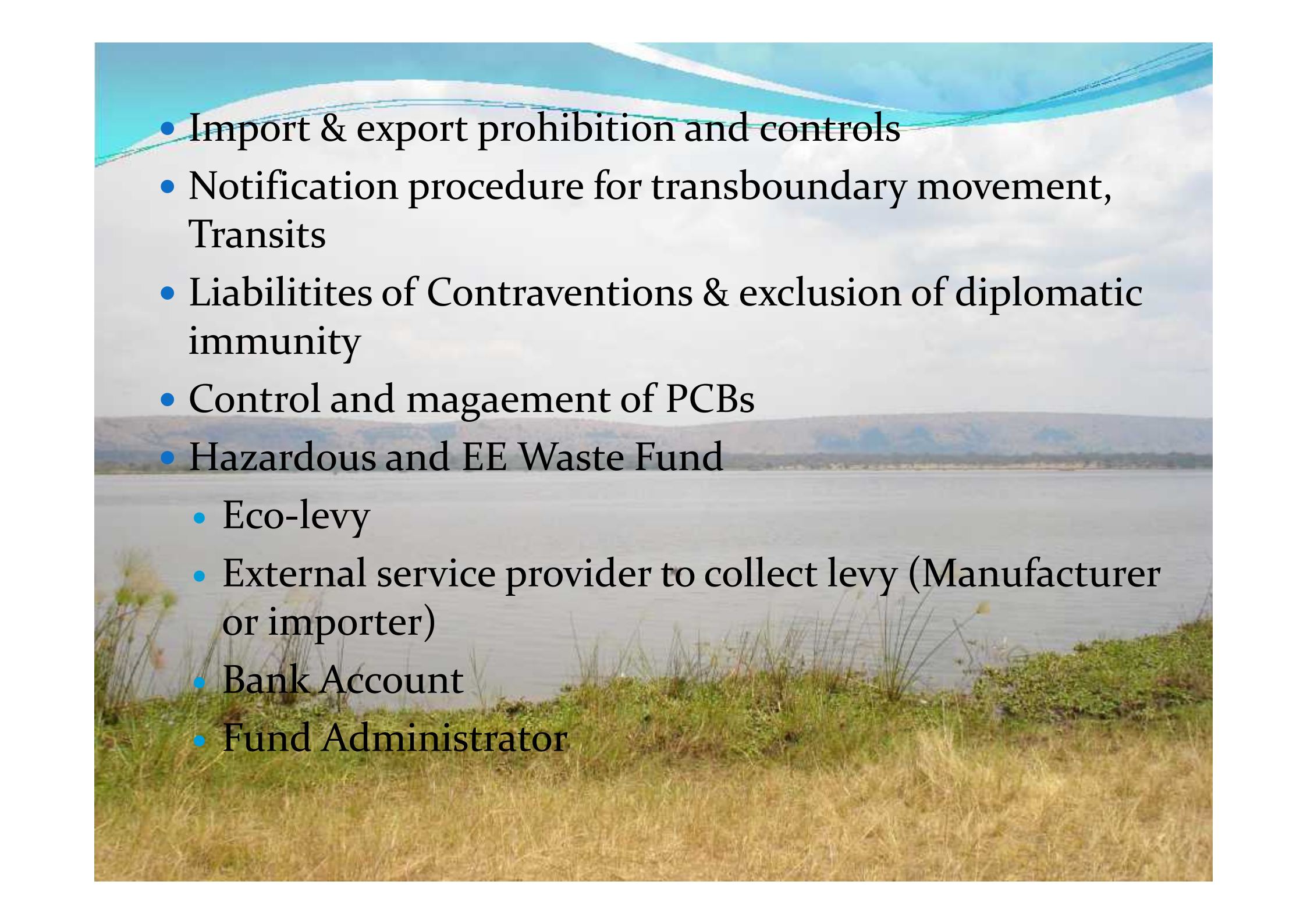
Legal Framework for Hazardous Waste Management

ULAB and its recycling activities are classified hazardous and before 2016, the applicable laws used to regulate them were

- Environmental Protection Agency Act, 1994 (Act 490)
- Environmental Assessment Regulations 1999, (LI 1652)
- Basel and Bamako Conventions
- **Interpol Pollution Crime Sub-Directorate (PCWG)**

In 2016, Parliament of Ghana passed the Hazardous and E-Waste Management and Control Act, 2016 (Act 917) as a domestigated version of the Basel convention. The Act covered two parts

- (1) Hazardous and other wastes (including Biomedical wastes)
- (2) Electrical and Electronic Waste

