

ILMC

International Lead Management Center Inc.



The International Lead Management Center

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**Control Strategies and Policies for the Recycling of Used
Lead Acid Batteries in the Informal Sector
“The Philippine Experience”**

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“The Philippine Experience”



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Introduction

It is very easy when pursuing policies and programs to improve environmental performance and reduce population exposure to pollutants to overlook the social impacts of our decisions. While nobody, and least of all the International Lead Management Center (ILMC), would wish to defer projects and technologies designed to raise the standards of environmental performance, it is important to take into account the social needs, priorities and aspirations of those people directly affected by Government policies, national legislation, new technologies and changes in trading patterns.

Such a situation, typical of many in the developing world, can be found in the Republic of the Philippines. The Philippines is an archipelago of over 7,000 islands and a population of over 78 million people. The Government actively promotes legislation to raise environmental standards, supports the Basel Convention and in conjunction with the United Nations Conference on Trade and Development (UNCTAD), the United Nations Development Program (UNDP) and the ILMC is determining the most appropriate strategies to ensure that used lead acid batteries (ULAB) are recycled in an environmentally sound manner.

Why is Recycling Important?

1. **Large battery manufacturing sector**
2. **No indigenous lead deposits**
3. **Lead has to be imported and/or recycled to meet demand**
4. **Reduces Risks of Environmental and Population Lead Exposure**



Why is Recycling Important?

So the first question is, “Why is the recycling of ULAB important to the Philippines?”

1. Firstly, the Philippines’ has a multimillion-dollar automotive battery manufacturing sector that provides one of the essential “locally produced” components in the overseas car assembly plants located outside Manila.
2. The country does not, however, have any natural deposits of lead ore and so the secondary industry provides the only local source of lead.
3. Consequently the battery industry can only survive if primary lead is imported or the Philippine secondary industry can recycle sufficient quantities of ULAB to meet the ever-growing demand for refined lead.
4. The recycling of used lead acid batteries (ULAB) reduces the risk of environmental and population lead exposure from the thousands of automotive batteries discarded every year.

Lead Supply

1. Domestic

- **Formal, licensed sector**
- **Informal, unregulated sector**

2. Imports

- **Primary lead**
- **Scrap lead - used batteries**

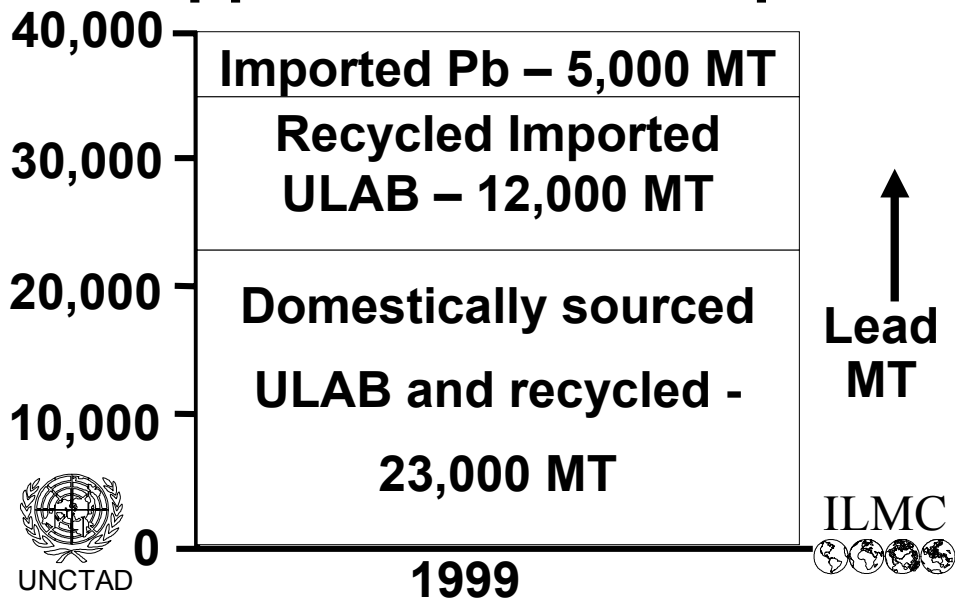


Lead Supply

Domestic lead supplies are generated by recycling used lead acid batteries in the Formal licensed and Government regulated sector, primarily Philippine Recyclers Inc., and the Informal unregulated sector.

Lead imports are in the form of either primary refined lead ingots or used lead acid batteries, imported under Government license, drained of electrolyte and in transit to a secondary lead plant.

Philippine Pb Consumption



Philippine Lead Consumption

Lead consumption in the Philippines last year was about 40,000 tonnes of refined lead. Recycling domestically sourced ULAB produced 23,000 tonnes. 12,000 tonnes was produced from imported ULAB and the balance of 5,000 tonnes was imported from the primary producers as refined lead. That means that nearly 60% of the lead consumed in the Philippines is sourced within the archipelago and nearly 90% of all lead consumed is produced by the secondary lead industry from scrap batteries.

The formal licensed sector, primarily PRI, produced 23,000 tonnes of secondary lead and the balance of 12,000 was produced by the informal sector. These statistics mean that the informal sector accounts for 30% of the secondary lead production in the Philippines.

Social Impacts

Formal Sector

Informal Sector

Licensed Recyclers - Backyard Smelters

Battery Retailers - Reconditioners

Corporations - Families

400 employees - 20,000+ workers

Exports~US\$ 12M - Income~US\$ 5M



Social Impacts

Whilst we can calculate the tonnages produced by the informal sector, in order to determine the full economic impact of the informal sector we need to understand the social interactions. To an extent this can be achieved by comparing the two sectors and their respective societal components.

The Formal sector is comprised of licensed battery recyclers and battery retailers that return ULAB to the regulated secondary smelters. These organizations are part of multi million dollar corporations and employ about 400 people directly and approximately another 1000 either indirectly or part time. Annual export earnings are estimated to be in the region of US\$ 12M.

In contrast the Informal sector comprises of “backyard smelters” and battery reconditioners owned and managed by small family groups, but employing an estimated 20,000 or more people. The income generated by this sector is at least US\$ 5M, albeit much of it within the “black economy” thereby denying the Government valuable tax revenues. Nevertheless, informal sector incomes are usually only just sufficient to keep the families involved above the subsistence level.