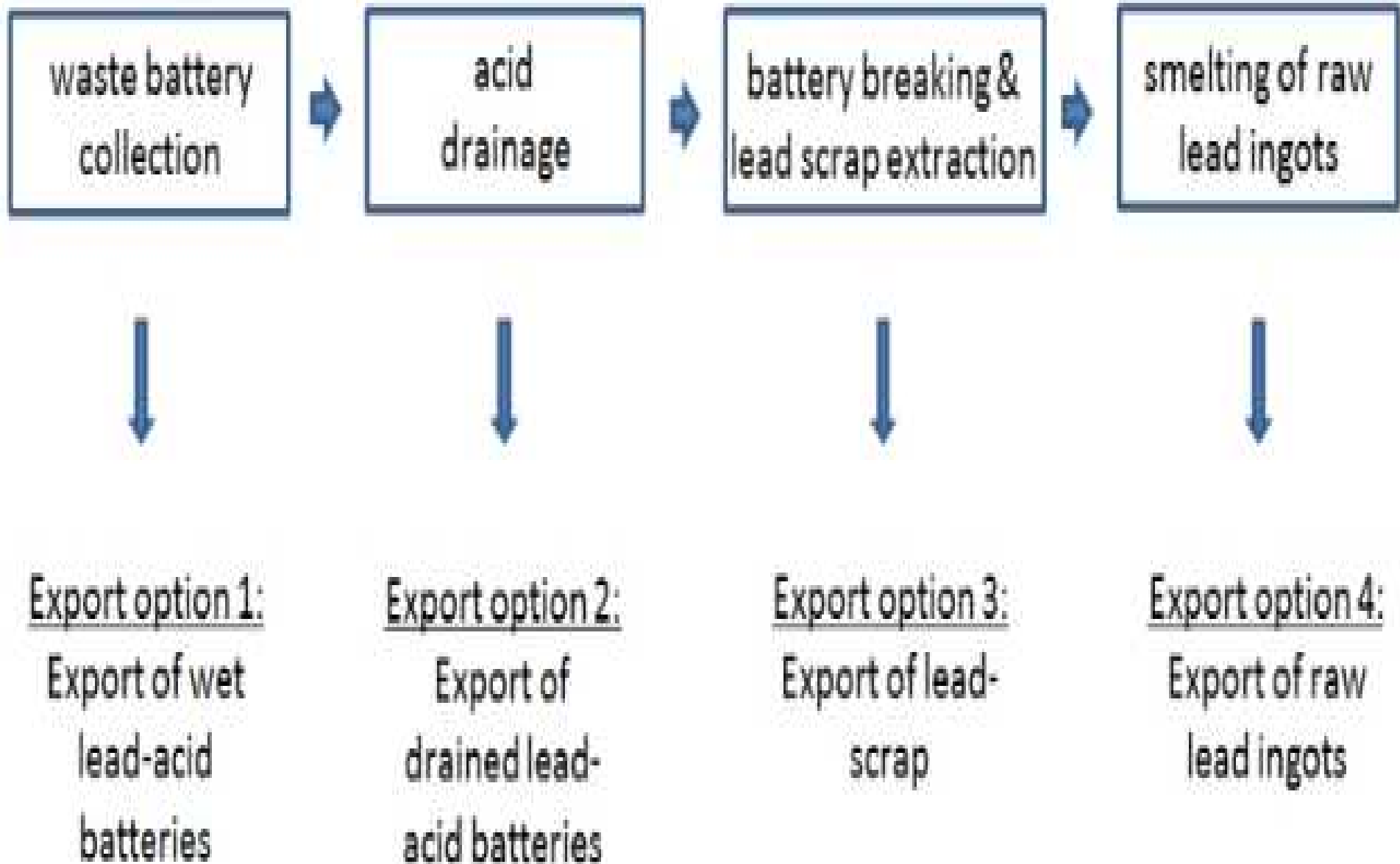
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- Import & export prohibition and controls
 - Notification procedure for transboundary movement, Transits
 - Liabilities of Contraventions & exclusion of diplomatic immunity
 - Control and management of PCBs
 - Hazardous and EE Waste Fund
 - Eco-levy
 - External service provider to collect levy (Manufacturer or importer)
 - Bank Account
 - Fund Administrator



Hazardous and E-waste Management and Control Regulations, 2016 (LI 2250)