Environmental Impacts



Electrolyte disposal



Occupational hygiene



Atmospheric pollution



Furnace residues



Population Exposure

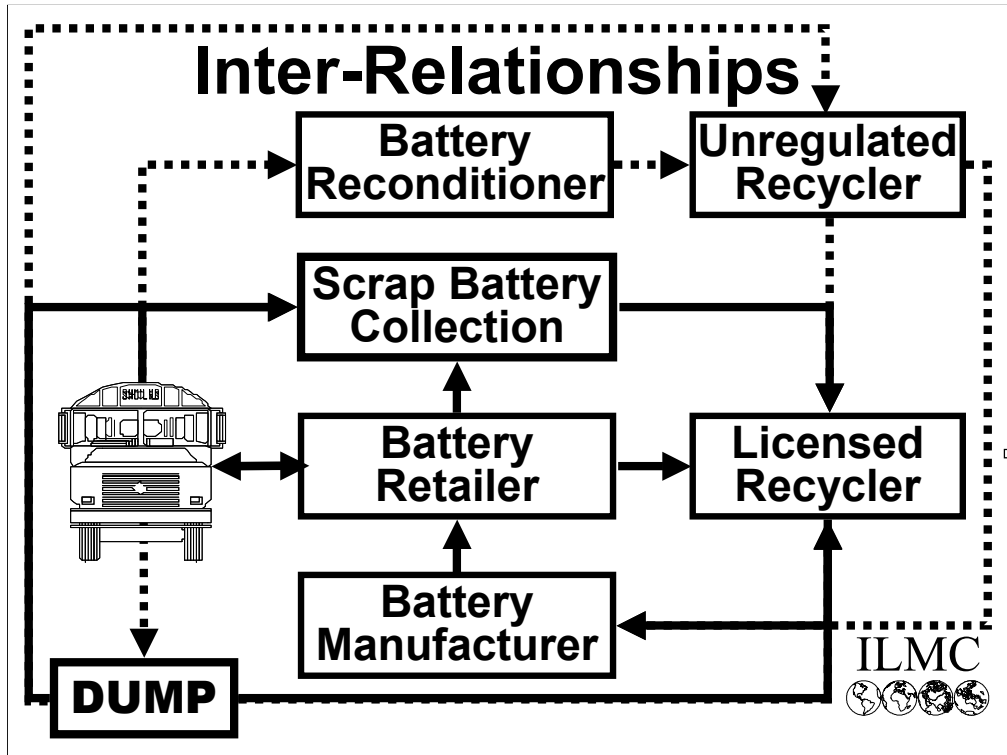


Environmental Impacts

Whilst the income generated by the families in the informal sector is vital to their daily survival, this sector is responsible for virtually all of the pollution arising from the recycling of ULAB in the Philippines. Moreso since PRI currently comply with all the environmental containment legislation and are accredited with ISO 14001 for their Environmental Management System.

Operating practices and working conditions in the informal sector vary tremendously, but on the whole;

- There are little or no facilities for the neutralization and safe disposal of battery electrolyte. Hence acidic effluent percolates into the water table, rivers and sanitary system.
- Occupational hygiene is poor and few operators wear little more than a towel to protect themselves from the lead fumes.
- There are few furnace exhaust control systems to prevent atmospheric pollution.
- Furnace residues are leachable, tend to have a high lead content and are dumped indiscriminately either around the premises of the unlicensed smelter or are sent to landfill.
- Many of the informal operations are located close to shops and homes increasing the risk of population lead exposure.



Inter-Relationships

So where do unlicensed secondary smelters obtain their scrap materials and where do they sell their lead ingots? The ULAB supply train and the sales outlets for the informal sector in the Philippines is typical of many in the developing world. For example:

- A battery manufacturer will sell a battery to a retailer.
- The retailer will sell the battery to the owner of a vehicle.
- When the battery is “spent” the vehicle owner will need a replacement and he could return the used battery to the retailer for recycling and a possible discount on the new battery.
- In which case the retailer will send the battery to a licensed recycler and the recovered lead will be sold to the manufacturer. The non metal components will also be treated in a environmentally sound manner, some recycled, others neutralized prior to disposal.

- However, the retailer might not take back used batteries and the vehicle owner may have to take the used battery to suitable used battery collection point.
- The battery scrap collector will then send the used batteries to the licensed recycler for recovery of the recyclable materials.
- However, depending on the prevailing market conditions there might be a better financial reward for the vehicle owner if the used battery was sold to a battery reconditioner. Sometimes a reconditioner can reclaim a used battery by cannibalizing another and using those components with some “life” left in them. These reconditioned batteries will not have a long life, but often find a ready market amongst the poorest in society.
- Those “spent” components that the reconditioner cannot reuse are usually sold to an unlicensed recycler, often referred to as a “backyard” recycler. This secondary lead sector of the industry is called the “informal” sector, although a more appropriate term would be “unregulated” as operating practices will rarely conform to sound environmental and occupational performance standards.
- In order to establish an accurate picture of the life of a battery in Central America account must be taken of all of the possible scenarios outlined above.
- Nevertheless, the informal secondary lead sector will often supply the battery manufacturers and the licensed recyclers with unrefined lead bullion. Another outlet for the lead bullion produced by the informal sector is fishing sinkers.
- Sometimes the vehicle owner is unable to take a used battery to any recycling collection point and the battery is disposed of in the nearest municipal “dump”. This scenario not only poses serious long term problems for the environment, but is a loss of a valuable resource.
- Where municipal authorities have sorting facilities, any used batteries are segregated and either sent to the nearest used battery collection point for shipment to a licensed recycler or directly to the licensed recycler.
- In many cases, particularly in the developing world, scavengers scouring rubbish dumps for anything of value will recover the used battery as a saleable recyclable commodity and sell it to a secondary lead plant, usually an unlicensed recycler.

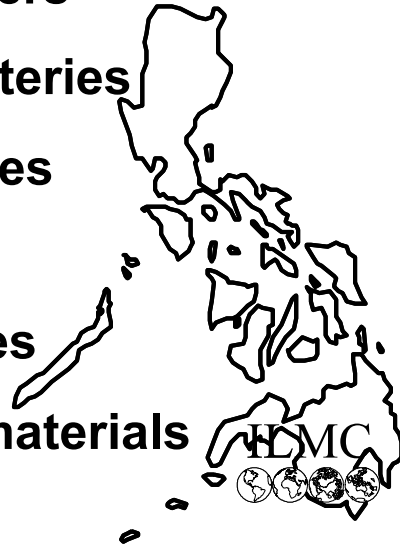
Informal Characterization

* Battery Reconditioners

- Charges flat batteries
- Rebuilds batteries

* Small Recyclers

- Collects batteries
- Smelts leaded materials



Informal Characterization

Throughout the major cities of the Philippines, and in particular the capital Manila, there are hundreds, possibly thousands of small battery reconditioners employing as many as 6,000 Filipinos. The typical battery reconditioner occupies a small motor accessory shop located along main city roadways with street access and is usually found amongst other shops selling a variety of provisions, fast foods, and domestic and consumer goods.

The battery reconditioner will perform two main tasks, namely recharging “flat” batteries and rebuilding batteries that are “spent” by cannibalizing “good” cells from one battery to replace those that are “dud” in the spent battery. Despite the fact that reconditioned batteries have a very short life compared to a new battery, especially in the hot climate of the Philippines, there is a thriving trade in renting or leasing these reconditioned batteries for daily, weekly and monthly periods to self employed truck, “Jeepney” and taxi drivers.

There are 12 known Smaller Battery Recyclers in the Philippines employing about 150 Filipinos and producing approximately 12,000 tonnes of secondary unrefined lead ingots per annum. Six of the smelters are located on the main island located close to Manila, and six on the smaller islands. The small recyclers have their own collection infrastructure to snare those batteries that are not returned to the major battery retailers for recycling and they also purchase and smelt the “spent” cell plates from the reconditioners. At best the Smaller Battery Recyclers probably recover about 90% of the available lead in the grids and battery paste.

The informal sector’s environmental performance is poor, but they also bring some benefits to the recycling process. The reconditioners provide a valuable recharging service that increases battery life. The Smaller Battery Recyclers collect batteries that are uneconomic for the major secondary smelters to recover and at least prevent them from being dumped in landfill sites.

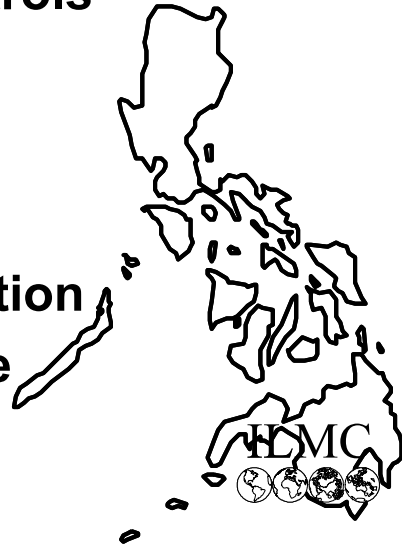
Short Term Improvements

* Environmental Controls

- Emissions
- Effluent
- Residues

* Occupational Education

- In the Workplace
- In the Home



Short Term Improvements

However, if the informal sector is to retain its “niche” place in the life cycle of the lead acid battery there has to be a dramatic improvement in environmental performance and occupational health.

In the short term there is a need to introduce or upgrade the environmental control systems and regimes to reduce furnace emissions, prevent contaminated effluent polluting the waterways and entering the sanitation systems, and ensure that the leachable solid residues are contained.

In addition it must be borne in mind that such improvements will only be effective if there is a complimentary and comprehensive education program to educate those who work in the industry and their families to reduce the risk of occupational and population lead exposure.