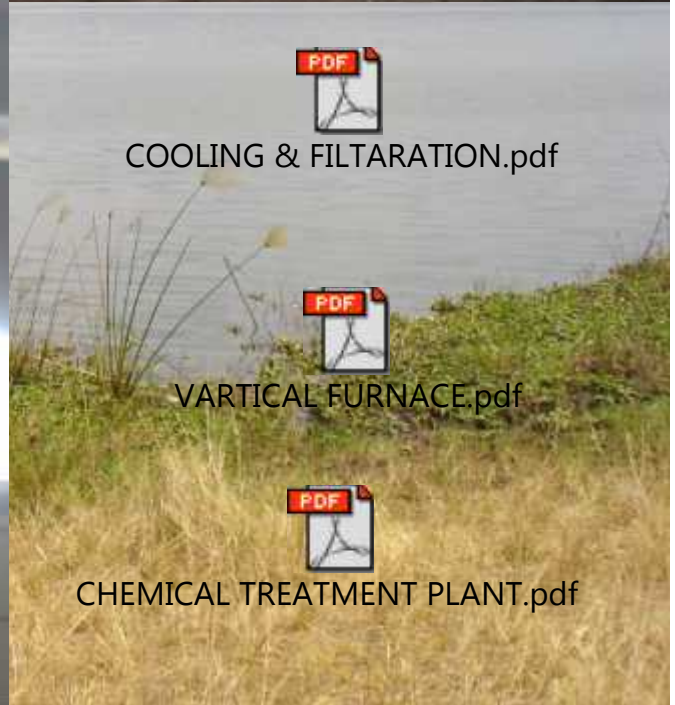
- Section 9 on Take-back scheme (also 5th Schedule)
- Section 11 specifically for Batteries
- Section 10 on Financing of Waste Management activities
- Sections 13-19 on requirements, application & permitting recycling facilities
- Section 21-22 on import export controls and
- Section 23 on Consent for Transit

Process Options adopted by Facilities in Ghana



Facilities in Ghana and methods adopted

Name of Facility	Process Stage	Installed Capacity
Gravita Ghana	Smelting to Pb ingots	1,200MT/Month
Goldline	Smelting to Pb ingots	1,200MT/Month
Success Africa	Smelting to Pb ingots	1,200MT/Month
Blancomet (Boliden)	Partial Processing - no smelting	1,200MT/month
Non-Ferrous Metals	Partial Processing - No Smelting	600MT/Month
Fidev Recycling	Partial processing - no smelting	200MT/Month
City Waste Management Company Limited	Collection Center - No processing but supply to recycling facilities	80MT/Year (2013, 2014, 2015, 2016)



COOLING & FILTRATION.pdf



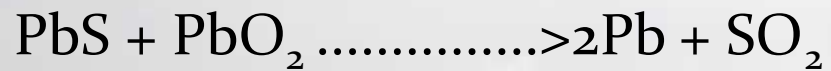
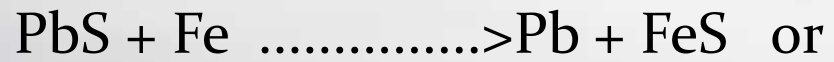
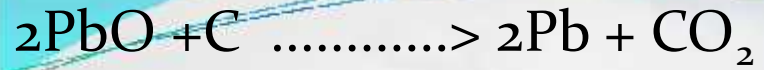
VERTICAL FURNACE.pdf



CHEMICAL TREATMENT PLANT.pdf



Reactions in Furnace



Cyclone Side) and Baghouse (down)



Looped wet scrubber to remove gaseous pollutants



Sources & Inventory of ULAB

- In-country

Transport sector: Garages,

Solar Installations,

Telecommunication Transmission towers

Desktop PCs and UPs

- External imports:

ECOWAS member countries (Burkina Faso, Mali, Niger, Nigeria and Cote D'Ivoire

EU, USA, Madagascar,

Estimated generation of ULAB in Ghana

Type of appliance	Devices in use	Mean weight of LAB	Mean life-time of LAB	ULAB generation
Passenger vehicles	0.82 million	20 kg	2 years	8,200 t/yr
Solar & Power generators	1.2 million	20kg, 50kg	5 years	XXX
Agricultural & Industrial Machinery	0.32 million	20kg 50kg		XXX
Telecommunication	0.15 million	20kg		XXX
Mining & Construction Equipment	0.07 million	50kg		XXX
BRVs & trucks	0.54 million	2 x 50 kg	2 years	27,000 t/yr
Desktop PCs + UPS	2.51 million	3 kg	5 years	1,506 t/yr
Total				