Ten Commandments

Wear respirators

Segregate work areas

Wear works clothing

Keep homes clean

Change work-wear

Wash hands & eat

Keep canteen clean

Shower daily at work

Avoid high exposure

Do not smoke

Ten Commandments

Any education and awareness program should focus on the following “10 Commandments” to reduce the risk of lead exposure:

- I. Make respirators available, ensure they are worn during charging and tapping
- II. Operators must only wear work clothes in the workplace
- III. Shower after every shift and whenever contamination risks have been high
- IV. Change into clean work-wear every day or shift
- V. Avoid procedures that generate high levels of exposure
- VI. Segregate working and clean eating areas
- VII. Keep eating and drinking areas clean and lead free
- VIII. Wash hands and face prior to eating at work
- IX. Keep homes clean and lead free, do not take work-wear home
- X. Do not smoke in a lead recycling plant

Long-term Options

- ★ **Reduce informal Lead Recovery**
- ★ **Raise domestic collection rates**
- ★ **Define a role for the small recycle**
- ★ **Integrate the Informal sector into the Formal sector**



Long-Term Restructuring Option

Long term solutions to improve the environmental performance of the recycling industry and reduce the risk of occupational and population lead exposure fall into four distinct categories:

Reduce Lead Recovery in the Informal Sector:

The first stage must be the introduction of long life batteries that provides up to 5 years of reliable service thereby reducing the number of batteries in the recycle loop and rendering the reconditioned battery poor value for money.

Raise Domestic Collection Rates

It would be beneficial for the small recyclers to be located in those regions of the Philippines where it is unprofitable for retailers to economically return small quantities of ULAB for recycling. Ideally located in unpopulated rural areas and employing new technologies that enable environmentally sound secondary plants to be designed on a smaller scale.

Define A Role For The Small Recycler

Consideration should be given to setting up Regional Secondary Lead Consortia between the battery manufacturers and the Smaller Battery Recyclers so that; battery scrap can be collected and segregated, electrolyte neutralized, leaded scrap toll processed, and clean polypropylene and lead ingots shipped to the manufacturers.

Further Integrate Recycling in the Philippine Republic

The Government has a key role in this process to ensure that assistance is available to provide relocation incentives and technology transfer to those small recyclers receptive to environmental improvements to complete their transition to from the informal to the formal sector of the industry.

National Strategy & Policy

- ★ **Improve domestic collection rates**
- ★ **R & D to extend battery life**
- ★ **License all reconditioners/smelters**
- ★ **Monitor all lead industries**
- ★ **Eliminate all unsound activities**



National Strategy and Policies

As far as the Government of the Philippines are concerned a move by battery manufacturers to purchase more primary lead at the expense of secondary lead could eventually lead to an adverse change in the balance of payments of as much as US\$ 20M. The Government when devising a National strategy to improve environmental performance in the lead industry has to take these factors into account.

Accordingly the Government will want to maximize the number of domestic ULAB collected and recycled and should be formulating strategies that provide economic incentives for batteries to be recovered even in remote areas, in conjunction with the formation of manufacturing and toll based recycling consortiums.

In order to further reduce the pressures on the domestic lead supply/demand gap the Government should try to initiate ways of extending automotive battery life beyond the current average of two years.

In return for assisting those recyclers in the informal sector the government should introduce a formal licensing scheme for all battery reconditioners, smelters, retailers and collectors so that the industry can be properly monitored.

Above all, however, the Government and the Industry should work together to eliminate all unsound operations and practices in the secondary lead and battery reconditioning businesses.

Benefits

- ★ **Environment is better protected**
- ★ **Lead exposure is reduced**
- ★ **Reduces reliance on imports**
- ★ **Avoids severe social hardship**



Benefits

The benefits to the Republic of the Philippines for adopting these strategies and policies are fourfold:

1. the environment will be better protected from the adverse effects of ULAB recycling.
2. occupational and population lead exposure will be reduced.
3. immediate and severe financial hardship will not be inflicted on the many Filipinos in the local population involved in battery recycling and who might be adversely affected economically and socially by the immediate imposition of improved environmental performance.
4. the Philippine economy will be less reliant on the import of primary lead to meet the shortfall of secondary lead

Currently the policy measures outlined in this paper are under consideration by the Government of the Philippines through a multi-stakeholder panel set up by UNCTAD and now with the Philippine Board of Investment as the lead agency. Membership of this panel comprises a number of Government agencies, NGO's and representatives from both the formal and informal secondary lead sectors.