E-Waste

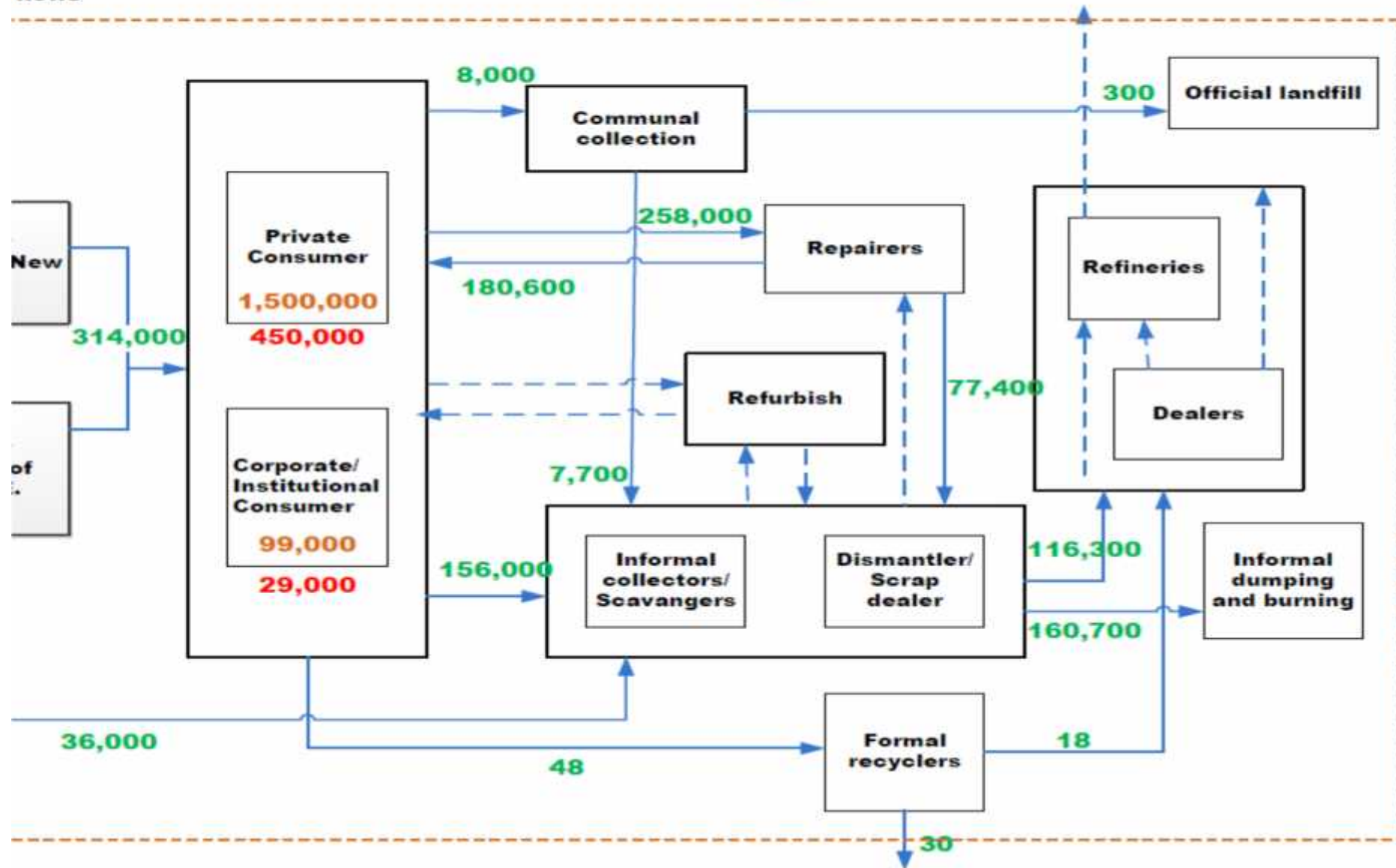
Identified flows

Quantified flows

Flow of (U)EEE
(Tons/Year)

Installed Base of
EEE (Tons/Year)

Stored Base of
WEEE (Tons/
Year)



Compliance Enforcement

- Profiling, monitoring inspections to sites on persistent violations or non-compliance; compressive documentations
- Consistent feedback to violators stating problems, severity and demand a timetable for solving problems
- Negotiated positions for compliance enforcement
- Issuance of notices and directives with timeliness
- Issuance of closure notices and effecting closures for corrections to be effected before resumption
- Prosecution: Big problem? One case currently ongoing

Steps to overcome challenges

- 1) Postive Government setting up Fund, appointment of External service provider to collect eco-levy and appointment of the Fund administrator
- 2) Eco levy finance collectors, buy-back centers and formal recycling facilities
- 3) Facilitating private and informal sectors to set up buy-back centres for E-waste & ULAB throughout the country
- 4) Facilitating Private sector establishment of a state-of-the art electronic waste facility at Agbogbloshie
- 5) etting up of buy-back centres throughout the country by the private sector
- 6) Inventories of PCBs, ULAB, E-waste, Used Tyres

- Facility audits ongoing in Ghana with the aim of pushing facilities to the best practices or be limited to a level of their efficiency (Brian Wilson)
- Comprehensive communication strategy under development for public education on the laws, the processes in the industry, detailed guidelines for best practices in industries







THANK YOU